Towards a Creationist Understanding of 'Transitional Forms'

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ABSTRACT

There is fossil evidence interpreted as transitional forms which can be understood to strongly support macroevolutionary theory. Creationist palaeontology is an immature field, the resources of creationists are severely limited, and the 'transitional form' issue has a low priority in the creation model. It is thus premature to engage in a rigorous evaluation of transitional form claims. It is suggested that creationists not divert resources or concern in the direction of 'transitional form' arguments. As a creationist response to evolutionary claims of transitional forms is developed, a new vocabulary should be adopted. It is suggested that distinctions be made among morphological, stratigraphic and stratomorphic intermediates, and among inter-specific, species, higher-taxon and series stratomorphic intermediates. Even at this early stage of development and with such significant challenges as the early whale series, the creation model appears to have potential for developing a creationist explanation of stratomorphic intermediates which is superior to that of evolutionary theory.

INTRODUCTION

Several recent lay articles[1-4] have spawned considerable interest in a subject which might be called the 'traditional transitional forms issue'. The 'traditional transitional forms issue' is defined as any argument/claim (or counter-argument/claim) that such and such fossil(s) is (are) good [candidates for] transitional forms (for example, 'Archaeopteryx *is not a transitional form because . . .*' or '*Mammal-like reptiles are an excellent transitional form because . . .*'). Repeatedly called upon to respond to queries on this issue, the author has decided to give an overview of his thoughts on the traditional transitional forms issue, such as they are.

THE TRADITIONAL TRANSITIONAL FORMS ISSUE AND THE PRESENT CREATION MODEL

Its Rigorous Evaluation Is Premature

Palaeontology is an interdisciplinary field combining elements of biology and geology. As such, a coherent field of palaeontology is wholly dependent upon pre-existent coherent fields of biology and geology.[5] To ultimately develop a coherent field of creationist palaeontology the author has participated in the development of baraminology[6,7] (a creationist classification system), creation polycladism[8,9] (an initial attempt at a coherent discipline of creationist biology), and catastrophic plate tectonics[10] (a coherent Flood geology model). Catastrophic plate tectonics may become the backbone of a coherent Flood geology of the future. Likewise, baraminology may become the creationist biosystematics of the future. Much less certain is what will be the form of the coherent creationist biology of the future. Given the developmental nature of the fields upon which palaeontology must be based, creationist palaeontology as a field does not currently exist in anything like a coherent state. As a result, there is no sense in which creationist palaeontology at this point is capable of addressing the traditional transitional forms issue issue in any rigorous sense.

Its Prioritization in Creationism Is Low

The commonness of transitional forms in the fossil record is an intuitive prediction of most macroevolutionary models. As a result, the traditional transitional forms issue has a high priority to the evolutionist. However, it is important to realize that what is important to an evolutionist may not be important to a creationist. Given that young-age creationists have very limited resources (time, money, researchers, lab facilities, training, etc.), each issue should be evaluated and prioritized with reference to the creation model. Optimally, issues should then be addressed in the *creationist* order of prioritization without regard to the prioritization given in other models. Prioritization should begin with the most obvious and broad-scale (that is, first-order) patterns and characteristics in each discipline, and then work down through the less obvious and finer-scaled (that is, second-, third-, etc. order) patterns. Although identification and evaluation of first-order fossil record patterns has only begun, a list of first-order patterns would likely include (not necessarily in order of priority):

(a) beauty in organismal form;[11]
(b) high complexity and integration of complexity in organismal form;[12]
(c) mosaic/chimeral (what I call 'chimeromorphic') nature of morphological traits and structures;[13]
(d) high homoplasy frequency;[14]
(e) commonness of fossils;[15]
(f) rarity of extensive bioturbation;[16]
(g) high disparity/diversity ratios;[17]
(h) stasis of species and higher taxa;[18]
(i) rarity of stratomorphic intermediates[19,20] (defined below);
(j) high species preservability;[21]
(k) randomness as a first-order order of first appearance of higher taxa;[22,23]
(l) sea-to-land ecology as a second-order order of first appearance of higher taxa;[24] and
(m) validity in the Precambrian/Palaeozoic/Mesozoic/Cenozoic faunal/floral distinctions.

The traditional transitional forms issue is nowhere found in this list of the first-order patterns of the fossil record, and this author does not feel it should ever be accorded such an 'honour'. To be wise stewards of His resources creationists should concentrate study on the first-order characteristics of the fossil record and not quibble about such details as the traditional transitional forms issue until the larger issues have been taken care of.

Its Evaluation Would Be Resource Prohibitive

A living organism contains an extraordinarily large number of characteristics. To fully characterize an organism is a daunting and, for all practical purposes, impossible task. Even the reduced number of characters in the fossil of an organism (for example, the bones of a vertebrate) is usually too great for a palaeontologist to fully evaluate. As a result, any biologist, palaeontologist or systematist (etc.) will only consider a certain subset of all characters in their study of an organism. Which characters they choose to utilize is determined by their biosystematics system, their over-arching geological and palaeontological models, and the particular questions they are asking about the specimen(s). Given the radically different biosystematic, geologic, biologic, and querying schemes which are utilized by creationists and evolutionists, it will rarely (if ever) be true that the characters most interesting to the creationist will have been evaluated by the evolutionist in his studies. [Note that this is not to say that the evolutionist is being deceptive in not including these characters . . . it's just that he is being a good steward of his resources and only evaluating those characters which are pertinent to **his** questions.] As a result, as a creationist properly evaluates the evolutionary claims of transitional forms, it will be **necessary** for the creationist to go to the original material and make his own observations. This will require a world tour of museums (for example, the mammal-like reptiles are variously stored in England, South Africa, various locals in the United States, South America, etc.; the earliest birds in Germany, England, China, etc.; the earliest whales in Egypt, Pakistan, the US, etc.), with the expertise necessary to make the proper measurements and observations. At this stage we lack

(a) the necessary monetary resources,
(b) the necessary morphological familiarity with the groups, and
(c) the necessary time required to accomplish such a task.

It Should Not Concern a Creationist

Because creationist palaeontology is not in the state necessary to properly address the traditional transitional forms issue, the traditional transitional forms issue is not of the highest priority in creationist palaeontology. Since proper evaluation of the traditional transitional forms issue would divert substantial resources away from other tasks, it is not an efficient use of creationist resources to address the traditional transitional forms issue at this point in time. To allow the evolutionist to determine creationists' priorities/allocation of resources (in this case, the traditional transitional forms issue) will thwart attempts to build a creation model. The traditional transitional forms issue should, at this time, not be a concern to the creationist.

THE TRADITIONAL TRANSITIONAL FORMS ISSUE AND THE FUTURE CREATIONIST MODEL

It Requires a New Vocabulary

As claimed above, the traditional transitional forms issue argument is important to the evolutionist. It has always been an evolutionary argument, and it is inherently alien to the creationist. Any time a creationist deals with the traditional transitional forms issue he is playing on an alien field and at a substantial disadvantage . . . a draw in such a game will result in a win for the evolutionist.

One of the inherent advantages the evolutionist has always had in this game is vocabulary. 'Transitional form', for example, is an **interpretive** term — it has meaning only within the evolutionary model; it has no inherent meaning in the creation model. Also, given that the word is defined by evolutionary theory, different evolutionary theories can (and do) have different meanings for 'transitional form'. For example, Stephen Jay Gould's different definition of transitional form from that of the gradualists has caused all manner of misunderstanding of Gould's belief in transitional forms ... leading some creationists, for example, to erroneously conclude that Gould does not believe *Archaeopteryx* is a transitional form.[25] Given the interpretive and ambiguous nature of the term, it is important that creationists NOT use 'transitional form' in their argumentation. This is why the terms 'stratigraphic intermediate', 'morphological intermediate', and 'stratomorphic intermediate' have been introduced into creationist literature with the suggestion that they be used in traditional transitional forms issue arguments.[26]

A **stratigraphic intermediate fossil** is a fossil which lies stratigraphically between two other fossils or between the lowest stratigraphic representatives of two fossil groups. As an example, the 'tully monster' (*Tullimonstrum gregarium*: the state fossil of Illinois) is found in Pennsylvanian System rocks and is thus a stratigraphic intermediate between the trilobites (known from the Cambrian through Permian Systems) and the whales (known from the Palaeocene Series on up). A **stratigraphic intermediate fossil group** is a set of fossils whose lowest stratigraphic member is between two other fossils or between the lowest stratigraphic representatives of two fossil groups.

A **morphological intermediate fossil** is a fossil which is in some sense morphologically intermediate between two other fossils or between the shared characters of each of two other fossil groups. It must be noted that the TYPE of morphological intermediacy (fully- versus partially-developed features, single versus multiple features, etc.) is not specified in this term. It may be that the organism has all the characters of one group PLUS one fully-developed character otherwise possessed by a second group (for example, the echidna and platypus are, because of their ability to lay eggs, chimeromorphic intermediates between the other mammals and non-mammalian vertebrates). In theory it could also be that the organism possesses an intermediate character state between every pair of characters which differentiate the two groups (no known example exists here). A **morphological intermediate fossil group** is a fossil group whose shared characters are in some sense morphologically intermediate between two other fossils or between the shared characters of each of two other fossil groups.

Lastly, a **stratomorphic intermediate fossil** (or **stratomorphic intermediate fossil group**) is a fossil (or fossil group) which is BOTH a stratigraphic intermediate AND a morphological intermediate between two other fossils or two other fossil groups. Though it is a stratigraphic intermediate between trilobites and cetaceans, the 'tully monster' is NOT an example of a stratomorphic intermediate because it is not a morphological intermediate between the trilobites and the cetaceans.

These three terms (stratigraphic, morphological, and stratomorphic intermediates) are more descriptive than interpretive terms and are much less ambiguous than 'transitional form', so should be used in its place. In various macroevolutionary models, stratomorphic intermediates might be expected to be any one or more of several different forms:—

(a) **inter-specific stratomorphic intermediates**;
(b) **stratomorphic intermediate species**;
(c) **higher-taxon stratomorphic intermediates**; and
(d) **stratomorphic [intermediate] series**.

As an example (and to provide informal definitions), if predictions from Darwin's theory were re-stated in these terms, one would expect to find:—

(a) numerous stratomorphic intermediates between any ancestor-descendent species pair (numerous inter-specific stratomorphic intermediates);
(b) species which were stratomorphic intermediates between larger groups (stratomorphic intermediate species);
(c) taxonomic groups above the level of species which were stratomorphic intermediates between other pairs of groups (higher-taxon stratomorphic intermediates); and
(d) a sequence of species or higher taxa in a sequence where each taxon is a stratomorphic intermediate between the taxa stratigraphically below and above it (stratomorphic series).

With this vocabulary as a beginning, the traditional transitional forms issue can be gradually transformed into a non-traditional form, more suitable to the creationist researcher.

It Is a Very Good Evolutionary Argument

Of Darwinism's four stratomorphic intermediate expectations, that of the commonness of inter-specific stratomorphic intermediates has been the most disappointing for classical Darwinists. The current lack of any certain inter-specific stratomorphic intermediates has, of course, led to the development and increased acceptance of punctuated equilibrium theory. Evidences for Darwin's second expectation — of stratomorphic intermediate species — include such species as *Baragwanathia*[27] (between rhyniophytes and lycopods), *Pikaia*[28] (between echinoderms and chordates), *Purgatorius*[29] (between the tree shrews and the primates), and *Proconsul*[30] (between the non-hominoid primates and the hominoids). Darwin's third expectation — of higher-taxon stratomorphic intermediates — has been confirmed by such examples as the mammal-like reptile groups[31] between the reptiles and the mammals, and the phenacodontids[32] between the horses and their presumed ancestors. Darwin's fourth expectation — of stratomorphic series — has been confirmed by such examples as the early bird series,[33] the tetrapod series,[34,35] the whale series,[36] the various mammal series of the Cenozoic[37] (for example, the horse series, the camel series, the elephant series, the pig series, the titanothere series, etc.), the *Cantius* and

Plesiadapus primate series,[38] and the hominid series.[39] Evidence for not just one but for all three of the species level and above types of stratomorphic intermediates expected by macroevolutionary theory is surely strong evidence for macroevolutionary theory. Creationists therefore need to accept this fact. It certainly CANNOT be said that traditional creation theory expected (predicted) any of these fossil finds.

It Appears Explainable in the Creation Model

The following is a possible creationist scenario of earth history:

(a) God created organisms according to His nature, with such features as beauty, complexity, integration of complexity, disparity,[40] diversity, and mosaic network of form,[41] thus explaining the beauty, complexity, integration of complexity, chimeromorphism, and high homoplasy frequency in fossil organisms;

(b) Before the Flood, there were probably biological communities unfamiliar to us today — for example, floating forests dozens to hundreds of miles wide along many of the earth's coastlines dominated by Palaeozoic plant groups and 'labryinthodonts';[42,43] and perhaps vast epeiric (shallow continental) seas dominated by Sepkoski's 'Palaeozoic Fauna';[44]

(c) pre-Flood ecosystems were probably more tightly structured than today and strongly biozoned — for example, the major plant groups arranged from ocean inland according to their ability to reproduce without standing water and plant-group-specific animal taxa tracking that biozonation;[45]

(d) The Flood was a global, diluvial catastrophe — explaining the commonness of fossils,[46] the rarity of extensive bioturbation,[47] the high species preservability,[48] and the first-order randomness of the first appearance of higher taxa;[49]

(e) The Flood was transgressive — burying plant-animal communities in the sequence they were encountered (thus explaining the second-order sea-to-land first-appearance order of major taxa,[50] the high disparity/diversity ratios characteristic of modern biological communities, species and higher-taxon stasis,[51,52] the rarity of stratomorphic intermediates,[53] and the distinction between Palaeozoic and Mesozoic biotas);

(f) After the Flood residual catastrophism continued with decreasing intensity,[54] the earth's climate cooled and dried,[55] the earth's biota exploded with intrabaraminic diversification (10 to 100-fold in mammal species and 1000-fold in insect species),[56] and organisms spread across the earth and developed make-shift communities.

Within this scenario, various stratomorphic series are likely to be examples of post-Flood intrabaraminic diversification under conditions of secular cooling and drying.[57] Examples would probably include the various mammal stratomorphic series of the Cenozoic, the *Cantius* and *Plesiadapus* series, and possibly parts of the hominid series. Other stratomorphic intermediates are probably geographic intermediates (morphological intermediates between animals of two adjacent biozones which — probably because of their intermediate morphology — lived in the geographical zone lying at the contact of the two biozones) buried by transgressing Flood waters as stratigraphic intermediates,[58] for example, *Baragwanathia*, the early tetrapod series, the mammal-like reptiles, and the bird series. The few stratomorphic intermediates which remain (*Pikaia*, *Purgatorius*, *Proconsul*, the archaeocetes, and the phenacodontids) may be nothing more than morphological intermediates which ended up in stratigraphic intermediate position by one accident or another. Given the very high abundance of morphological intermediates in the present biota, and the relative rarity of stratomorphic intermediates in the fossil record (comparing the absolute number of stratomorphic intermediates with the number of ancestor/descendent pairs which are necessary in macroevolutionary theory) suggests that a few stratomorphic intermediates might be expected in even a random burial process.[59] The author suggests that when this is finally quantified, it will be found that the number of stratomorphic intermediates not immediately explainable in the creation model could reasonably be expected from a random depositional process.

It Offers Challenges for the Creationist Model

At this point in time, the largest challenge from the stratomorphic intermediate record appears to this author to come from the fossil record of the whales. There is a strong stratigraphic series of archaeocete genera claimed by Gingerich[60] (*Ambulocetus*, *Rhodocetus*, and *Prozeuglodon* [or the similar-aged *Basilosaurus*][61]) followed on the one hand by modern mysticetes,[62] and on the other hand by the family Squalodontidae and then modern odontocetes.[63] That same series is also a morphological series: *Ambulocetus* with the largest hind legs;[64–66] *Rhodocetus* with hindlegs one-third smaller;[67] *Prozeuglodon* with 6 inch hindlegs;[68] and the remaining whales with virtually no to no hind legs: toothed mysticetes before non-toothed baleen whales;[69] the squalodontid odontocetes with telescoped skull but triangular teeth;[70] and the modern odontocetes with telescoped skulls and conical teeth. This series of fossils is thus a very powerful stratomorphic series. Because the land mammal-to-whale transition (theorized by macroevolutionary theory and evidenced by the fossil record) is a land-to-sea transition, the relative order of land mammals, archaeocetes, and modern whales is not explainable in the conventional Flood geology method (transgressing Flood waters). Furthermore, whale fossils are only known in Cenozoic (and thus post-Flood) sediments.[71] This seems to run counter to the intuitive expectation that the whales should have been found in or even throughout Flood sediments.

At present creation theory has no good explanation for the fossil record of whales. On the other hand, clues that an alternative solution might be forthcoming comes from the following considerations:

(a) The archaeocete group is not defined by good synapomorphies,[72,73] and is more or less a taxonomic waste-basket group. It is more or less arbitrarily divided from modern cetaceans at the Eocene/Oligocene boundary. It is likely that a careful re-evaluation of the group will find it to be more taxonomically diverse, just as has been found with studies of other stratomorphic intermediate taxa (for example, mammal-like reptiles and early tetrapods). Perhaps the archaeocetes are made up of early post-Flood odontocetes and mysticetes along with representatives of other (unrelated) aquatic or marine mammal baramins.[74]

(b) During the development of some sperm whales the fetus develops portions of hind limb and pelvic bones and subsequently resorbs them. Other modern cetaceans have other bones in embryology and sometimes adulthood which suggest hind limb vestiges.[75] This suggests that modern cetaceans have latent genetic information for the development of small hind limbs. Could this mean that *Basilosaurus*, for example, (which has hind limbs and pelvis) is actually an early post-Flood representative of some cetacean baramin and that modern cetaceans of that baramin are actually descendant from it — or something similar to it?

(c) Most of the archaeocete specimens are found in shallow-water sediments. If the environment of burial was examined carefully would it reveal that the land/sea mammal morphological intermediates lived in land/sea geographical intermediate positions? Could it be that there has been a bias towards searching shallow-water sediments and/or that the Lower Cenozoic has a bias towards terrestrial sedimentation?

(d) Collected evidence from sightings of Nessie, Champs, and other similar sightings at similar latitudes has suggested that they might be living examples of the archaeocete *Basilosaurus* (old name *Zeuglodon*). If so, then its elusive nature and low population density might suggest how the pre-Flood whales survived the Flood without representation in Flood sediments. In any case, the capture of an actual *Basilosaurus* would go a long way towards solving this mystery.

It Offers Encouragement to the Creationist Model

The fossil record of the mammal-like reptiles is often marshalled as powerful evidence for macroevolutionary theory. The mammal-like reptiles are stratigraphically between the oldest mammals and the oldest reptiles, making them a good higher-taxon stratomorphic intermediate.[76] Furthermore, as one rises stratigraphically through the mammal-like reptiles their teeth show a virtually monotonic change from the cone-shaped teeth of the reptiles to the complex teeth of the mammals, and the three jaw bones show a virtually monotonic change from the subequal size of the three bones of the reptile jaw towards the single bone of the mammal jaw[77] — they are thus morphological intermediates as well. As hinted by the 'dont' in every mammal-like reptile (cynodont) group (for example, tritolodonts, chinoquodonts, trithelodonts) mammal-like reptile distinctions largely revolve about the nature of their dentition. It is also dentition trends which place the mammal-like reptiles in a morphologically intermediate position. (NOTE also that the complex teeth of a mammal and the associated complex jaw musculature may well require the increased jaw strength given by one bone as opposed to three). This suggests that the different mammal-like reptiles have different diets. Those diets are also different — but intermediate — between the diets of the reptiles and the mammals. This in turn suggests that if the mammals and reptiles occupied largely distinct but adjacent portions of the earth before the Flood, that the mammal-like reptiles are likely to have been placed in a geographical (and dietary) position between them. The Flood would then have encountered and buried them in the intermediate stratigraphic position in which they are found today. Another possible expectation from such a scenario is that there was actually a series of mammal-like reptile communities — each composed of both herbivores and carnivores — which could be traced from the reptile zone to the mammal zone. Flood burial would thus show a number of independent groups of mammal-like reptiles (for example, herbivore and carnivore groups) — each 'becoming' more mammal-like in morphology as one went up-section, and this is exactly what is seen. The difficulty of explaining this in conventional theory (via convergent and/or parallel evolution)[78] suggests that the creation model may actually turn out to be a better explanation of the fossil record of the mammal-like reptiles than macroevolutionary theory.

The horse series is often given as an excellent example of evolution evidenced in the fossil record.[79] In general, the mammal stratomorphic intermediate species series of the Cenozoic (for example, camels, elephants, pigs . . .) — of which the horse series is an example — are together quite impressive.[80] Characteristically, within the groups there is high correspondence between phylogenetic and stratigraphic order, and between the groups there are similar morphological changes (for example, increased body size and increased hypsodonty). Given that all the fossils are found in the Cenozoic System, it is likely that whatever is happening here is post-Flood. Given further that the within-group morphology differences are within taxonomic families, it is likely that the differences are intra-baraminic in every case. If the fossils were recording real changes (and thus real phylogenies) within mammal baramins after the Flood, it would explain the within-group correspondence between phylogeny and stratigraphy (and thus the stratomorphic series). The similar morphological changes across groups (baramins) are most interesting. They not only occur simultaneously with a change in woodland to grassland floral communities, but the most significant morphological change (increased hypsodonty) is definitely more advantageous in increased grassland situations. On this point, the conventional explanation is substantially more strained than the creationist scenario suggested above. In the creationist scenario, the woodland-grassland change is reflecting a drying of the post-Flood earth.[81] At the same time as there was strong selection pressure caused by this floral change plus the secular cooling of the earth, the already created, latent genetic material in each of the baramins was somehow stimulated. Natural selection may then have allowed the baramins to respond to that selection pressure. The cooling may have prompted an increase in body size, and the increased percentage of grasses in the diet may have prompted the increased hypsodonty.[82] Conventional theory has no explanation for the secular decrease in ocean temperature over this period, nor for the increase in grassland over this period (except for the ad hoc suggestion that the grasses must have evolved). Then conventional theory must suggest that high selection pressures caused parallel and convergent evolution to occur within a number of groups. Given the absence of a mechanism for the cooling and drying of the earth and the difficulty in independent creation of new genetic material in a number of groups, conventional theory is much less successful at explaining some of their favourite fossil evidence (namely the horse series) than is the creation model.

CONCLUSION

Substantial supporting evidence of macroevolutionary theory can be found in the fossil record of stratomorphic intermediates. Additionally, the creation model is not well enough developed at present to properly evaluate this evidence or to develop an adequate alternative scenario or explanation. However, in the light of the creation model's incomplete development, its non-inconsiderable success at explaining that record is exciting and promising indeed. There is little doubt in this author's mind that with the maturity of the creation model will come an explanation of stratomorphic intermediates superior to that of macroevolutionary theory.

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40. **Disparity** is a measure of the range of 'differentness' of organisms; **diversity** is a measure of the number of organisms. Examples — a human alone with a bacterium in a room represent a high disparity (between humans

and bacteria) and a low diversity (two), whereas the 5000 species of *Drosophila* on the islands of Hawaii represent a low disparity (a single genus of fruit-fly) and high diversity (5000 species and LOTS of individuals!)

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58. Wise, Ref. 9, p. 162.
59. Simpson and Wise, Ref. 19.
60. Gingerich, Ref. 1; Zimmer, Ref. 3.
61. It must be noted that relative dating of these three genera is still not settled and may never be certain. This is because they are very close stratigraphically and found in different locations: *Ambulocetus* and *Rhodocetus* in two different geographic locations in Pakistan a few hundred miles apart; *Prozeuglodon* in Egypt; and *Basilosaurus* in the US.
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