Gogonasus—a fish with 'human' limbs?

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A recent find of an almost complete *Gogonasus* fossil skeleton in the early Frasnian of the Gogo Formation in northwest Western Australia has resulted in a major revision of the fish-to-tetrapod lineage. The mainstream media has exaggerated this new find into a new missing link, claiming *Gogonasus* is a fish with 'human like limbs'. However, these claims are shown to be vastly exaggerated in comparison to the claims made about *Gogonasus* in the mainstream scientific literature. Moreover, the anatomical evidence clearly delineates *Gogonasus* as a fully formed lobe-finned fish, albeit with what appears to be a unique morphology. Therefore we conclude that *Gogonasus* provides no support for fish-to-tetrapod evolution.

There have been many claims in the past year of 'missing links' filling in the gaps in the fish-tetrapod evolutionary transition in the fossil record in the Late Devonian.[1–3] However, many of the claims that have been made in the media unreasonably exaggerate the claims put forward in the original articles in the scientific literature.[4,5] The latest of these finds is an exquisitely preserved *Gogonasus* fossil found in the Gogo Formation in northwest Western Australia. *Gogonasus* has received the usual media attention reserved for 'missing links', boldly proclaiming that the fins are 'like human arms'.[6] In contrast, the original *Nature* article[3] is far more conservative about the claims. So what is the actual story behind this fossil?

Fantastic fossil formation

Gogonasus was exquisitely preserved in the Gogo Formation, a limestone formation in the Kimberley region of northwest Western Australia. 'It's one of the few sites in the world where you can get whole complete fish in limestone', John Long, one of the authors of the *Nature* paper, told *LiveScience*.[7] It was so well preserved that scientists could even open and close the mouth of this fossil fish. 'It's like it died yesterday', Long said.[7] This formation 'is widely acknowledged for its perfect three-dimensional preservation' of fish fossils.[3,8] But *Gogonasus* is placed in the Late Devonian (Frasnian) period, giving it a 'date' of around 380–384 million years.

The standard uniformitarian interpretation of the Gogo Formation is that the limestone deposits form part of an ancient coral reef.[9] However, such certainty regarding this paleo-environmental interpretation of the Gogo Formation is not likely justifiable according to the data.[10] Rather than speaking of a coral reef ecosystem, which would have developed slowly, the limestone deposits interspersed with shale in the Gogo Formation, together with the magnificent preservation of the anatomical structure of the fish buried, suggest a recent catastrophic burial during the Genesis Flood.[11,12] Therefore, *Gogonasus* looks 'like it died yesterday' because it died a lot closer to yesterday than to 380 million years ago!

Dating games

Even under uniformitarian assumptions, the dates assigned to the tetrapodomorph fish fossils from *Eusthenopteron* through to *Tiktaalik* are rather arbitrary. The fossils of *Eusthenopteron* (385 Ma), *Gogonasus* (~384–380 Ma), *Panderichthys* (385 Ma) and *Tiktaalik* (380 Ma) all come from what seem to be the same stratigraphic level, the early Frasnian (Late Devonian). The dates assigned to these different fossils, rather than being assigned on the basis of the stratigraphy, seem to be assigned by assumed evolutionary transition. The flexibility of these dates can be shown by comparing the date assigned to *Panderichthys* before and after the *Tiktaalik* fossil find was announced. Ahlberg and Clack,[13] reviewing the *Tiktaalik* find, commented that the date assigned for *Panderichthys* was 385 Ma. However, not 6 months previously, Clack[14] dated *Panderichthys* at 375–380 Ma. This obviously does not preclude evolutionists from dating these fossils with a 10 Ma error range. Therefore, there does not appear to be a clear stratigraphic case for or against their order of transitional forms, so the stratigraphic record cannot be used as independent evidence for the proposed chronological order of the fossils.

However, even the underlying uniformitarian assumption of the universal applicability calls into question the dating of these fossils. The locations of the fossils also present problems for stratigraphic and index fossil dating. The fossils come from Canada (*Eusthenopteron*, *Tiktaalik*), Latvia (*Panderichthys*) and Australia (*Gogonasus*). Unless evolutionists are going to posit that all these layers are linked worldwide (they don't[3]), dating them all to the same time is speculative at best. [15]

'Earie' holes and fins that'll grab you

If *Gogonasus* is such a well-preserved fossil that is clearly a fish, why is there so much media attention? All the attention revolves around two structures, the spiracle opening and the pectoral fin.

The spiracle opening is a hole in the head of a fish that leads to the gill chamber. This opening in *Gogonasus* is 'thought to be the forerunner for the middle ear in modern

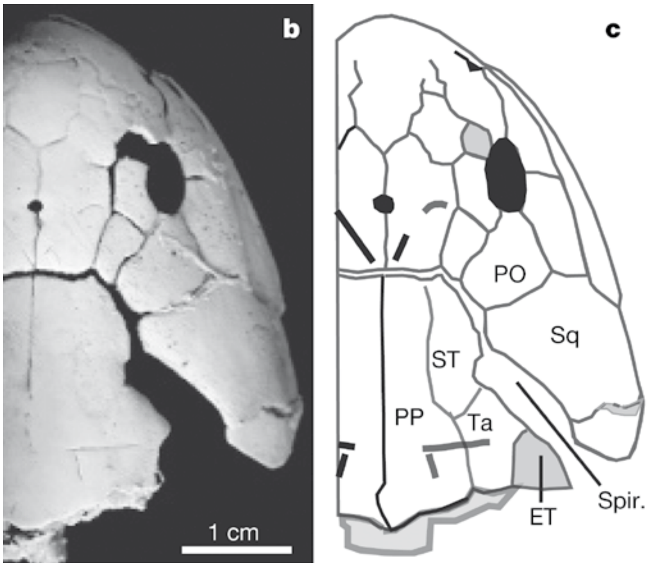

Figure 1. *Gogonasus* skull in dorsal view. The spiracular opening (labelled 'Spir.' in the diagram on the right) is larger in *Gogonasus* than any other tetrapodomorph fish. (From Long *et al.*[3]).

land animals.'[7] This is based on *Gogonasus* possessing a stubbier-than-usual hyomandibula bone (a bone in the gill arch which suspends the jaw joint from the braincase[16]), making it look slightly more like the middle ear bone of the early tetrapod *Acanthostega* than most other fish fossils. The hyomandibula supposedly retracted from the spiracular opening from *Eusthenopteron* (the 'model fish ancestor' used at the beginning of the fish-to-tetrapod evolutionary story), through *Gogonasus* and *Tiktaalik*, to the early tetrapods, where it supposedly turned from a gill into an ear.[1,2,3] However, the spiracular opening is in fact larger than expected from an evolutionary standpoint in *Gogonasus*; it is the largest found of any 'tetrapodomorph' fish found (figure 1). It caused Long *et al.* to speculate that the spiracle evolved more than once in tetrapodomorphs.[3]

Despite this problem with the spiracular opening, the speculation concerning fish spiracles and tetrapod middle ears is a new interpretation of the evidence, and is not supported by all evolutionists. For example, Michael LaBarbera, a professor of organismal biology and anatomy at the University of Chicago. Not even convinced about the structure Brusseau and Ahlberg identified as a spiracle in *Panderichthys* (which has many similarities to *Tiktaalik*, which is supposedly two steps along the line from *Gogonasus*),[1] he states that Brusseau and Ahlberg's idea is 'based on the interpretation of a structure that would be completely novel and unprecedented in this lineage'.[17] One thing is clear, and that is the identification of the bone that supposedly underwent the change from gill to ear function (the hyomandibula, allegedly evolving into the stapes, a middle ear bone). In fish, including *Gogonasus*, it is always identified as a hyomandibula. In all tetrapods, including the earliest, e.g. *Acanthostega*, it is always identified as a stapes.[18]

Concerning the pectoral fins of *Gogonasus*, the *Nature* article described them as 'approaching the condition of *Tiktaalik*'.[3] *Gogonasus* bears close resemblance to the fin structure of *Tiktaalik*, Therefore, while superficially more 'arm-like' than most other lobe-finned fishes, *Gogonasus*' fin structure is not even as close to tetrapod limbs as *Tiktaalik*. Note that Ahlberg and Clack, who believe *Tiktaalik* is a true transitional form, wrote in their review of that fossil:

> 'Although these small distal bones bear some resemblance to tetrapod digits in terms of their function and range of movement, they are still very much components of a fin. There remains a large morphological gap between them and digits as seen in, for example, *Acanthostega*: if the digits evolved from these distal bones, the process must have involved considerable developmental repatterning. The implication is that function changed in advance of morphology.'[13]

Therefore, if the fins of *Gogonasus* and the rest are a long way from turning into the arms of even their supposed closest tetrapod ancestor, any claims that *Gogonasus*' fins are in any new or spectacular way 'similar to a human arm'[19] are substantially misleading.

An object lesson in speculation

Molecular biologist Michael Denton once wrote, 'To begin with, ninety-nine per cent of the biology of any organism resides in its soft anatomy, which is inaccessible in a fossil.'[20] This is especially true of the parts of anatomy of all these recent fish-to-tetrapod 'missing links' that are being used to establish evolution. In order to establish the evolution of what is most likely a respiratory structure into an ear, or a fin into a leg, much more needs to be known than the bone structures of these traits. A huge chasm exists.

The coelacanth is a perfect example of such imaginative speculation buckling under the weight of hard, scientific data. Thought to be extinct for 65 million years, the coelacanth was discovered alive and well off the coast of South Africa in 1938. Scientists were excited by this discovery because the coelacanth is a close relative of the Rhipidistia, considered by many scientists, at one time, to be the ancestors of amphibians. They thought that their bony pectoral fins enabled these fish to make the transition from walking in shallow water to walking on dry land and evolving into amphibians.

However, researchers have spent a considerable amount of time filming coelacanths underwater, and they do not walk at all. Instead their robust pectoral and pelvic fins are utilized for high powered, highly manoeuvrable swimming in the deep sea. In addition, a soft tissue analysis revealed that their physiology was 100% fish, and was in no way transitional between fish and amphibian.[21]

Extrapolating function and ancestry from bones alone is a highly inexact science. Bat wings, whale fins and

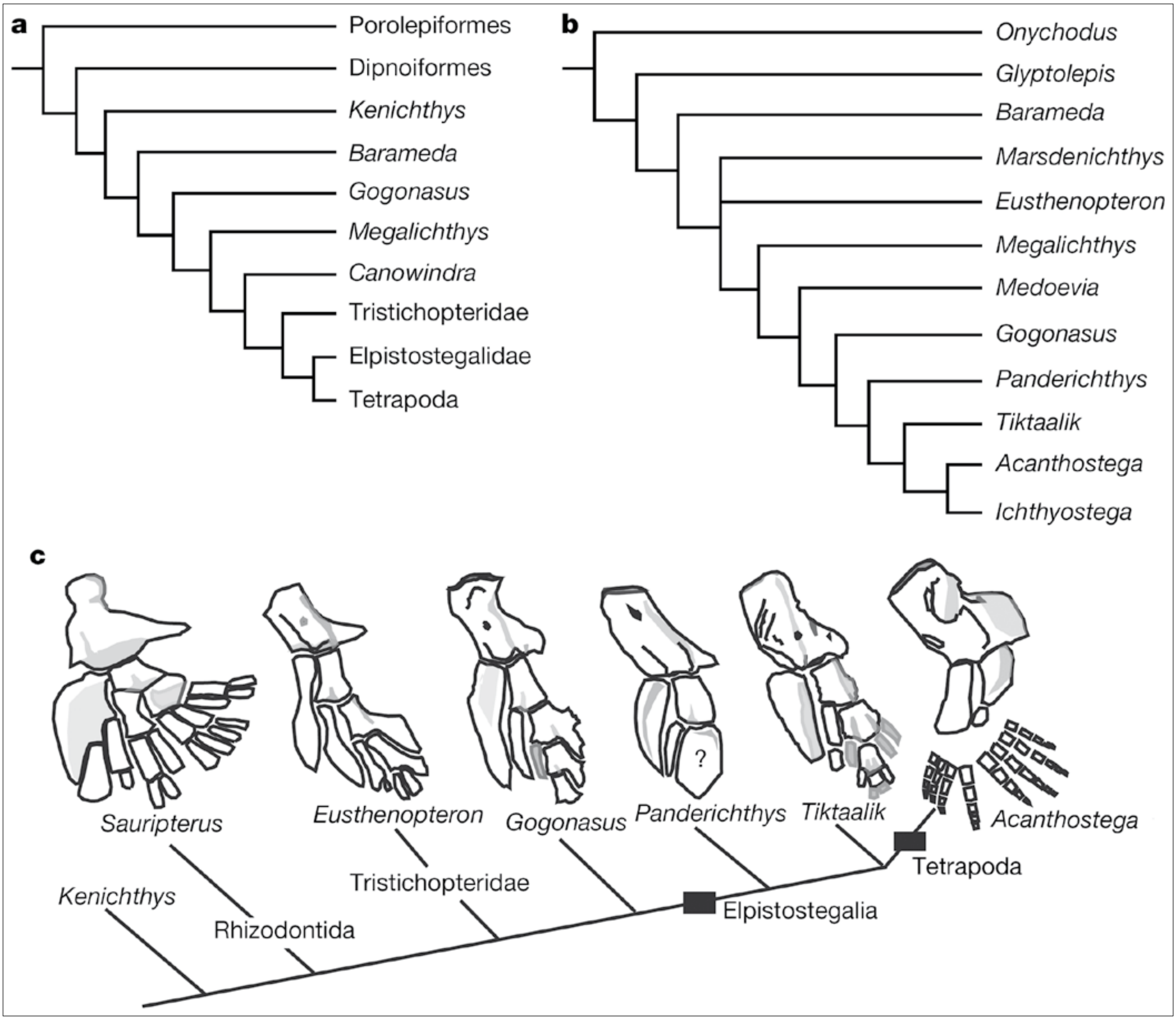

Figure 2. Old and new cladograms of fishes to early tetrapods. Figure 2a shows the old position of *Gogonasus*, and figure 2b shows Long *et al*.'s new position for *Gogonasus*, which is much closer to the 'early' tetrapods. Figure 2c image shows the inferred lineage with the fin/foot structures of different fossils along the 'lineage'. (From Long *et al*.[3]).

human hands all have the pentadactyl pattern, with five digits, a humerus, radius and ulna, but that doesn't mean they had a common ancestry.[22] Vast amounts of biological, genetic and soft tissue restructuring would be required to effect such a change. However, such restructuring has never been observed, tested or even successfully modelled in living organisms. A common designer is just as good an explanation for such a widespread pattern as 'common descent'. In fact, common descent falls down when it comes to the obvious similarity between the bone pattern in forelimbs and hindlimbs—clearly, no evolutionist teaches that this is the result of common descent from an ancestor which had only fore- or hindlimbs. They would probably claim that the similarity was because natural selection chose the same pattern for good bioengineering reasons. This is precisely the argument one could apply as to why God utilized the same pattern repeatedly in different types of vertebrates—now including *Gogonasus*.

Where does *Gogonasus* fit?

Long *et al.* give a cladistic analysis of the traits of the fossils either side of the supposed fish/tetrapod barrier (figure 2). Cladistics is a method of classifying singular traits that are distributed though a collection of organisms.[23] In this analysis, Long *et al.* place *Gogonasus* in a sister group alongside the two closest fish 'relatives' of tetrapods, *Panderichthys* and *Tiktaalik* (figure 2b & c), which is a large reshuffling of a number of the fossils in this group, compared to previous arrangements (figure 2a). This shows that these evolutionary trees are based on a little bit of evidence and a whole lot of speculation. For all we know, another single fossil find will cause another complete revision of the entire arrangement!

Importantly, cladograms (tree diagrams based on a cladistic analysis), such as those in figure 2, *are not evolutionary lineages*.[24] They merely describe the relative similarities between a suite of singular traits of organisms. Unfortunately, evolutionists often portray cladograms *as* evolutionary lineages. But cladograms can give the appearance of evolutionary relationship where none exists at all—you can arrange a collection of teaspoons in a cladogram. The *Courier Mail* quoted Long as saying, regarding human ancestry, 'You can now trace it back to this fish [i.e. *Gogonasus*]'. However, a cladogram does not identify ancestors, even for those who believe in evolution.[25] Unfortunately, most people are unaware of this, and this sort of misrepresentation of the situation in the media is misleading.

Homoplasy and evolution

Looking at the relationship between *Gogonasus* and the early tetrapods, Long *et al.* aver:

> 'The conspicuously large spiracular opening is proportionally similar to those recently reconstructed for *Panderichthys* and *Tiktaalik*. … There are some surprising similarities to the recently described pectoral fin in the advanced elpistostegalian *Tiktaalik*. … such features could indicate homoplasy between *Gogonasus* and early tetrapods'.[3]

The key word to note here is *homoplasy*.[26] It is commonly used of the evolutionary relationships between different traits and different organisms. However, homoplasy provides no support for evolutionary explanations. Homoplastic structures are similar enough to require an explanation for the pattern observed, but are too different to be described as a 'genetic throwback'[27] or don't fit a pattern of common descent. So the idea of 'parallel' or 'convergent' evolution is used to maintain that evolution independently came up with the similar solution more than once—in 'parallel'.[28] Indeed, an accumulation of such homoplastic structures is part of a *mosaic* pattern seen widely in living things and fossils, one that *thwarts* evolutionary explanations.[29] The tetrapod-like spiracle gap and fin structures in *Gogonasus*, combined with the many fish structures, provide examples of homoplasy and mosaic evolution. This homoplasy between *Gogonasus* and early tetrapods (this includes the comparison of *Tiktaalik* to the early tetrapods, and possibly other lobe-finned fish) is convergent,[26] which is not helpful for constructing an evolutionary lineage of tetrapods from a supposed evolutionary 'ancestor'. As ReMine quipped, 'convergence thwarts lineage'.[28]

The conclusions of Daeschler *et al.* concerning *Tiktaalik* and the fish-to-tetrapod picture, of which *Gogonasus* is now claimed to be a part, are instructive:

> 'Major elements of the tetrapod body plan originated as a succession of intermediate morphologies that evolved *mosaically* and *in parallel* among sarcopterygians closely related to tetrapods, allowing them to exploit diverse habitats in the Devonian [emphases added].'[2]

Despite the media hype, they are therefore *not* claiming that the fossils present a direct lineage from fish to tetrapods, but that different parts of tetrapod morphology evolved at different times, often independently in different lineages, in response to the demands of their habitats. However, mosaic and parallel evolution, convergence, homoplasy, etc. are part of the evolutionists' contingency plan for when common descent fails.

Gogonasus, like many of the fossils closely related to it, appears to have a mix of traits that are similar to different animals. Though fundamentally a fish, *Gogonasus* provides an example of a chimera in a few features.[30] Therefore *Gogonasus* may be classed a stratomorphic intermediate between *Eusthenopteron* and *Tiktaalik*, and a morphological intermediate between *Eusthenopteron* and *Panderichthys* as defined by Wise.[31] However, the above caveats concerning the stratigraphic dating need to be taken into account, and as such can only make such a classification speculative.

From a biblical viewpoint *Gogonasus* was *fully functional*, and its design was fully formed and in no way 'transitional' in an evolutionary sense. Furthermore, it may be that the pectoral fins and spiracular structure of *Gogonasus* and similar 'tetrapodomorph' fish such as *Eusthenopteron*, *Panderichthys* and *Tiktaalik* represent a unique morphology that distinguishes them as a biblical kind. However, such a conclusion would need to be established by further examination and evidence.

What are they claiming?

One may think that with all the attention given to these fossils they constitute irrefutable evidence for evolution, thereby falsifying the biblical record of history. However, whatever *Gogonasus* is precisely, it is first and foremost a *fish*. In contrast to the statements made for public consumption, Long *et al.*[3] do not claim that *Gogonasus* is the ancestor of all land-dwelling vertebrates. Rather, they conclude somewhat more circumspectly: 'A new phylogenetic analysis places *Gogonasus* crownward [i.e. closer to the tetrapods] of *Eusthenopteron* as the sister taxon to the Elpistostegalia.' But then they boldly assert that their 'new phylogeny replaces the tristichopterid *Eusthenopteron* as the *typical fish model* for the fish-tetrapod transition [emphasis added].' They believe they have found a new fish that they can use the starting point for telling the story of fish-to-tetrapod evolution: 'Once upon a (geological) time there was a fish called *Gogonasus* …'.

Gogonasus is yet another example of nothing much being blown up to look as if it is the final nail in the coffin for the Bible. When one takes the time to look beyond the media parade at the actual evidence, it is clear that the claims are far less spectacular and do not in the slightest threaten the straightforward history of Genesis. Even given the assumptions of the evolutionary model, they are at most mildly interesting—except, perhaps, for their potential use in the struggle to make it look as if there is this barrage of evidence coming out to support evolution. As the Bible says: 'Examine everything, hold to what is good' (1 Thessalonians 5:21).

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26. When evolutionists describe the relationship between organisms as homoplastic, it means they believe that their features supposedly evolved independently toward a similar design. Examples of homoplasy include parallel evolution, convergent evolution and evolutionary relay, however it is difficult to distinguish between different types of homoplasy in practice (See the definition of 'Homoplasy' in the glossary of Liem, K., Bemis, W., *et al.*, *Functional Anatomy of the Vertebrates: An Evolutionary Perspective*, 3rd ed., Harcourt College Publishers, Orlando, FL, 2001). The contrasting term in evolutionary language is *homology*, which is where a characteristic is shared between two organisms through direct lineage.
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