North American Paleontology Convention 96

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ABSTRACT

The sixth North American Paleontology Convention met at the Smithsonian in Washington, DC, June 9-12, 1996. Many issues of interest to creationists were discussed. A brief summary of some of those are given in this report. Issues include: abrupt appearance, fossil stasis, the Precambrian, intrabaraminic diversification, radiometric dating, geocatastrophism, palaeoclimatology, fossil DNA, whale evolution, and identification of the Flood/post-Flood boundary.

INTRODUCTION

True scientific meetings are extraordinary events — catastrophes in human knowledge. They only last a few days, and are often months to years apart, but they involve enormous amounts of intellectual change — arguably more than what cumulatively occurs between them. My experience is that they are extremely fruitful for everyone. My experience also tells me that even secular scientific meetings can be enormously valuable for creationists. These are times to learn, if one just listens; times to develop relationships and professional associations if one also mixes; and times to hone research and presentation skills if one contributes.

The Smithsonian Institution in Washington, DC was the site for the sixth North American Paleontology Convention (NAPC), June 9-12, 1996. Previous NAPCs (1969, 1977, 1982, 1986, 1992) have uniquely brought together palaeontologists from small but otherwise deeply separated subdisciplines (Precambrian palaeontology; palaeobotany; invertebrate palaeontology; vertebrate palaeontology; micropalaeontology; and paleo-anthropology). This NAPC was no different. This note is intended to be a report on the things at NAPC96 which might be of interest to the creationist. It must, however, be understood to be a very biased view. Over the course of three very full days, six talks were given concurrently, so I was able to attend only a small percentage of the talks given (I have notes from only 59 talks — less than 14 per cent of all the talks given). Plus, I chose, of course, those talks of greatest personal interest. Add to this the bias of personal interpretation; the profound bias of this report's perspective should be evident. Abstracts of the papers referred to in this report are published in Repetski,[1] arranged therein alphabetically by first author.

THE ARCHAEAN EXPLOSION

The opening plenary session to the NAPC96 was given by J. William Schopf, who focussed on Precambrian microfossils. Known now from 6,000-7,000 specimens from 450-500 localities throughout the Precambrian, these microfossils are definitive evidence of fossil bacteria in rocks scattered throughout the Precambrian (see Snelling[2] and Wise[3] for some discussion on the implications of this for the creationist). Schopf focussed his attention on the oldest known fossils (from near Marble Bar, Australia). All species in this flora are found to be morphologically identical to modern cyanophytes and leave an identical chemical signature. The ultimate in 'living fossils', the cyanophytes show no evidence of evolution throughout their history — showing stasis on all taxonomic levels. Given they are the oldest known fossil on Earth they also appear abruptly, without transition. Even more remarkable, however, is the observation that the cyanophytes are thought to be some of the evolutionarily most derived

bacteria. This suggests that if evolution is true, by the time of the first appearance of bacterial life all the bacterial phyla **had already** evolved. Considering the number of bacterial phyla (17 in Margulis and Schwartz[4]) and the extraordinary range of metabolisms utilised by bacteria (hydrogen-oxidising, nitrogen-fixing, sulphur-reducing, fermenting, purple-, green-, and blue-green-photosynthesising, etc.) what might be called the 'Archaean Explosion' is far more impressive than even the 'Cambrian Explosion' (approximately 38 phyla of animals with a single type of metabolism). Furthermore, although in his talk Schopf emphasised that 400 million years of conventional time separates the radiometric age of the oldest body fossils (3.465 Ga) and the estimated age of the last Earth-surface vaporising bolide impact (about 3.9 Ga), there is cyanophyte chemical signature in rocks radiometrically dated as 3.8 Ga (the oldest known sediment on Earth). The 0.1 billion year spread between the oldest fossil evidence and the last life-destroying impact is not large enough to discern in proper radiometric dating error analysis (which is in excess of 10 per cent). Therefore, there is little to no evolutionary time available for the cooling of a vaporised Earth surface, the re-origin of a gaseous atmosphere, the origin of the first cell **and** the 'Archaean Explosion'. Millions to billions of years long though it is, conventional geological time is too short for comfort. The evidence is much easier explained by catastrophic burial of a bacterial biota (for example, Flood deposition as suggested by Snelling,[5] or Day 3 Regression as suggested in Wise[6]).

THE CAMBRIAN EXPLOSION

The second plenary lecture (by Bruce Runnegar) and other presentations throughout the conference directly or indirectly spoke about the now brow-beaten subject of the Cambrian Explosion. In recent years it has been demonstrated that the Cambrian Explosion was much more 'explosive' than ever before thought. Re-evaluation of radiometric dating in this interval has taken the 90 million year prelude and 100 million year postlude believed 15 years ago and shrunk them to 50 million years and 30-40 million years respectively. Depending upon how modern animal groups are defined, less than five million years of conventional time may be available between the first appearance of the evolutionarily most primitive animal phylum and the evolutionarily most advanced. And, given the fact that bacterial and soft-bodied fossils are found below this boundary, it does not appear to be valid to argue that the groups had a longer preamble but just didn't get preserved. And, since five million years is less than 1 per cent of the presumed age of this horizon, it is **much** less than the resolution of any dating techniques. This is thus effectively a geologic instant in time. Therefore, if conventional dating and evolution are both true, the fossil record argues for the origin of all animal phyla in very little to no time. Again, the first appearance of animal phyla (as is the case with the bacterial phyla) is most consistent with catastrophic burial — in fact the beginning of a catastrophic event like Noah's Flood.

PRECAMBRIAN STROMATOLITES

Hans J. Hofmann gave a talk reviewing Precambrian fossil localities. This talk reminded me of the stromatolite challenge for the young-age creation model (see Snelling[7] and Wise[8]). There are at least 1,000 stromatolite localities throughout the Precambrian. Some stromatolites are simple and might be inorganically produced; others are extraordinarily complex and seemingly preclude any non-biologic origin. Some are just a few centimetres across; others are in excess of a kilometre in size. The stromatolites need to be studied carefully so as to properly incorporate them into the creation model.

THE CURIOUS *CERION*

The land snail genus *Cerion* has long been a curious critter. Inter-population *Cerion* variation is not only very much larger than intra-population variation, but also unusually large for interspecific variation in land snails as a whole. As a result *Cerion* has been broken up into hundreds of species. Hoping to study macroevolution in some group of living organisms, Stephen Jay Gould chose *Cerion* for his life research. The results have been somewhat disappointing to Gould. With one exception, every place where geographic ranges of two *Cerion* morphologies ('species') meet, there is hybridisation of the two forms. Gould is also quick to point out that the one exception involves the sympatric occurrence of a very small and a very large form — equivalent to the size difference between a Chihuahua and a Great Dane. As Gould suggests, perhaps even these forms might be able to interbreed genetically, but are prevented from doing so for morphological reasons. In any case, using a conservative species definition *Cerion* is composed of a single — at most two — species. With less conservative species definitions its hybridisation would indicate that it is a superspecies. Gould has expressed disappointment that the group he chose 'just happens' to be one which fails to show evidence of evolution. He believes the taxon is a fluke — that it is not displaying normal evolutionary behaviour. In a creationist world view, on the other hand, *Cerion* would be understood otherwise. The hybridisation evidence would identify *Cerion* as a monobaramin. Given the hypothesised important role of intrabaraminic diversification in the creation model and how common it is to unite many species into baramins in baraminology studies thus far (for example, Wise[9] and Scherer[10]), the *Cerion* phenomenon could be understood by the creationist to be a common phenomenon, not a rare one. Gould didn't stumble upon the rare exception to macroevolution, but

rather the common example of intrabaraminic diversification. *Cerion* studies would generally constitute 'non-data' for the evolutionist. If biologists were to publish all such 'non-data' (just as Gould has insisted palaeontologists publish the non-data of species stasis), the ubiquity of this feature of life would be evident to all.

At the NAPC Gould introduced another curious wrinkle into the already fascinating *Cerion* story. In a paper co-authored with Glenn A. Goodfriend, fossil *Cerion* from Great Inagua were dated using ^{14}C. On the north side of the island is a hybrid zone between a flat-topped *Cerion* morph and the more typical morphology of the island. From the same area, fossil *Cerion* are found with an even flatter top, suggesting the modern flat-topped form is itself a persistent hybrid form. The fossils date by ^{14}C to about 13,000 years BP, SO the hybrid forms may represent prolonged hybrid stability. Better evidence of this is found on the other side of the island. There, fossil *Cerion* of a variety of ages were picked up in reworked beach sand. Amino acid racemisation was used to determine the relative ages of the fossils. Curiously enough, the age sequence of the shells also places them into a morphological sequence from the oldest — a distinct fossil morph — through a stable intermediate morphology towards the present *Cerion* morphology. Calibration of the racemisation method with ^{14}C indicates that the intermediate morphology persisted for between 3,000 and 5,000 years in creationist time. This curious persistence of intrabaraminic morphs as stable morphologies over long periods of time is something deduced from the creation model for other reasons (see the last section of this report).

GEOCHRONOLOGY

A couple of NAPC papers expressed caution about certain dating techniques. Goodfriend and Gould pointed out that the land snail *Cerion* tends to 'eat' carbonate, scraping it up to produce the carbonate of its own shell. Acquiring at least some of its shell material from ^{14}C-lacking carbonate sources results in living *Cerion* being dated by ^{14}C techniques as being dead for between 1 ½ to a few centuries. ^{14}C dates on *Cerion* must be adjusted to account for this. It may turn out that other organisms cause similar problems for ^{14}C dating. As they reinterpret ^{14}C dates, creationists need to be just as aware of these kinds of challenges as evolutionists need to be.

William B. Gallagher and David C. Parris shared their experience of using rubidium-strontium dating on sedimentary glauconite in Cretaceous sandstones in New Jersey. They got dates in overlying sediments older than those in sediments below, thus suggesting some sort of serious problem with the technique. This data confirms many other studies which have questioned the validity of radiometric dating of sediments — including those with glauconite.

SPECIES IDENTIFICATION

Goodfriend arid Gould's *Cerion* paper also touched on another important issue in biology — the identification of species. The stratomorphic series of two fossil forms with the living form would, if no other *Cerion* were known in the present, be identified as an example of species evolution and not hybridisation — something which should be seriously considered by creationist palaeontologists. The common natural hybridisation of living *Cerion* indicates that using traditional morphological and geographic criteria there has been severe taxonomic over-splitting of baramins. Very little more than morphological and possibly geographic data can be derived from the fossil record. It is also true that criteria used to identify fossil taxa are intentionally chosen so as to mimic as much as possible the criteria used to distinguish living taxa. These factors would suggest that fossil baramins are likely to be as taxonomically over-split as living baramins. A paper by Michal Kowalewski *et al.* underscores this point. In that paper, *Glottidia* species (a living lingulid brachiopod) which were originally distinguished primarily on the basis of soft-part anatomy, were rather successfully differentiated using simple morphometric studies somewhat commonly used in palaeontology. This suggests that if living *Glottidia* is over-split (which I strongly suspect it is), then fossil *Glottidia* probably are also. The degree of over-splitting of taxa, both modern and fossil is important in baraminology studies.

DISPARITY/DIVERSITY ISSUES

Ever since Stephen Jay Gould popularised the notion of disparity-before-diversity in **Wonderful Life,**[11] disparity has been a hot topic in palaeontology. In conventional evolutionary theory high disparity (large morphological differences among organisms) is achievable only through a long series of speciation events and thus only following a substantial increase in species diversity. In the fossil record, however, quite the opposite tends to be found. High disparity seems to **precede** high diversity. This is seen in the 'Archaean Explosion' of bacteria, where, as William Schopf indicated, nearly every species known of early bacteria represent different major groups. It is also indicated in the Cambrian Explosion of animals where, for example, nearly every soft-bodied arthropod species in the Burgess Shale represents a different class of arthropods,[12] as well as in Ordovician echinoderms where a variety of echinoderm classes appear, all at low diversity. At this NAPC Ivan J. Sansom *et al.* argued that conodonts may be appearing in the Upper Cambrian in a similar fashion. It appears that different tissue types occur in virtually every conodont studied so far. In another paper, by Matthew A. Wills, the high disparity and low diversity of crustacean subtaxa in the Cambrian was also pointed

out. For the creationist who believes in high pre-Flood biozonation, the high disparity/low diversity phenomenon is an expectation of their model. As the Flood transgressed over distinct biozones, the high disparity/low diversity expected and observed within biozones would be preserved by transgressing waters.

INTRABARAMINIC DIVERSIFICATION

Gunther J. Eble presented a paper which championed the use of morphospace analysis to identify developmentally-caused evolutionary change. Oversimplified, morphospace analysis is a way of quantitatively comparing morphologies. In his study Eble showed how analysing **both** juveniles and adults from a variety of (probably conbaraminic) taxa, similarities between juveniles of adult-differentiated taxa would be evidence of von Baer's Second Law (the more general, higher-taxon-distinguishing characters appearing early in ontogeny; more specific lower-taxon-distinguishing characters appearing later), similarities between juveniles of one species and adults of a younger species would be evidence of paedomorphosis, similarities between adults of one species and juveniles of a younger species would be evidence of peramorphosis, and similarities between adults of juvenile-differing taxa would be evidence of convergence. Several things are interesting from this. One is that no polarity, no rate, nor any combination of polarity and rate of transition between taxa is theoretically excluded from evolutionary theory. This unfalsifiable *post hoc* quality of evolutionary theory is pervasive (as argued by ReMine[13]). Also interesting is the commonness of apparent paedomorphosis, peramorphosis, etc., among organisms on Earth. Such phenomena are a potentially exciting research area for creationists. Whereas some of these are the result of God's mode of mosaic creation (for example, the paedomorphic-like similarities between humans and apes), many of Eble's studies appear to focus on intrabaraminic taxa. Eble also observed that teratologies of one species often mimic the morphologies of other species. All this suggests that a suite of alternate developmental pathways may have been programmed into the archaebaramins and then utilised by the organism during the process of intrabarminic diversification.

Eleni Paxinos *et al.* reported on some interesting goose fossils in a Hawaiian lava tube. Different skeletons (^{14}C dated at 510, 870 and 900 years BP) represent a large, extinct, flightless species of Canada Goose which used to inhabit Hawaii. Scherer's study of the goose family (in Scherer[14]) would suggest that the entire family is monobaraminic. This suggests that a large flightless morphology was also part of the created genetic diversity of the duck/swan/goose archaebaramin. This may be very important information as the history of flightless birds is reconstructed. It also suggests that wings on at least some flightless birds may actually be vestiges and evidence of relationship to winged birds. Paxinos *et al.* also made passing reference to what they saw as convergent similarities with other large flightless birds (for example, a robust bill). These might be clues to similar gene complexes in different archaebaramins and/or the same gene complex utilised repeatedly within the same baramin.

RAPID DEPOSITION AND FOSSILISATION

Because they are so exciting to palaeontologists, lagerstatten (fossil localities with extraordinarily well-preserved fossils, such as at Solnhofen, Burgess, and Mazon Creek) are always discussed at palaeontology conferences. This NAPC was no exception. Nigel C. Hughes and Ralph E. Chapman reported on the famous Silurian 'Aulacopleura Shale' from the Czech Republic which has produced so many beautiful trilobites (see, for example, Plates 28, 181-185, 191-192 in Levi Setti[15]). They claimed the shale was deposited in days, to at most months. Constance M. Soja *et al.* reported on a Devonian System locality in Alaska where an estimated 20 million tiny (averaging 6 mm long) nautiloids were killed in one or more mass mortality event(s) and then buried in tempestites (high energy storm deposits). (By the way, creationists must be careful with this deposit as boring and algal-generated encrustations which usually indicate a considerable pause in sedimentation have also been reported from this locality.) Ian J. Duncan and Derek E. G. Briggs reported on the Miocene deposits of Riversleigh, Australia, where insects, as well as their decomposing fungi and bacteria, are preserved by phosphate in spectacular three-dimensions. The fossilisation, as in the case of the Santana Formation of Brazil, is thought to be an example of what is called the 'Medusa Effect' of virtually instantaneous phosphatisation. The rapid phosphatisation (hours to at most days) is thought to have occurred after between one and six months of decay. It must be noted that whereas the first two examples above are most probably examples of rapid fossilisation and deposition during the Flood, the third is most probably an example of a rapid post-Flood event.

TREE RINGS AND CLIMATE

For creationists and evolutionists alike, tree rings are important indicators of climate (see, for example, Wise[16]). At the NAPC, Edith L. Taylor described three newly-located petrified forests from the Permian and Triassic Systems of Antarctica. Even considering plate tectonic activity, these trees were deposited at high latitudes (80-85°S in the Permian; 70-75°S in the Triassic). The strangest observation on the rings of the logs was that they have very little latewood and virtually no transition between earlywood and latewood. Although there is no modern forest analogue, Taylor believes that this feature is due to the trees having shut down photosynthesis when light levels

fell below a certain threshold point (something which has been observed in plants in the laboratory). Taylor also reported on a single log with frost rings. All this would indicate that the climate the trees lived in was much more moderate than today, but that it was also strongly seasonal — with both frosts and seasonal changes in sunlight availability (that is, axial tilt). This confirms earlier claims of Wise[17] that evidence of seasonality can be found in trees from the Carboniferous onwards. Taylor's report would suggest even more evidence for substantial axial tilt. If these sediments are Flood sediments, then the pre-Flood Earth was warmer than at present, but nevertheless subject to seasonality and a high axial tilt.

GLACIATION EVIDENCE

In addition to the evidence of the most recent Pleistocene glaciation, conventional geologists claim several other major glaciations in Earth history. The only one claimed in the Lower Palaeozoic sediments is evidenced in the Ordovician System. This glaciation has a problem, however, as atmospheric carbon dioxide levels during the Ordovician have been estimated to have been 14-16 times the present levels. Glaciation would seem to be precluded by such high carbon dioxide levels. At the NAPC, Mark T. Gibbs *et al.* struggled with this problem, hoping to computer model a glaciation in such situations. Although they claimed success, they noted that every successful run was very close to runaway icehouse. One of their runs, for example, was terminated because it seemed to be leading to worldwide ice coverage. Assuming their model is correct, the sensitive nature of the system would suggest that glaciation in such high carbon dioxide levels is not likely. Given that there was no validation of their model with data it is also very likely that their computer model is itself invalid. The high carbon dioxide levels indicated in the Ordovician still stand as a substantial barrier to Ordovician glaciation claims. At the same time, Gibbs *et al.* revealed that recent redating of the Ordovician sediments interpreted as glaciogenic indicates that all of them may date to within one million years of each other in conventional dating. This is much less than the maximum resolution of conventional dating in the Ordovician. This in turn would suggest that all the 'glaciogenic' sediments of the Ordovician may be the result of a single, virtually instantaneous event. If these sediments are re-interpreted as landslide deposits, as Molen,[18] Oard,[19] and Austin and Wise[20] have suggested for other deposits conventionally interpreted as glaciogenic, then the Ordovician 'glaciogenic' deposits may be the result of a tectonic event which stands above the background tectonic activity of the Flood. Since its date corresponds at least approximately to the transition between the Sauk and Tippecanoe Megasequences in North America, and thus a major change in Flood sedimentation patterns, perhaps it corresponds to a major change in plate motions (a la catastrophic plate tectonics[21]) and/or the impact of a bolide. Among other things, such sediments can function as isochronous deposits for creationist geology. This deserves closer attention by creationist geologists.

ALLOCHTHONY VERSUS AUTOCHTHONY

Flood geologists often interpret as allochthonous (transported) those fossils conventional geologists interpret as autochthonous (grown in place). As is often the claim within lagerstatten, every claim of rapid preservation at the NAPC (Czech trilobites, Alaskan nautiloids, Australian insects — all reported above — as well as Joanne Kluessendorf and Donald G. Mikulic's report on a second locality for the Wisconsin Waukesha biota) was also claimed to be allochthonous. In Edith Taylor's talk she also reported on some allochthonous fossil 'forests' in Antarctica — including examples of upright-floating rootballs.

FLOOD/POST-FLOOD BOUNDARY

As creationists debate over the location of the Flood/post-Flood boundary (see, for example, Robinson[22] Scheven,[23] Garton,[24] Garner,[25,26] Tyler,[27] Holt,[28] Oard[29] and Woodmorappe[30]), several palaeontological issues discussed at the NAPC will be relevant:-

(1) Edith Taylor's report on allochthonous Permian and Triassic Antarctic logs with rings;
(2) Martin Lockley's review of dinosaur trackways around the world; and
(3) Mark A. Norell *et al.'s* report on the Oviraptors sitting on egg nests (now four specimens) (I must add that at the NAPC there was some discussion and scepticism about the brooding and sandstorm interpretations of these latter specimens).

FOSSIL DNA

Alan Cooper, from the Institute of Molecular Medicine, Oxford University, gave an illuminating and fact-filled talk on fossil DNA. He showed convincingly how easy it is to get recent contamination in fossil samples and how it is virtually **impossible** to be certain you don't have it when studying human fossil material. He outlined numerous techniques and controls which he feels **must** be a part of any fossil DNA study, and presented convincing evidence why. Consistent with the estimation of organic chemists on the decay rate of DNA, Cooper's studies indicate that DNA is not to be expected in fossils frozen for more than 50,000 years by conventional dating, or refrigerated for more than 11,000 years, or unrefrigerated for more than 5,000 years. Furthermore, since no claims of older DNA (for example, in amber and/or in dinosaur material) have been reproduced in multiple labs Cooper rejects them. I believe we should all be as wary as Cooper in not accepting

these claims until such time as they are successfully reproduced.

WHALE EVOLUTION

There was an excellent series of papers on whale evolution (of which I attended 11), which the organisers hope to publish in the form of a book some time in the future. This should be a very interesting volume as a number of newly discovered and/or newly prepared specimens were described in these presentations. Given the explosion of studies and discoveries of fossil whales, any critique of whale evolution by creationists will almost certainly be out of date by the time of publication. I would suggest patience until the proverbial dust has settled. In the meantime I include a few observations from the NAPC papers. The pattern I noted in an earlier paper[31] continues to hold, and arguably looks even better for evolutionary theory than I indicated at that time. At the same time, other interesting patterns are also emerging. The most interesting seems to be the high incidence of homoplasy (interpreted as convergence in evolutionary theory) — vaguely reminiscent of the spectacular homoplasy exhibited by other stratomorphic series (for example, the mammal-like reptiles of the Mesozoic and the herbivorous mammals of the Cainozoic). This homoplasy is seen in four areas:-

(1) the general body shape homoplasies among the cetaceans, sireneans, and pinnepeds. Each group is thought to have evolved into the marine realm independently (cetaceans from mesonychids; sireneans from phenacodontids; pinnepeds from carnivores). They are thus thought to have acquired similar characteristics independently and, in fact, more or less simultaneously.
(2) As Daryl P. Domning pointed out at the NAPC, there are three more specific homoplasies (pachyostosis, shortening of cervical vertebrae, and hind limb reduction) which were acquired more or less simultaneously by sireneans and cetaceans. Domning interpreted these in an *ad hoc* manner, as due to three more or less independent but simultaneous selection pressures.
(3) As pointed out by John E. Heyning, fossil odontocetes and mysticetes show homoplasies.
(4) Heyning also pointed out that homoplasies show up among various fossil odontocete species.

All in all, of course, homoplasies are extremely difficult to explain in evolutionary theory. At the same time, these homoplasies may be challenging to creation theory as well. Observations of simultaneous multiple homoplasies in mammal-like reptiles led me to suggest successive habitat destruction by Flood waters to explain them.[32] Similar homoplasies among Cainozoic herbivorous mammals led me to suggest post-Flood climatic change as a mechanism.[33] A similar pattern is found in Eocene and Oligocene Cetacea, but cannot be explained by either of these hypotheses, A third explanation for cetacean homoplasies would increase the *ad hoc* nature of, and strain the credibility of, creationist explanations. This intriguing pattern, when considered along with chimeromorphism evident in the same groups, is devastating to macroevolutionary theory. They also suggest some sort of spectrum of morphological grade linked to ecology. Yet, they still stand as a substantial challenge to young-age creation theory. This is well worth careful scrutiny by creationists in the future.

FOSSIL RECORD ORDER

Most of the fossil record (dominated by shallow water invertebrates) shows a pattern of first appearance which does not correspond to the predictions of macro-evolutionary theory.[34] Schopf 's report on what I call the 'Archaean Explosion' gives qualitative evidence of this among bacteria taxa when he reported that the oldest bacteria were the most evolutionarily derived. Similar observations can be made for the Cambrian Explosion. In Matthew A Wills' report, for example, he disparagingly reported that no matter what crustacean cladogram you use to hypothesise phylogeny, 'ghost lineages' (taxonomic ranges which must be inferred because a more derived taxon is found stratigraphically below the taxon of interest) are extremely common and lengthy.

Talks I was not able to attend which are of potential interest to creationists include the following:

COMMUNITY STASIS AND ABRUPT APPEARANCE

Arthur Boucot[35] pointed out that fossil record mutualisms (for example, mutual symbiosis and communities) appear in the fossil record abruptly and remain in stasis thereafter. Although somewhat easy to explain in a systematic community-engulfing transgressive sequence (for example, the Flood), the abrupt appearance of such complex multi-taxon phenomena is currently a source of lively discussion in palaeontology. The issue of fossil mutualism was the subject of a series of papers at the NAPC by these authors: A. J. Boucot, M. A. Gibson, P. Hallock, A. M. Kuris, J. J. Lee, R. D. Norris, P. D. Taylor, T. N. Taylor, S. E. Walker and R. A. Wood.

CHANGE/ENVIRONMENT DISSOCIATION

Following Stephen J. Gould's insistence that species stasis be considered data, evidence for species stasis has rapidly accumulated. Besides the brisk theoretical debate about how it was that species **could** remain unchanged for millions of years, the most disturbing observation for evolutionary theory has been that species seemed to remain static regardless of changes in inferred environments.

Since environmental changes are thought to be important forces in evolutionary change, morphological and environmental change would be expected to be correlated. A NAPC paper by Paul N. Pearson and Nicholas J. Shackleton reviewed and restudied Lower Cainozoic planktonic foraminifera to confirm that apparent changes in foram morphology are uncorrelated with changes in environment. The issue appears to be left unanswered by Pearson and Shackleton. The apparently large amount of post-Flood intrabaraminic change paired with long-term stability of intrabaraminic morphotypes (for example, early depictions of animals, well-preserved fauna and flora in early cultural sites and such evidence as has been given by Goodfriend and Gould at this NAPC) suggests that there was an early period of explosive intrabaraminic diversification and subsequent morphological stability. Given the rather catastrophic, but yet consistently changing environment which we postulate in post-Flood times,[36] morphological change would appear to be dissociated from environmental change as the foram data would indicate. As encouraging as this might be, that dissociation still seems odd, or at least anti-intuitive. It should be evaluated with great scrutiny in an effort to characterise it and understand it better in a young-age creation world view.

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