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ABSTRACT

Fossil assemblages through most of the Phanerozoic are evaluated for the presence or absence of in situ life communities. It is shown that most of the water-laid deposits of Palaeozoic "age" must have been formed during approximately the first five months of the Biblical Flood year. From the appearance of emergence surfaces and briefly inhabited sediments and hard-grounds after the Carboniferous (Pennsylvanian) it is deduced that the transition from Flood-laid to post-Flood rocks took place at the turn from the late Palaeozoic era to the Permian "period" of the conventional time scale.

INTRODUCTION

Adherents of Flood geology have been baffled how index fossils of the various geological systems seem to point to evolutionary changes of life on earth rather than to a cataclysmic mélange of drowned creatures. Claimed instances of fossils "out of place" or strata laid down in the "wrong order" have been of no help in resolving this mystery. Moreover, the preservation of temporary surfaces and sea floors, particularly in the upper parts of the geological column, defy all attempts to accommodate the entire sequence of fossil-bearing strata within the one year of the Flood. However, does the Bible teach this? Are not major geological events connected with the division of the earth in the days of Peleg, during the second and third century after the Flood? Does not plain reason dictate that a literal worldwide Flood resulted in a literal devastation of the entire earth? Could a natural re-colonization have occurred other than through worldwide ecological successions? In the following paragraphs we will highlight some fundamental distinctions between the pre-Permian and the post-Carboniferous fossil record. Although all true fossils owe their existence to a temporary setting aside of natural processes by the Flood events, a boundary can be drawn between those formed during the Flood year proper and those that came progressively into being during the following 2-3 centuries.

I. DEFICIENCIES OF THE CONVENTIONAL INDEX FOSSIL CONCEPT IN THE LOWER PALAEOZOIC

1. Erroneous Evolutionary Lineages

Members of many animal species vary morphologically in time and space. The species contained in rocks of the Lower Palaeozoic are no exception in this respect. Proponents of historical geology have stressed the time factor and have ascribed the observed alterations of shape in fossils to evolutionary processes operating during long periods of time. If, on the other hand, a rapid deposition of these sediments is envisaged, the observable morphological differences between the superimposed fossil organisms must necessarily stem from variations within different contemporaneous populations that lived in separate areas. The black Upper Cambrian alum shales of Sweden are perfectly uniform and must have been accumulated from an equally uniform environment. The frequently interspersed bituminous limestone lenses contain distinguishable trilobite assemblages that have been used for defining chronostratigraphical units. Thus, the 8 metres section of Råbäck in Västergötland yields, in ascending order, the olenid trilobite genera Olenus, Parabolina, Leptoplastus, Eurycare, Ctenopyge, and Peltura (Figure 1). These are said to represent an evolutionary period of about 18 million years. In actual fact, many of the described species are grading into one another. According to Henningsmoen (1), "within a phylogentic trend the number of thoracic segments may increase or decrease ... Features that may seem to be lost in a phylogenetic lineage ... may reappear later in the lineage." In other words, these lineages, proposed solely on the successions of designated index species, cannot be regarded as established. Thus, a convincing case for the elapse of millions of years during

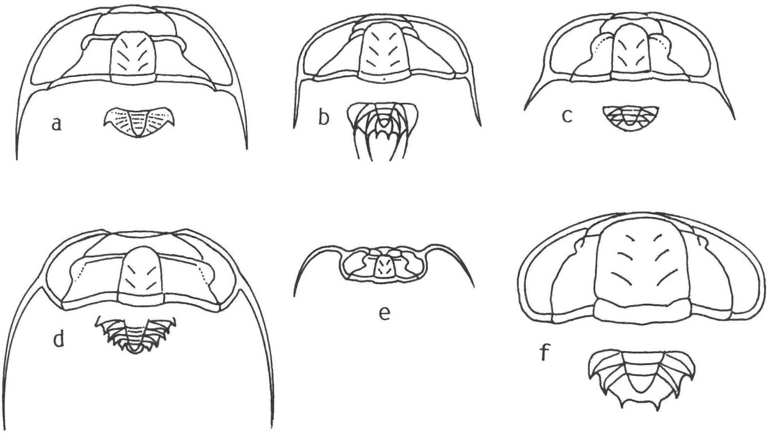


Figure 1. Heads and pygidia of some olenid trilobites that are used for defining stratigraphic horizons in the Upper Cambrian of Scandinavia: Olenus (a), Parabolina (b), Leptoplastus (c), Eurycare (d), Ctenopyge (e), and Peltura (f). Many olenid "species" are connected through intermediate forms and seem to represent different populations rather than members of successive evolutionary stages. Adapted from Henningsmoen (1).

this part of the Palaeozoic cannot be built.

Graptolites are similarly inept for this purpose. The evolutionary dendrogram of this group given by Elles (2) rests on the assumption that an originally "pendent" Didymograptus type gradually evolved via "declined", "deflexed", "horizontal", "reflexed" and "reclined" stages eventually to the "scandent" type seen in Diplograptus and Monograptus (Figure 2). A "rapid" evolution is suggested even by this author since the horizontal, reclined and scandent types of graptolites are already present in the Arenigian stage, i.e. rather shortly after their first appearance (Figure 3). Equating the banded sequence in the 1600 metres Bannisdale slates with a deposition time of roughly 700,000 years, Marr (3) calculated at about 350,000 years the duration of a single graptolite zone, and the duration of both the Ordovician and the Silurian "periods" together at 9.5 million years. If, on the other hand, the graptolite zones are viewed as deposited assemblages of spatially different communities, the time factor for producing these formations becomes evanescent.

Every student of conodonts is struck by the similarities of many differently named elements between their rise in the Ordovician and their decline in the Triassic. Lindström (4) remarks on the so-called platform elements: "The third, or lateral, process is reduced in many stocks but turns up again and again in the course of later evolution. This is the homeomorphy which is a recurrent feature of conodont evolution. The basic pattern appears in the Lower Ordovician and recurs until the Upper Triassic, and this indicates a strong correlation between shape and function." Whilst this is true, a more immediate conclusion is that the conodont-bearing animal lived in a water body that was circulating through "Palaeozoic" as well as "Triassic" life communities. The disintegrated parts of these presumably pelagic creatures were then added to the respective fossil assemblages where they signify the true contemporaneity of those supposedly vastly distant "ages".

2. Index Graptolites Unreliable as Time Markers

Graptolite shales have been generally regarded as old floors beneath abyssal seas, whereas fossiliferous Palaeozoic limestones are thought to represent formerly shallow near-shore communities composed of corals, crinoids, brachiopods and various trilobites. Usually, one of these faunal types occurs to the exclusion of the other. Since sediments are derived materials the same must be postulated of their fossils. The coarse reefal debris must have necessarily been subject to currents of higher energy than the muds that settled as shale. Index graptolites in relation to Palaeozoic limestones may be therefore quite misleading as time markers. A puzzling problem are the "Silurian" Monograptus shales separating "Ordovician" limestones

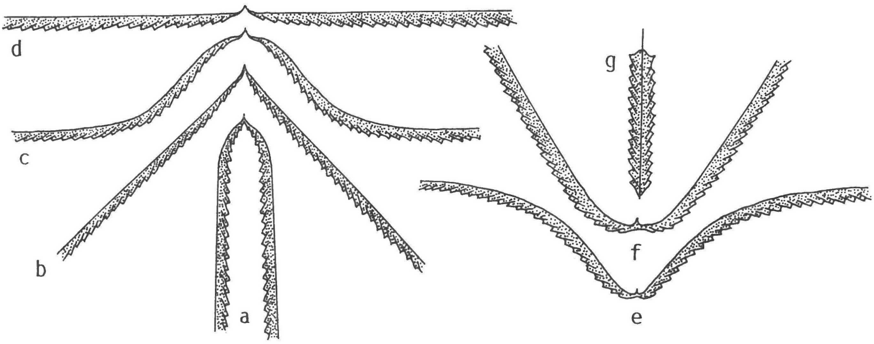


Figure 2. The supposed evolution of graptolite types from the originally "pendent" condition (a) through the "declined", the "deflexed", the "horizontal", the "reflexed", the "reclined" to the eventual "scandent" one (b-g). Adapted from Elles (2).

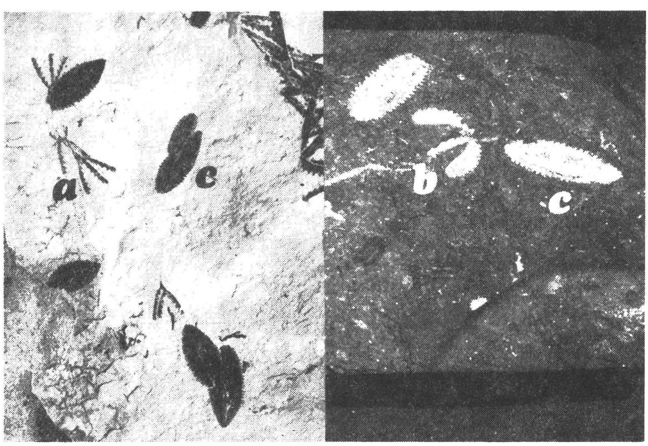


Figure 3. Ordovician graptolite assemblages with mixtures of "declined" (a), "reclined" (b), and "scandent" (c) stages of the assumed evolution of graptolites. Left: Bendigo, Australia; right: Trail Creek Pass, Idaho. About natural size.

in the Kallholn quarry of Dalarna, Sweden. Ingenious explanations such as fissure fillings have been put forward. However, the clearly stratified graptolite shales within the supposedly much older limestone calls for a more convincing explanation, namely that shale and limestone arrived at about the same time.

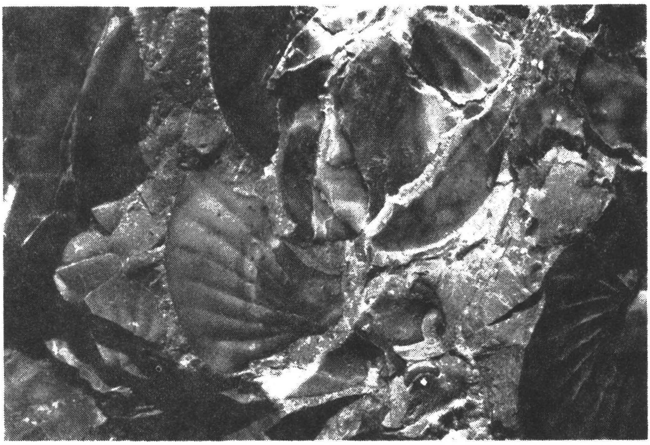


Figure 4. Tails (pygidia) of the trilobite Eobronteus as an example of a supposedly "advanced" type appearing already during the Ordovician. The external similarity of species from the Ordovician and the Devonian points to similar ecological conditions rather than to an "evolutionary progress". About natural size.

3. Ecologically Similar Trilobites from the Ordovician to the Devonian

The assumption that the occurrence of index fossils has anything to do with evolutionary progress must be doubted on yet another ground. The pygidium of the Devonian trilobite genus Scutellum (Bronteus) used to be regarded as the more highly evolved version of "older" pygidia composed of originally movable segments. The Ordovician Eobronteus, however, shows the same "advanced" specialization and must have corresponded to very similar, if not identical, ecological conditions (Figure 4). A number of other distinctive trilobite genera make their first appearance in the Ordovician (or Silurian) and continue right into the Devonian, eg "Harpes", "Calymene", "Phacops". This suggests life in ecologically similar habitats rather than during widely separated "ages".

4. Specifically Identical Forms from the Ordovician to the Devonian

The whole of the marine Palaeozoic may be regarded as an originally coherent aquatic ecosystem composed of a number of different habitats. These, upon their deposition in the course of the Flood, gave rise to the Cambrian through the Permo-Carboniferous and (in part) Triassic systems. Each of these are more or less distinguished by their characteristic assemblages of index fossils. The above view is confirmed by the existence of indisputably identical fossil species ranging from the Ordovician to the Devonian. The tabulate corals Heliolites, Favosites, and Alveolites and a number of stromatoporoid species are common to all three of these systems. The tabulate coral Halysites reaches from the Ordovician to the lowermost Devonian (or Upper Silurian - according to definition). The bivalve Goniophora volvens is recorded from the Ordovician and reappears under the name G. gallica in the Devonian (5,6). The genus Conocardium has an even greater vertical range. It is known from the Ordovician to the Permian (and, possibly, Triassic) (Figure 5). The most natural explanation for these cases of persistence is that the marine Palaeozoic does not represent an era of geological time but on the remains of various parts of one aquatic pre-Flood ecosystem that came to the surface when the "fountains of the deep" erupted.

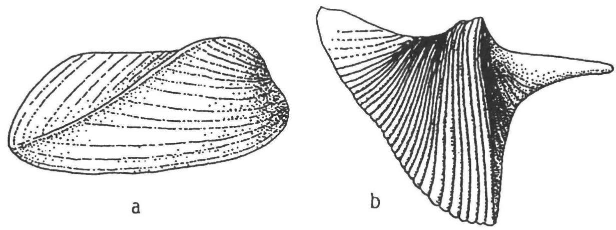


Figure 5. Representatives of two bivalve genera, Goniophora (a) and Conocardium (b), as examples of forms that persist through most of the Palaeozoic. Such distinct types may be interpreted as local members of an aquatic pre-Flood ecosystem inhabiting the subterranean part of the antediluvian water cycle.

II. CLAIMED INSTANCES OF AUTHENTIC SEA FLOORS IN THE LOWER PALAEOZOIC

1. Mistaken Autochthony

The above cases have been adduced in order to corroborate the contention that a demarkation line can be fixed between rocks deposited during the 370 days of the Flood events, and those that formed afterwards. Of the almost innumerable cases of autochthony in lower Palaeozoic rocks described in the geological literature only the most typical ones can be dealt with here. Nearly any layer exhibiting bioturbation has been automatically regarded as an ancient sea floor, and substantial times for the existence of each have been set apart. The very preservation of a surface with trace fossils, however, betrays its practically instantaneous formation and this the more so as the producers of the tracks etc are regularly absent, i.e. swept away with the same current that transported the sediment. Whole series of trace fossil horizons within one rock unit only strengthen this view. The most obvious proof for the transient nature of these alleged sea floors are the "escape shafts", i.e. sediment-filled tunnels within the sediment that terminate at the surface. In this form typical of Lower Palaeozoic sandstones, they are usually ascribed to the activity of some trilobite (Figure 6).

An even more ponderous claim of autochthony is based upon the thick sheets of Palaeozoic limestones. Most of them have been declared to be "reefs" built from stromatoporoids, tabulate and/or rugose corals, bryozoa, calcareous algae, etc. Widely known are the Silurian (Niagaran) "reefs" of Gotland in the Baltic Sea. Lumps of coherent reef frames (the "ballstones" of Britain) may indeed reach enormous proportions, but it is quite certain that even the largest of these lumps (the "reef cores" of authors) have been dumped into their present position and not grown in place during hundreds of thousands of tranquil years. The fact of their water-borne transport may be gathered from the way they impress into the underlying marls, best seen along the NW coast of Gotland (Figure 7), and beautifully exposed by the sea as the famous "Philip structures" (7). Their allochthony may also be deduced from the sometimes "wrong" orientation of the original reef fabric. A pile of "ballstones" at Hoburgen, the southern tip of Gotland, demonstrates this most convincingly (Figure 8). These lumps are often draped with sediment layers which may be continuous over several "reef cores". Observations like this preclude the possibility that such sediment sheets can have originated as true reef talus.

The voids between individual pieces of coral etc in limestones are frequently filled with linings of fibrous calcite (Figure 9). They are known under the name Stromatactis and have been erroneously interpreted as of organic origin. In the literature they are quoted as algal coattings which cement loose fragments to a reef fabric. As such they would make a strong case for autochthony. However, the few cases of organic remains incorporated in Stromatactis that have been described in the literature seem to be merely accidental. Stromatactis is of a plainly inorganic nature and is known from "reefal" limestones as widely distinct as the Ordovician of Dalarna in Sweden, the Silurian of the Carnian Alps, the Devonian of the "Lahn marble" in West Germany, the Carboniferous limestone of Derbyshire, the alpine Triassic, and others. Pressurized water seems to have played a vital part in the formation of these linings with fibrous calcite since Stromatactis occurs only in limestones associated with tectonic stress. The time factor involved is obviously quite negligible.

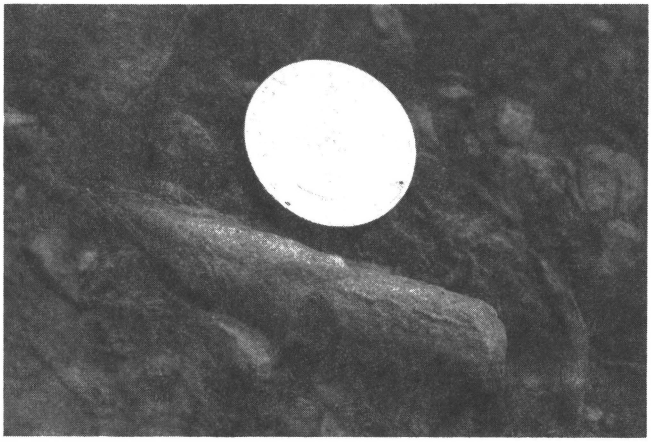


Figure 6. Underside of a sandstone layer with "escape shaft" of a trilobite. The animal has dug itself upwards after being overwhelmed by sand. Preserved bioturbation layers of this kind cannot be interpreted as true sea floors. Silurian, Gotland (Sweden).

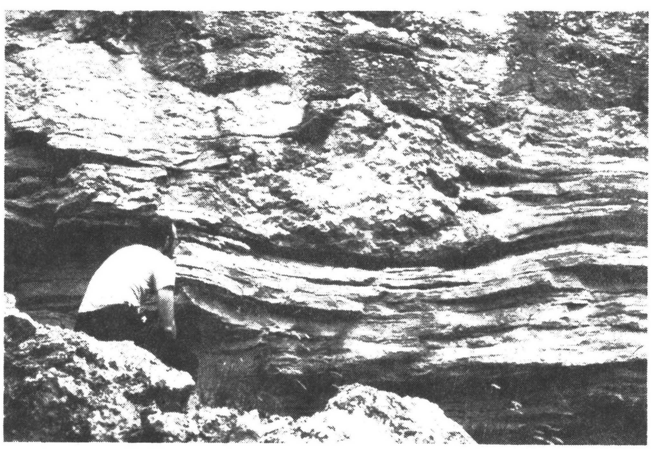


Figure 7. A "ballstone" in the Silurian of Gotland. These structures are erroneously regarded as reefs that have grown in place. Ballstones are made up of dislodged and transported reef fabric. After deposition and very rapid lithification, the calcitic ballstone resisted compaction and caused the underlying marl to be pressed downwards. Snäckgärdsbaden, Gotland.

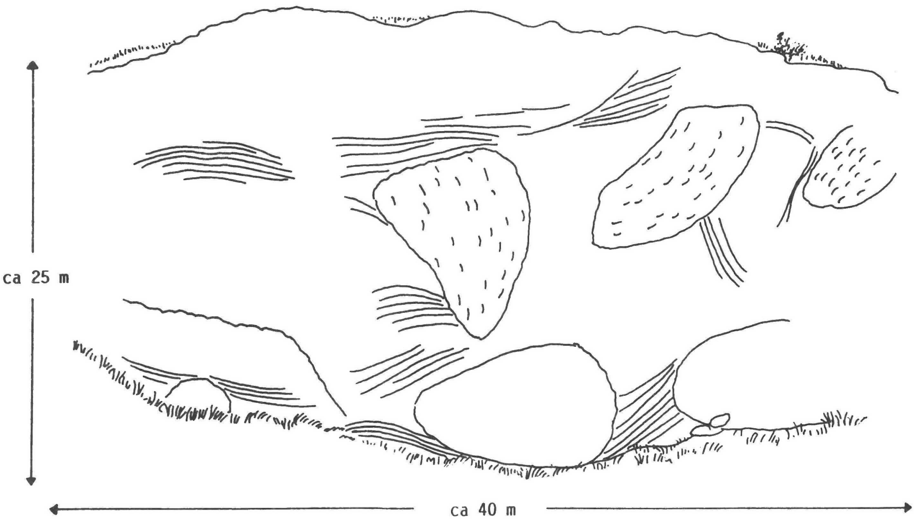


Figure 8. A pile of huge Silurian "ballstones" in a cliff face at the southern tip of the Isle of Gotland. The crescent-shaped lines indicate the orientation of hat-like stromatoporoids that are the main constituents of the original reef fabric. Hoburgen.

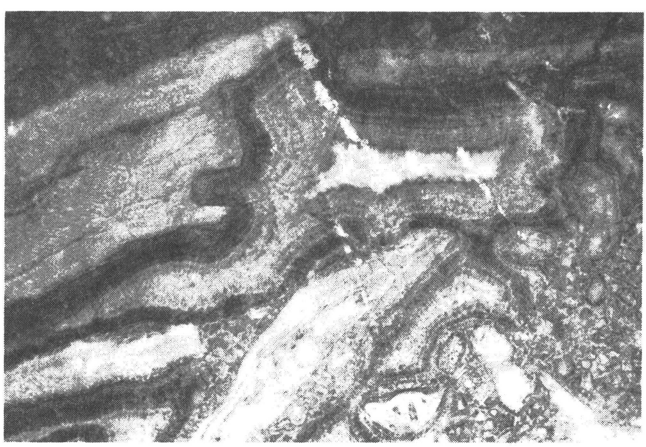


Figure 9. Vertical section through an alleged reef fabric known as Stromatactis in a Devonian limestone. What appears to be an in situ cementation of organic frame builders consists in reality of inorganic fibrous calcite that lines the voids of loosely packed stromatoporoid crusts etc. Lahn marble, Wirbelau (Westerwald, West Germany).

2. Inconclusive Cases

A debate of long standing concerns the Permian "reefs" of the Guadalupe Mountains in New Mexico and Texas. Both the advocates of authochthony and of allochthony can list points in favour of their views. Large colonies of highly aberrant productid brachiopods suggest at least some autochthonous growth, while the adherents of allochthony tend to emphasise the haphazardly floating character of such colonies within a stratified matrix (8,9). A certain analogy may be seen in the Upper Permian Zechstein reefs of Germany where an undoubtedly allochthonous carpet of Productus shells is variously associated with heaps of bryozoa etc that in turn are fixed by a stromatolitic algal growth known as Stromaria. Such mixtures of dead allochthonous and living autochthonous components are here termed "inhabited dumps" ("Belebte Deponien"). Inhabited dumps are a feature of many marine deposits of post-Carboniferous origin.

Johnson & Baarli (10) have drawn attention to a site in Manitoba, Canada, where Silurian limestone is in contact with the Precambrian basement. They report instances where colonies of the tabulate coral Favosites are still attached to the Precambrian rock surface which is said to have formed an ancient shore line. If the observation is correct it would confirm that the Silurian as part of a pre-Flood ecosystem does indeed rest on an unfossiliferous, i.e. on a created surface of the earth. However, since the fossiliferous limestone does not differ from other Silurian occurrences the evidence for a genuine in situ growth of Favosites is not convincing.

3. Platform Autochthony

Apart from the unsettled cases like the one just mentioned, the intervention of a certain amount of time must be granted for certain other rocks of the Palaeozoic. Lower Cambrian "reefs" or "bioherms" in Labrador are on record that are made up of archaeocyathids. Their autochthonous growth is deduced from the presence of algal borings, as one type of bioerosion. The borings are said to occur on the upper side of the archaeocyathid colonies and would indicate a brief period of undisturbed growth (11). Similar borings have been reported from a number of other Palaeozoic skeletal organisms, but the Manitoba site seems to be the only instance of an in situ growth in the Lower Cambrian.

Another sure indication of briefly stable conditions found in Palaeozoic rocks are the algal coatings formed around the shells of brachiopods, etc, in the Upper Silurian of Gotland.The resulting sphaerules, known as Sphaerocodium, are especially interesting in that they appear in as widely different geological systems as the Silurian, the Triassic, and the Tertiary (Figure 10). The explanation for this occurrence of Sphaerocodium in Palaeozoic rocks is to be sought in the exceptionally shallow situation of the Silurian platform of Gotland where the terminal surface seems to have lain exposed for some months or so after the Flood.

Such platform situations lead to an understanding of emergence surfaces as "low" as the early Palaeozoic. The Cambrian salt pseudomorphs of the Salt Range in Pakistan as well as all other mudcracks, raindrop impressions, etc, below the Permian, eg the Old Red, are likely to find their explanation in this way.

III. THE EARLIEST KNOWN AUTOCHTHONOUS SEA FLOORS

1. Stromaria Reefs of the German Zechstein

The palaeo-geographical relations between the type locality of the Permian on the Russian platform and the occurrences of this system in Central Europe are not well understood. This much can be said, however: The former bears distinct marks of rapid deposition whereas the latter shows some evidence of a formation lingering on through, perhaps, a few years. This is particularly so where the Upper Permian (Zechstein, Magnesian Limestone) is developed in its reefal facies. Although the original fabric of these "reefs" is difficult to ascertain, the massive debris of bryozoa and small bivalves is usually fixed within large cupular stromatolitic structures named Stromaria that are ascribed to the growth activity of algae (Figure 11). Perhaps the best known example of such Stromaria reefs are the famous "Westersteine" at the W foot of the Hartz Mts. in West Germany. The reefs of the Zechstein seem to be the geologically earliest structures that can be classified as true temporary sea bottoms. For a brief period of settlement rather than for being brought in from a foreign source argues also the very much impoverished fauna of these deposits.

2. Placunopsis Crusts of the German Muschelkalk

Another expansion of epeiric seas comparable to the Zechstein transgression is the German Muschelkalk of the Middle Triassic. Genuine hardgrounds are among the distinguishing features of

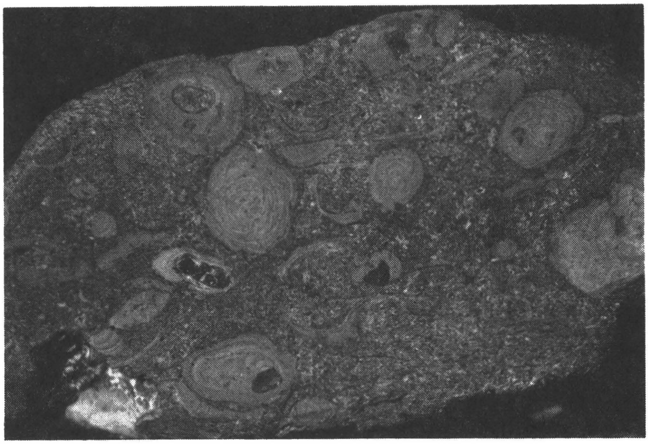


Figure 10. Algal coating around shell fragments in section known as Sphaerocodium. Occurrences in rocks of the Lower Palaeozoic indicate that the original sediments remained exposed on shallow platforms for some time after the Flood year. The above specimen is from the Upper Muschelkalk, Triassic, of Germany. Slightly enlarged.

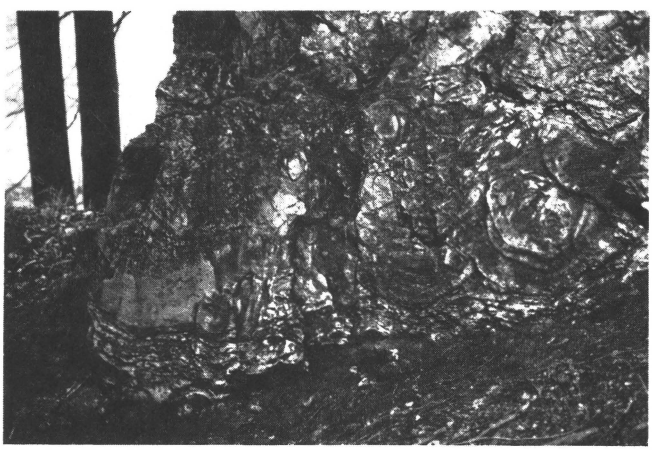


Figure 11. Stromatolitic reef fabric known as Stromaria in the Zechstein (Magnesian Limestone) of the Permian of Europe. The cupular layers are ascribed to the activity of an encrusting type of algae. Permian reefs are the first temporary sea floors developing after the Flood. Westersteine, W. Germany.

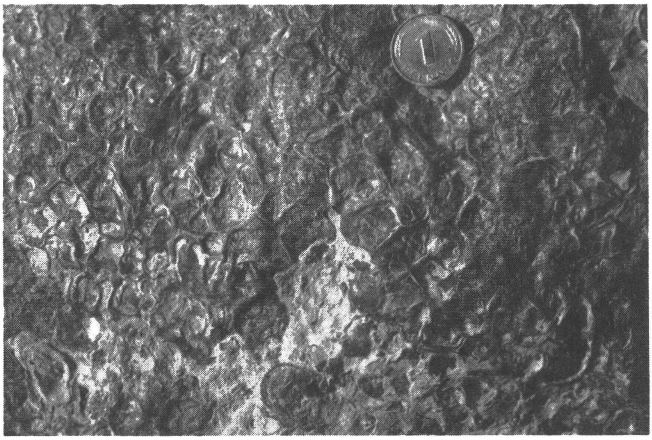


Figure 12. A crust of the tiny oyster-like bivalve Placunopsis in the German Muschelkalk. The Muschelkalk sea existed approximately 50 years after the Flood and may have lasted for hardly more than 20 years. Specimen from Schwäbisch Hall, Germany. The size of the coin is 16 mm.

this limestone sheet that is spread across much of the Middle of Europe. Certain areas of the floor of the shallow Muschelkalk sea must have been overgrown with meadows of sea lilies (Encrinus) as witnessed by the enormous accumulations of stem ossicles, the "Trochitenkalk", that are derived from them. For this type of shifting sea basins the term "dynamic seas" seems appropriate. The tiny oyster-like bivalve Placunopsis was able to colonize some of the temporary hardgrounds before this living veneer itself was buried under a new blanket of sediment. The sessile clams provided their own hardgrounds on which to settle (Figure 12). Layers of Placunopsis growing upon each other are locally known to have reached up to 60 cm in thickness. In grossly over-estimating the individual lifetime of these exceptionally small bivalves, durations of many thousands of years for such hardgrounds have been proposed. More realistic values that take into account the short life of the tiny Placunopsis lie within the range of weeks or months. An additional proof for an error in calculating the duration of the Upper Muschelkalk sea in connection with Placunopsis will be given in a later paragraph. Space forbids to link the facies of the German Triassic to the different types of the "alpine" Triassic elsewhere. Suffice it here to state that the erratic blocks or massifs of the "Hallstatt facies" that are floating in other types of sediments cannot be included among the other post-Flood deposits of temporary dynamic seas. It is probable that they consist of pre-Flood sediments and their included faunal remains.

IV. THE TRANSIENT MUDFLATS AND DESERTS OF THE PERMO-TRIASSIC

The epeiric seas of the early post-Flood geography were bordered by immense alluvial plains, mudflats, and deserts of redbed character. Redbeds set in universally with the Permo-Triassic and signal an important turning point of the sedimentary régime. The "Rotliegendes" of the Lower Permian of Central Europe is the lowermost deposit in which mudcracks, impressions of raindrops and tracks of vertebrates are a constant accompanying feature. In Britain, where the marine Triassic is missing, there is no ascertainable boundary between the terrestrial Permian and the Triassic. Both are, consequently, united as the "New Red".

The sedimentological evidences for the brief duration of the New Red episode are so overwhelming that the proponents of long ages have resorted to accommodating the missing "geological time" within the bedding planes of stratified formations. The uniform petrology of superimposed layers betrays the fallacy of such procedure. Large scale cross-bedding and thick pebble beds can only be interpreted in terms of regional catastrophes. As might be expected, claims of

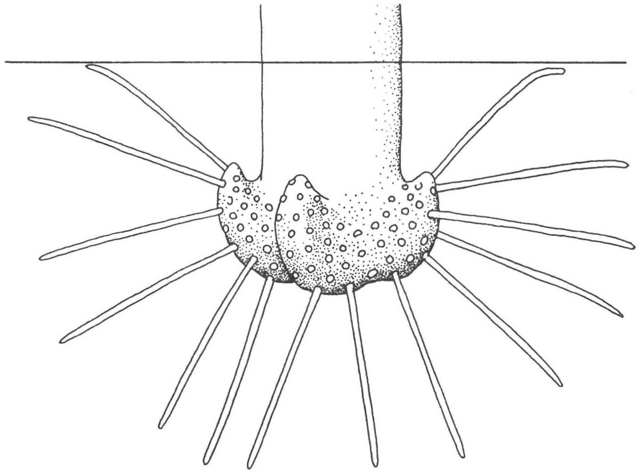


Figure 13. Stem base of the Triassic lycopod Pleuromeia with some roots restored. The peculiar arrangement of the root scars, analogous to that of the Carboniferous scale trees, suggests an aquatic mode of life. This renders claims of a prolonged in situ growth of Pleuromeia in redbeds meaningless. Adapted from Mägdefrau (12).

prolonged persistence have been raised for some of the Permo-Triassic redbeds. So-called "purple horizons" have been interpreted as temporary soils. These often quoted palaeosols are poorly stratified purplish rock layers within the redbeds that seem to signify short interruptions of aggradation. It is certainly possible that during such intervals a scant vegetation could have developed. A variety of horsetails, ferns, cycads, etc are known especially from Triassic redbeds while the general aspect of the flora remains unchanged up to the Lower Cretaceous. The famous Pleuromeia, far from being a late descendant of the Carboniferous scale trees, was an aquatic herb that seems to have formed floating carpets on water. This can be gathered from the peculiar shape of the stem bases that are preserved as steinkerns (Figure 13). The diversity of created animals and plants was obviously much greater than today, and many of them did not outlive the time during which they fulfilled an indispensable function as inhabitants of the transient mudflats and seas of early post-Flood years and decades. Most of those creatures became extinct. Notable exceptions are the Permo-Triassic crustaceans "Estheria" and the more conspicuous Triops cancriformis (Figure 14). Their living representatives are indistinguishable from their Mesozoic predecessors.

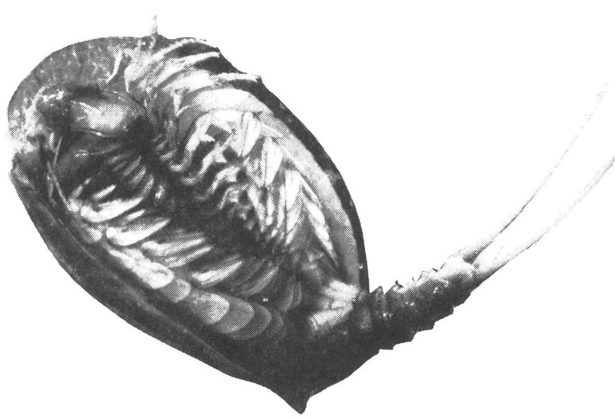


Figure 14. Triops cancriformis, a crustacean living in temporary ditches in the cooler parts of the Northern Hemisphere. The same organism populated shallow ponds of the early post-Flood redbeds during the Permo-Triassic of Europe. Twice natural size.

V. MEGA-SUCCESSIONS: STAGES IN RE-COLONISATION OF THE EARTH

1. Mass Propagations of Single Species

Present day life communities are usually composed of a great variety of species. A striking feature of fossil life communities preserved in post-Carboniferous rocks is their relatively monotonous composition of a few species only, but these in great numbers. Mass propagations always indicate disturbed ecosystems. Under natural conditions such impaired ecosystems tend to revert to normal by themselves. The different stages on the way are termed "successions". The final state resembles the original one and is called "climax".

After its devastation by the Flood the earth must have passed through many such stages of recolonization. Since whole seas and land masses were involved we speak of "mega-successions". Ecological processes of this kind explain the worldwide occurrence of post-Carboniferous index fossils without having to resort to auxiliary hypotheses of evolution. The mega-successions proceeded in step with the geological changes that developed after the Flood. (These will be briefly dealt with in a later paragraph.) It is indeed unusual to discover that fossils of vastly separated localities, particularly in the Mesozoic, turn out to be specifically the same. Thus, the Cretaceous ammonite Pulchellia is found from Germany to Colombia in South America; the bivalve Gervillela in Europe and South Africa; other bivalves like Pterotrigonia in Europe, S.Africa and S.America, or Neithea in Europe and N.America. None of these genera can be traced back to some hypothetical "more primitive stock". It is therefore evident that we have to do with organisms that survived the Flood in small numbers but became detectable only after special conditions had arisen which provided for population explosions on this scale.

One of the incipient stages of marine successions is the German Muschelkalk. The deposits of this early epicontinental sea are confined to Europe and the Near East. Of the almost innumerable ammonite genera of the Triassic that have been described from the Hallstatt facies, hardly more than one or two (Beneckeia, Ceratites) found their way into the shallow Muschelkalk basin where they multiplied and gave rise to a much more limited variety of populations. These represent genuine, infra-specific, evolutionary lineages from several originally polymorphic stocks. Anyone conversant with Mesozoic marine fossils is able to add examples of such mass propagations and will readily confirm the enormous genetic diversity of many species.

2. Mass Propagations in Rock-Forming Quantities

Another aspect of these post-Flood mass propagations is the occurrence of fossils in sometimes rock-forming quantities. Perhaps the most striking of all is the ordinary chalk. If viewed under the SE microscope chalk reveals its entirely organic composition from platelets of coccolithophorids and tests of foraminifera (Figure 15). Both types of organisms are abundant in present day seas but never accumulate on the sea floor to form any quantity of chalk. Instead, their limey skeletons are dissolved by the sea water during their slow descent to the bottom. The fact that these remains are preserved as chalk is proof that the Cretaceous seas were so shallow that the dissolving of those skeletal parts could not take place. The very conspicuous banding of many vertical chalk exposures suggests that the bottom sediments of the chalk seas were first carried away when these epicontinental basins suddenly drained off just before the "Tertiary". The superposition of those sediments then led to the banding now observable. The great faunal break with its mass extinctions of very many Mesozoic organisms can be linked with the commencement of the "Tertiary catastrophe" that is alluded to, by revelation, in Genesis 10:25. Ammonites, dinosaurs, and many Mesozoic plants of the semi-deserts suddenly lost their habitats and made room for the Tertiary stage of the post-Flood mega-successions.

Among all the systems of earth history the Tertiary is the one most complicated and most difficult to comprehend. Fault-bounded subsidence, movements of whole continental plates, mountain-building, volcanism and impacts from space led to immediate processes of erosion and deposition of great violence. These events occurred after the earth had already been largely re-populated with the greatest possible variety of organisms. Such was certainly the case at the end of the second or the beginning of the third century after the Flood. The orderly progression of post-Flood mega-successions had reached its climax.

3. The Climax Communities of the Tertiary

That such climax stage existed after the Flood can be easily demonstrated. Very many of the tree genera and species that are now confined to limited parts on the continents of the Northern Hemisphere had a vast distribution through the Old and the New World before the ice age. For example, fossil leaves of the maidenhair tree (Ginkgo biloba) are known from North Dakota, Scotland, Germany and Italy whereas the wild occurrence of Ginkgo now is in a remote part of

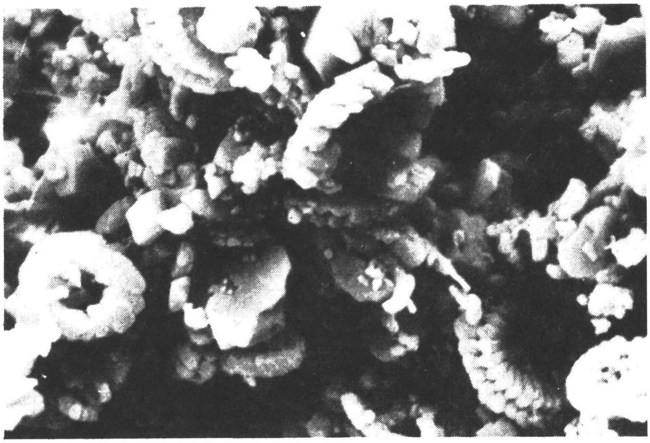


Figure 15. Detached skeletal parts of coccolithophorid algae made visible under SEM in chalk of the Cretaceous. The mass propagation of these algae and their preservation without being dissolved in sea water bespeaks the extraordinary productivity of the Cretaceous stage of the post-Flood mega-successions.

China. Similarly, Ailanthus, Pterocarya, and Koelreuteria are known in the fossil state from Wyoming and Colorado as well as from Europe; their living representatives survive only in the Far East, apart from Pterocarya which has also one species in the Caucasus. Conversely, fossil leaves of Sassafras and Comptonia, Liriodendron and Liquidambar are known from Europe while their closest relatives now live in N.America. Further species of these genera, extinct in Europe, reappear in China or Taiwan. This list could considerably be increased. From this former wealth of plant life across the Northern Hemisphere in the Tertiary it can be deduced that the culminating point of re-colonisation has long since been surpassed. The geological revolutions during the Tertiary changed large parts of the earth to barren mountain ranges and deserts, and the ensuing ice age did its part to wipe out much of this luxuriant plant and animal life. All this occurred before post-Flood man could rise into prominence.

VI. TESTING THE CONCEPT

1. The Bible as Standard of Comparison

a. The lack of pre-Flood land communities in the fossil record -. From a number of evidences it is possible to fix the Flood/post-Flood boundary within the fossil record at the turn from the Carboniferous to the Permian. This coincides with the commencement of discernible mega-successions. All earlier fossil life communities, including the Carboniferous coal forests, are associated with water. If land communities from pre-Flood times were known, a distinction between Flood-laid and post-Flood rocks would become impossible. However, no such land-living communities exist. The reason for the total absence of fossils associated with antediluvian man is found in the Bible. God says in Genesis 6:7, "I will destroy man". In this place a Hebrew verb is used that actually means erase or put out of sight. The reason for this must be sought in God's purpose to save only those who believe Him by their free will. If God's judgement upon mankind in the past had remained visible we would be unable to believe Him, i.e. to take Him at His Word also regarding the impending future judgement. Ezekiel 31:18 intimates that the inhabitants of the pre-Flood world were brought down "unto the nether parts of the earth". This revealed fact is fully borne out by the existence of Palaeozoic hydrocarbons (petroleum) derived from organisms whose organic compounds have not passed through the natural pathways of decay but were processed to energy-rich substances with complete loss of their shapes.

b. The formation of synclinal troughs after the onset of the Flood -. By far the thickest stacks of sediment belong to the Palaeozoic era. The Ordovician greywacke complex of Wales, for instance, amounts to many kilometres. The Devonian deposits of the Rhenanian Slate Mountains of Germany have been estimated at 12 - 15 kilometres thickness. Similar values are obtained in the troughs of the Millard and Magog Belts bordering the N.American continent. Subsidence and migration of synclinal troughs do occur after the Palaeozoic, but they are clearly on a smaller scale. The general trend is in line with the Biblical order of events. The eruption of the subterranean waters belonging to the pre-Flood water cycle must have resulted in the sudden collapse of entire continental plates. Thus, the Flood account of the Bible provides the background for appreciating the true speed of geological events during the Palaeozoic.

c. Early post-Flood conditions reflected by deserts and epeiric seas -. The striking change of the sedimentary régime from synclinal basins to epeiric seas after the Palaeozoic is in perfect accord with developments that are to be expected in the wake of a worldwide Flood. The barrenness of sands without topsoil and the ever shifting sea beds that were burying incipient marine life communities beneath them are abundantly demonstrable in rocks of this age. Attention must also be drawn to the enormous amounts of carbonate fixation by marine organisms in Permian, Triassic, Jurassic, and later deposits. This can only have been caused by an imbalance in the carbon cycle. After the destruction of the entire biosphere, such imbalances in the atmospheric turnover of carbon should be expected.

d. Continental drift and mountain-building in the days of Peleg -. From geological evidence it appears that the earth emerging from the Flood waters was initially one coherent land mass. Many horizontal movements, no doubt, went on from the beginning of the Flood, but the real drift commenced probably not before the end of the Cretaceous. Since the birth of Peleg is fixed at 101 years after the Flood, the Cretaceous stage of mega-successions may have lasted well into the second century after the Flood. The period of post-Flood mountain-building, the most marked feature of the Tertiary, is likely to have continued into the third century. Only after the hot crust burst and came into contact with water could sufficient evaporation occur to generate a sudden precipitation of ice, resulting in an ice age. If we reduce the Tertiary from its conventional 63 million years to a more reasonable period of little more than one century, the development of a sudden ice age through catastrophic evaporation would be a natural consequence fully within the limits of known physical laws.

2. Was There Geological Time?

a. Uninterrupted sedimentation during the Lower Palaeozoic -. Many examples of alleged sea floors during the Palaeozoic era are listed in the geological literature. These cases cannot be reviewed here. As has been pointed out under a previous paragraph, they are either mistaken, inconclusive, or refer to platform autochthony. From field evidence it can be regarded as certain that the whole of the marine Lower Palaeozoic may be accommodated within less than the 370 days of the Flood year.

b. Coal seams from mats of aquatic forests -. All Carboniferous coals of the Euro-American coal fields were primarily composed of scale trees. Their roots formed densely interwoven mats that included large amounts of air in plant tissues and enabled these ecosystems to float on water. The now superimposed coal seams (sometimes more than 200) must have originally grown on one and the same surface before they were swept away and deposited in subsiding synclines. It follows that these forests were all of the same age before burial. A "coal age" lasting 40 million years has evidently never existed.

c. Lessons from Placunopsis -. Minute sessile clams were able to colonize temporary floors in the Triassic Muschelkalk sea of Central Europe. Layered "reefs" of Placunopsis may reach more than 2 metres in thickness. The densely packed shells were successively cemented upon each other during their consecutive lifetimes. One centimetre contains about 25 shell layers. By fixing the unknown average lifespan of the individual clams at five years, a one centimetre increment of the Muschelkalk sea floor has been estimated to have required 125 years. This would bring a "reef" of 2 metres to a lifetime of 25,000 years. Such quantitative calculations of geological time from field evidence have been naturally valued as the most accurate. The flaw in this neat looking example is that, in actual fact, nothing is known about the true speed of development of Placunopsis. It has been overlooked that spat of recent clams in tropical seas may attain about the same size within days of weeks. An even more devastating fact is the disclosure that particularly the largest of these "reefs" are lenticular or globular in shape with shells overgrowing the entire upper and lower surface! (Figure 16). During life, these aggregates stayed more or less suspended in water as water-borne reefs, as it were. In the situations where they are found now they were obviously set aground together with the sed-

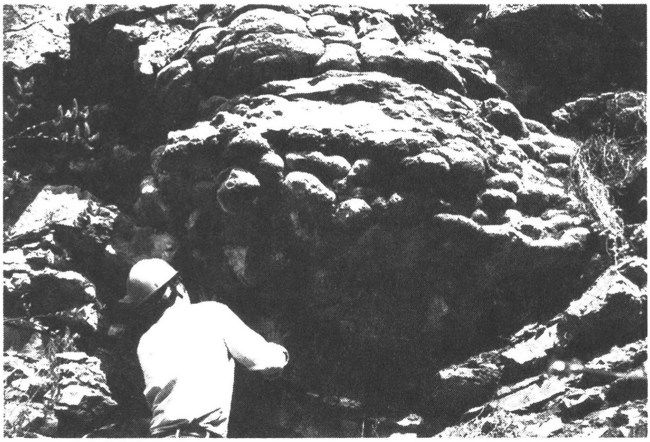


Figure 16. A globular reef composed of the minute sessile clam Placunopsis ostracina in the Upper Muschelkalk (Middle Triassic). During life, these aggregates stayed more or less suspended above the sea floor as evidenced by Placunopsis shells overgrowing the entire surface, including the one at the bottom. Such reefs have obviously not grown in one place but were dumped into their terminal position together with the sediment. Langensteinach, W. Germany. Reproduced from Scheven (13).

iment. The Muschelkalk sea is likely to have existed for about 20 to 30 years which may seem, at the first glance, very little. However, certain is that the burial of suspended reefs with 2 metres of sediment can be accomplished within a matter of minutes.

d. The natural breakdown of mass propagations -. Was there "geological time"? A strong denial comes also from a biological consideration. Index fossils as supposed markers of geological time qualify as such only if they are reasonably common. As a rule, they are very common indeed. Mass propagations as expressions of disturbed ecological conditions cannot have gone on longer than for a few years. Far from forming stable communities they would only lead to the next stage within a succession. Even granting that many fossil concentrations have come about through water sorting, the great and often truly incredible numbers of individuals found in fossil-bearing rocks were caused by biological conditions. The concept of geological time marked out by successive index fossils is, on biological grounds, untenable.

3. Some Applications to Regional Geology

a. The relationship of the "Old Red" to the "New Red" -. A Flood/post-Flood boundary at roughly the beginning of the Permian "New Red" is seemingly contradicted by the existence of emergence surfaces as early as in the Devonian "Old Red". Both systems are separated by the Carboniferous limestone and the coal measures. Basing our argument on Biblical revelation, the first temporary flats with mudcracks may have already appeared soon after the Flood waters had begun to recede, i.e. during the 6th or 7th month of the Flood year. Certain Old Red exposures in Britain are indistinguishable from those of the New Red. The only significant difference between the two red sandstones appear to be the lack of tetrapod tracks in the former and the lack of shock-induced convolute bedding in the latter. The highly idealized and horizontally condensed N-S section through Britain of Figure 17 may serve to illustrate the relationship of the two geological systems on a regional scale.

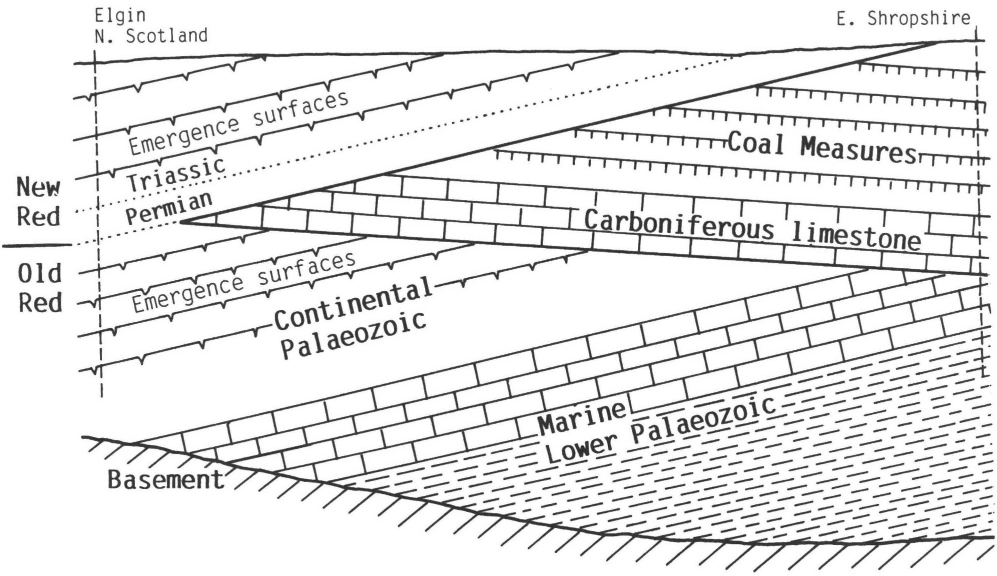
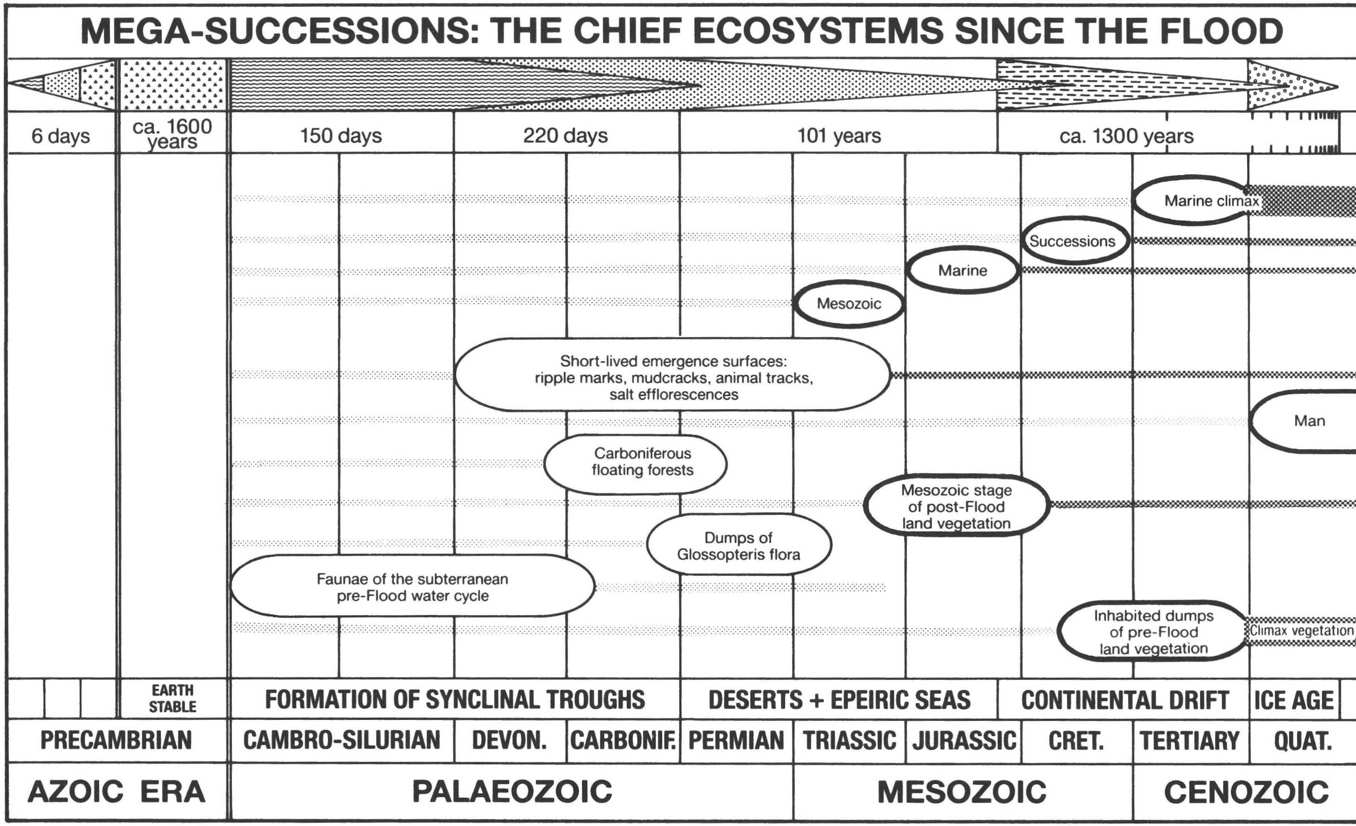


Figure 17. Highly idealised and horizontally shortened N-S section through a part of Britain. The separation of the Old Red from the New Red by the rocks of the Carboniferous is due to tilting movements of the basement during the Flood year.

b. The burial of floating coal forests marks the end of the Flood year-. The previously mentioned coal forests of the Northern Hemisphere stood on water and covered very extensive areas of the pre-Flood earth. Their actual location was probably within and perhaps beyond the north polar circle. The floating mode of life of this type of vegetation is well established. All Euro-American coal fields have in common that several, up to very many, coal seams lie superimposed upon each other. The deposition of these floating forests in coal troughs can obviously not have taken place as long as the Flood waters were still rising, i.e. during the first 150 days. Likewise, the deposition cannot have taken place after the waters had completely drained off, i.e. after 370 days. This leaves us with about 7 months of a "coal age" within the Flood year. The Carboniferous, as the most accurately datable geological system, thus serves as the most important marker on the time scale of Biblical earth history (Figure 18).

c. The worldwide identity of Palaeozoic marine faunas points to their pre-Flood origin -. The various epeiric seas, from the Magnesian limestone to the Tertiary, have covered the earth only locally. Their fossil faunas are restricted accordingly. The distribution of Palaeozoic fossils, however, follows quite a different pattern. Almost all genera of coral, trilobites, crinoids, conodonts, graptolites, etc occur worldwide. Included into the Palaeozoic here are the Triassic limestones of the Hallstatt facies whose fossil contents remains perfectly the same from the European Alps to the Island of Timor. The Hallstatt harbours typically "Palaeozoic" fossils like orthoceratids and conodonts and is linked to the other Palaeozoic rocks on this account. The difference between worldwide occurring and more locally appearing marine fossil assemblages enables us to distinguish between sediments derived from the partly subterranean and interconnected habitats of the pre-Flood water cycle and those of entirely subaerial marine habitats of post-Flood times. The former were ejected at the breaking up of the fountains of the great deep; the latter had to pass through mega-successions that slowly led to a variety of local faunas, the familiar condition that obtains today.

Figure 18 (opposite page). Synoptic chart of Biblical earth history from Creation to about 1000 years before Christ. The end of the Flood coincides with the Carboniferous (Pennsylvanian). The division of the earth in the days of Peleg commences with the late Jurassic and reaches its culminating point during the Tertiary. The ice age is interpreted as the natural outcome of heated magmatic rocks brought into contact with shallow seas during the "Tertiary Catastrophe". Bold ellipses signify some of the post-Flood mega-successions known from their fossil assemblages. All assemblages that do not reach the right hand margin are extinct.


MEGA-SUCCESSIONS: THE CHIEF ECOSYSTEMS SINCE THE FLOOD
6 days
ca. 1600 years
150 days
220 days
101 years
ca. 1300 years
Marine climax
Successions
Marine
Mesozoic
Short-lived emergence surfaces: ripple marks, mudcracks, animal tracks, salt efflorescences
Man
Carboniferous floating forests
Mesozoic stage of post-Flood land vegetation
Dumps of Glossopteris flora
Faunae of the subterranean pre-Flood water cycle
Inhabited dumps of pre-Flood land vegetation
Climax vegetation
EARTH STABLE
FORMATION OF SYNCLINAL TROUGHS
DESERTS + EPEIRIC SEAS
CONTINENTAL DRIFT
ICE AGE
PRECAMBRIAN
CAMBRO-SILURIAN
DEVON.
CARBONIF.
PERMIAN
TRIASSIC
JURASSIC
CRET.
TERTIARY
QUAT.
AZOIC ERA
PALAEOZOIC
MESOZOIC
CENOZOIC

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Appendix: The geological changes recorded in Flood-laid and post-Flood rocks:

geological changes	Flood period	post-Flood period
changes of régime	sedimentation in deep synclinal troughs	sedimentation progressively more in shallow basins
	emergence surfaces are rare	emergence surfaces are common
	no mountain-building activities	increase of mountain-building with culmination during the Tertiary
changes of lithology	greywacke and derivatives prominent	progressively more organogenic sediments, eg chalk
changes of ecology	aquatic assemblages	aquatic and non-aquatic assemblages
	no authentic sea beds, no autochthonously grown reefs	true fossilised sea floors and autochthonous reefs
	no faunal provinces	faunal and floral provinces exist

DISCUSSION

This paper attempts to solve one of the most difficult stratigraphic problems as it relates to the Flood—the boundary between the Flood and Post-Flood. The primary evidence brought to bear on the boundary question is the presence or absence of in situ fossil assemblages. Several field examples are cited and a few literature references are included. The paper, however, lacks sufficient documentation for the conclusions presented, and does not make reference to the variety of geologic evidences which are needed to adequately establish the Flood/Post-Flood boundary (welded tuff beds, hardgrounds, paleomagnetic stratigraphy, interregional versus basinal deposits). How do we know that the Upper Permian Zechstien reefs indeed represent the earliest post-Flood autochthonous sea floors? The evidence presented is far from adequate. How do we know that Permo-Triassic Sandstones represent desert dune deposits on transient mudflats after the Flood? The geologic evidence presented is far from compelling. Those who know the equivalent strata on the North American continent would have great difficulty accepting the Flood/Post-Flood boundary near the Permo-Triassic boundary. We need a variety of geologic and paleontologic evidences applied to solve the Flood/Post-Flood boundary problem.

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The existence of distinctive index fossils and characteristic assemblages has long provided a challenge for flood geology interpretations. Dr. Scheven's paper accepts that they have a chronological significance and proposes a model from within the diluvialist paradigm. It provides a panorama of events, and leaves the details to be filled in subsequently. Thus, statements like: "graptolite zones are viewed as deposited assemblages of spatially different communities" are actually hypotheses yet to be tested. The reader will be able to note numerous similar examples.

Geological and palaeontological data are suggested to favor the following general scheme: Palaeozoic rocks are the main diluvial deposits; Mesozoic and Cenozoic rocks are the remains of post-Flood catastrophes affecting temporary ecosystems. This model is powerful and deserves to be tested further by specific investigations of field evidences. Serious consideration needs to be given to the Old Red Sandstone facies with their evidence of emergent surfaces. Dr. Scheven recognizes the problem (Section VI.3a), but does not do justice to these rocks by referring to "temporary flats with mudcracks".

The term "continental drift" (Section VI.1d) is so closely linked with mantle convection mechanisms and long timescales that this reviewer favors the use of an alternative word by diluvialists. The term "continental separation" has no association with specific mechanism and retains all the essentials.

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[Review: of Part I] Since Dr. Scheven has not systematically considered all Lower Paleozoic index fossils, he is not justified in concluding that the conventional index fossil concept is invalid. Furthermore, since he has not considered post-Lower paleozoic index fossils at all, he has not demonstrated that the lower Paleozoic is substantially different from the remainder of the column. For an example, most taxa have stratigraphic ranges which run continuously through the Carboniferous and Permian. There is not a good faunal break between the Carboniferous and Permian. At the end of the Permian, YES; at the beginning of the Permian, NO.

[Review: of Parts II & III] Dr. Scheven provides insufficient documentation and discussion to conclude either that claims of pre-Permian autochthony are invalid or that claims of post-Carboniferous autochthony are valid. What if the Permo-Triassic sediments are buried and/or redeposited pre-flood soils (Ariel Roth, personal communication) - perhaps representing the beginning of the inundation of the land?

[Review: of Part IV] As Dr. Scheven claims, the Permo-Triassic sediments represent a change in lithology over the Paleozoic. These and other Mesozoic sediments, however, also seem to be distributed globally (like the Paleozoic, but unlike the Cenozoic) and deposited catastrophically. This would imply that the Mesozoic is part of the same global event which deposited the Paleozoic. Why couldn't the Paleozoic represent submarine deposition in the early Flood and the permo-Mesozoic represent the transgression over the land in the later Flood? The Permo-Triassic exposure features could then be pre-flood in origin.

[Review: of Part V] Even though modern life communities have a high diversity of species, species abundance follows the a pattern of a hollow curve. Only a few species are abundant; most species are very rare. A less than perfect fossil record of even climax communities will tend to be composed of just a few species with high abundance. Unlike the claim of Dr. Scheven, monotypic fossil communities do not represent disturbed ecosystems. Although Dr. Scheven claims that post-Carboniferous fossil communities tend to be monotypic (or nearly so), he does not show that this is not true of the pre-Permian. It is my impression that low diversity "communities' are quite common in the Paleozoic (e.g. Mississippian Crinoid Conglomerates, Carboniferous Coals, Carboniferous Lingula Beds, Cambrian Ollenelus Shales, Ordovician Graptolite Shales, etc.).

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CLOSURE

Dr. Scheven was unable to respond at this time, but wishes to thank his reviewers for their comments and criticism.