



Soapbox

Idolatry

Certainly no reader of this newsletter will be unaware that there is a new kid on the block in the Pantheon of famous fossils: Ida. She was revealed to the world on 19th May 2009 through two distinct channels. Her formal description appeared in a scientific paper in the peer-reviewed journal *PloS ONE*, but the vast majority of people will have first met Ida in the popular media, where she was presented as a rather more glamorous girl than what the sober facts would seem to suggest. Hence, immediately after this double debut, scientists, science writers and everyone else with an opinion took on the media

hype in the communal inbox of the blogosphere. Yet, it wasn't any of the basic facts about Ida that elicited this global typing tirade. After all, she represents the most completely preserved fossil primate ever found, and as such fully deserves the media attention so liberally foisted upon her. She is so stunningly fossilized that the furry outline of her body can be traced on the rock, and even the remains of her last meal of leaves and fruit are still detectable in her digestive tract.

I saw a cast of Ida last week at the Natural History Museum in London. She is on display in the middle of a large room that she has all to herself on the mezzanine level of the Central Hall, just a few metres away from a large statue of the man in whose honour she received her formal name *Darwinius masillae*. As I stared at her cast in silence before the hordes of visitors arrived at the Museum, I contemplated what all the fuss was about. Bizarrely, I wish that somehow Ida could have known that 47 million years after her death she would become an overnight pop culture celebrity, that she would come to adorn the logo of Google, if even for just one day, that she would be introduced as the special guest on Charles Darwin's 200th birthday party, and that she would be hailed as the "missing link" and "ancestor" to another group of primates, who would value her little skeleton to be worth almost \$13,000 per centimetre.

Yet, even though we are living through a global economic crisis, it is not the almost \$750,000 price tag that is controversial about Ida. Instead, the controversy focuses on both the phylogenetic interpretation of Ida as reported in her scientific birth certificate in *PloS*, and especially on the evolutionary hyperbole with which she is surrounded in the popular media. The reason why I decided to write this essay, rather than simply refer you to the many pages on the Web that discuss the Ida case at length (I especially recommend the Ida pages on the blog of science writer Carl Zimmer: <<http://blogs.discovermagazine.com/loom/category/darwinius/>>), is the response of Dr Jørn Hurum, who is one of the authors of the Ida paper, to a question posed by Lucas Laursen in a *Nature News* interview (Laursen, 2009) on 27th May 2009. Laursen asked Hurum "[w]hat response do you have for critics who argue that your approach [in the coordinated media circus] distorts the scientific process?" Part of Hurum's answer was that "[y]ou need to simplify it down to more understandable words. Of course in that you lose a little bit of the scientific terms, but really I think the message is very, very much the same in what we are doing popularly and scientifically." Since Hurum is the global spokesperson for Ida (he convinced the Natural History Museum of the University of Oslo to buy her from a collector, and then orchestrated the scientific research and



the worldwide media presentation) it becomes very interesting to investigate in some detail this palaeontologist's strategy of translating his science into language understandable to lay people, or in his words "more understandable words," without distorting the scientific conclusions. I think this little exercise provides an important lesson to all of us who are concerned with disseminating our research to a broader audience. And lastly, while Hurum has been roundly condemned for the spin he has given *Ida* in the media, we must not fail to realize that his strategy is nothing more than a very visible example of what regularly goes on in our own professional journals. Unless we want to be hypocrites, we should at least have the courage to probe our communal sins before publicly crucifying one individual.

Phylogenetic party poopers

The entire controversy about *Ida* is phylogenetic. The paper that describes *Ida*'s morphology and palaeobiology (Franzen *et al.*, 2009) concludes with a brief phylogenetic discussion. Except 'discussion' is really the wrong word, and I wouldn't dare call it a phylogenetic analysis either (the authors also don't). It offers its main conclusion in just a single sentence: "All of the determinate synapomorphies in Table 3 link *Darwinius masillae*, and by implication other Adapoidea [a clade of strictly fossil primates of uncertain phylogenetic position], to Haplorhini [dry-nosed primates] rather than Strepsirrhini [wet-nosed primates] (see also Fig. S7)." Since humans are haplorhines this phylogenetic position means that *Ida* could potentially illuminate early steps in the evolution of humans from their primate ancestors. In what must be a rare exception to the rule that pictures are worth a thousand words, the authors apparently felt compelled to graphically bolster this concise conclusion with a superfluous three-taxon cladogram in the supplementary material (their Fig. S7). But never mind, so far so good you might think. But, it is here that the trouble starts.

Experts were quick to point out that the phylogenetic conclusion was wholly unconvincing. For example, in a commentary in *Science* on 19th May 2009 (Gibbons, 2009a), Dr Chris Beard from the Carnegie Museum of Natural History in Pittsburgh, Pennsylvania claims that *Ida*'s describers have "ignored 15 years of literature," including important work by himself. Dr Richard Kay from Duke University said "the data is cherry-picked". The conclusion is that other crucial taxa and many more characters need to be considered before we can pinpoint *Ida*'s address in the primate tree. Any definite phylogenetic statements in the Franzen *et al.* (2009) paper are premature. Jørn Hurum seemed unconcerned about this. At the unveiling event of *Ida*'s cast at the NHM in London, Rowan Hooper, online news editor for *New Scientist*, asked Hurum whether the team should perhaps have waited until they had done a more rigorous analysis before making the media splash they did. Hurum responded that the phylogenetic conclusion "is really not an important part of the paper" (Hooper, 2009). This is a very surprising answer, because the terms in which the great importance of *Ida* is described all over the media are entirely phylogenetic.

Now that wireless Internet connections have become our adult umbilical cords, science bloggers play the useful role of digital antibodies in helping us to fend off media-mutated scientific factoids that leak incessantly from the hulking placenta of the Web. Recall the recent media flurry surrounding the Dunn *et al.* (2008) paper on metazoan phylogeny in *Nature* last year. The paper showed that ctenophores were the sister group to the rest of the Metazoa, which would have remarkable consequences for envisioning the evolution of animal body plans. The popular media took this to mean that comb jellies are/were our 'first ancestor,' a misinterpretation quickly



corrected in the blogosphere. In Ida's case, the blogosphere's phylophiles went ballistic, mostly justified in my view, because the media widely labelled Ida as "the missing link" and an "ancestor" in the evolutionary lineage leading to humans. The commentaries rightly focused on the difficulties of recognizing ancestors and the arbitrariness of calling a particular fossil taxon "the" missing link. However, in contrast to the case of the comb jellies, the spin doctoring in the case of Ida was started and encouraged by the scientists.

Shades of inconsistency and conflicts of interest

Ida is Jørn Hurum's baby. He can't help but be overpoweringly enthusiastic. I would be as well if I had described the most complete fossil primate ever. And Hurum has more than pure science to be excited about because the biggest splash was made in the public arena. However, could it be that the boundless enthusiasm masks signs of inconsistency and conflicts of interest between the science and media aspects of Ida's discovery? Surely it would be rash to suggest that the media project could have affected the science, right? No competing interests were declared in the Franzen *et al.* paper. Well, not initially anyway.

The plot thickened a little bit when the science writer Carl Zimmer (<http://blogs.discovermagazine.com/loom/>) questioned this. This led to a formal correction of the paper (in the comment section) disclosing that "a production company (Atlantic Productions), several television channels (History Channel, BBC1, ZDF, NRK) and a book publisher (Little Brown and co) were involved in discussions regarding this paper in advance of publication". Of course, there really was no competition between any of the parties involved, because everything was well organized so that Ida took the public and scientific spotlight on the same day. Hurum simply labels this coincidence "just luck, really" (Laursen, 2009).

Luck? Perhaps, in a way. Just luck? Definitely not, in the sense of being mere coincidence. As revealed by Managing Editor of *PLoS ONE* Peter Binfield (<http://blogs.discovermagazine.com/loom/category/darwinius/>) the journal managed to race the paper through the production process weeks faster than is customary in order to try to have it published on the day of Ida's global unveiling on 19th May. In fact, Binfield reveals that the journal respected the authors' wish not to issue a press release or any other information relating to the paper before 19th May. This is a great strategy to pack maximum punch with the media presentation of Ida, which of course is exactly what the scientists attempted to achieve: "The scientific publication of Ida has been carefully timed so that the film, book and website can be launched at the same time" (www.revealingthelink.com). This is hardly just luck.

Here we need to touch briefly on the choice of the journal in which Ida was formally described. Given the extreme effort and money involved in the research, and in view of the exceptional scientific importance that is loudly claimed for Ida on her official website (www.revealingthelink.com), the choice may seem puzzling. First, Hurum convinced the museum where he works to pay almost \$750,000 for Ida. An armed escort delivered Ida to Oslo in September 2007. Then he assembled an international "dream team" of researchers to work on her in secrecy. The team agrees that what we have here is a "Rosetta stone", an "8th wonder of the world," "the scientific equivalent of the Holy Grail", new insights that will be "like an asteroid hitting the earth" (all quotes from Ida's official website). And then they decide to publish in *PLoS ONE*. A journal without an impact factor. When the author of the above *Nature* interview (Laursen, 2009) asked Hurum whether they



had offered the paper to any other journals, he simply said no. Hurum stated that second author Phil Gingerich had had a good experience with *PloS ONE* for a previous paper, “so he was the one suggesting *PloS*.”

I find this rather amazing, even though other papers may follow of course. I am certain that most of us would be strongly advised, to say the least, to seek an outlet with at least an impact factor. Moreover, although Gingerich may indeed have suggested *PloS ONE*, a statement he made in the *Wall Street Journal* (Naik, 2009) at least suggests that that choice was not just informed by scientific reasons. Asked whether the study would not have deserved publication in *Science* or *Nature*, Gingerich answered “There was a TV company involved and time pressure. We’ve been pushed to finish the study; it’s not how I like to do science.” That sounds suspiciously like a potential conflict of interest between science and media exposure. Yet, Hurum explains: “I’m paid by the tax payers of Norway to do this research. I’m not paid by *Nature* or *Science* and still they charge money for other people to read my scientific results.” I have no reason to think Hurum is disingenuous here, even though he doesn’t acknowledge any funds in the *PloS* paper, which may of course just indicate that the work wasn’t done on a formal government grant. It is true, of course, that *Science* or *Nature* would likely have offered less space than *PloS ONE* for the important descriptive details about Ida. However, some inconsistency arose when answering a question by *New Scientist*’s Rowan Hooper at the NHM. Anticipating a more comprehensive phylogenetic analysis in the future, Hurum without hesitation stated “This will be a *Nature* paper” (Hooper, 2009).

Life in a mediocracy: from jargon to “more understandable words”

The most concise phylogenetic conclusion of the Franzen *et al.* paper is that Ida is more closely related to haplorhine primates than to strepsirrhine primates. An even more concise summary in terms of sister group relationships is impossible because the authors know that Ida is part of a larger clade of exclusively fossil primates (Adapoidea), but none is included in their cladogram. For the present purpose, ignoring the criticisms that primate experts have levelled against the paper’s phylogenetic conclusions, one could ‘translate’ this finding as follows. Living primates can be subdivided into two groups, the strepsirrhines (wet nose primates), and the haplorhines (dry nose primates). Ida is more closely related to the dry nose than to the wet nose primates. Because humans are dry nose primates, Ida may have the potential to help us infer the evolution of some traits acquired by certain early primate ancestors of humans. This is one of several possible concise and clear translations, with minimal use of evocative but vaguely defined words such as ‘early.’ Now consider the way in which Ida’s describers and the associated book and documentary present her to the general public.

1. “She’s on our ancestral line” (Hurum in Devlin, 2009)
2. “It is a member of the ancestors” (Jens Franzen, in Herbert, 2009)
3. “It is a representative of an ancestral group giving rise to all kinds of higher primates” (Hurum in Waugh and Susman, 2009)
4. “This is the first link to all humans” (Hurum in Gibbons, 2009a)
5. *The Link. Uncovering our earliest ancestor* (book by Tudge, 2009)
6. *Uncovering our earliest ancestor: the link* (title of the BBC1 documentary)



Where do these statements leave Hurum's claim that "the message is very, very much the same in what we are doing popularly and scientifically"? An anonymous editorial in *Nature* (Anon, 2009) strongly condemned the research team's media pronouncements as a "drastic misrepresentation of their research." The above statements suffer from the ill effects of the use of evocative but deceptive language. Statements 1 and 2 are richly suggestive, yet very vague. Statement 3 seems to conflict directly with a conclusion in the *PLoS* paper. The paper notes that *Ida* is an adapoid, and that adapoids "could represent a stem group from which later anthropoid primates evolved, but we are not advocating this here, nor do we consider either *Darwinius* or adapoids to be anthropoids [monkeys, apes and us]." Statement 4 and the titles of the book and documentary that accompanied *Ida*'s unveiling are deeply anthropocentric in their use of the definite article. It is ironic that even though Hurum states on *Ida*'s website that "Humans are not special – we're related deep in time to more primitive mammals", the apparent strategy is to make *Ida* more special by explicitly attempting to cast her as our long lost primate cousin. Of course the whole concept of missing links has always referred to the seemingly enormous chasm between us and the rest of the animals, but in this case there was nothing really missing. For those for whom our current understanding of the primate tree of life is not sufficiently compelling to accept our primate ancestry, poor *Ida* is not going to do the trick. Not surprisingly, creationists dismiss *Ida* as just a dead lemur. Also, the misleadingly unequivocal "the" gives non-professionals a wholly distorted view of the scientific process. *Ida* is a special fossil, but not that special. A simple rewording may have avoided much criticism: *Ida* may be a missing link.

These are hardly the "more understandable words" that Hurum hoped to achieve in the popular presentation of *Ida*. In overhyping *Ida*'s evolutionary significance in the media, her describers behaved a bit like over-enthusiastic salesmen trying to convince us that their inordinately beautiful and expensive gem is also a wickedly efficient crystal ball that affords an unobscured view into the deep past. Although one should never underestimate the media's own ability to spin scientific findings, should we be surprised in this case that other media sound very similar or worse? Just consider these gems from a SKY News TV report that aired on 19th May 2009 (<[http://news.sky.com/skynews/Home/World-News/Missing-Link-Scientists-In-New-York-Unveil-Fossil-Of-Lemur-Monkey-Hailed-As-Mans-Earliest-Ancessor/Article/200905315284582](http://news.sky.com/skynews/Home/World-News/Missing-Link-Scientists-In-New-York-Unveil-Fossil-Of-Lemur-Monkey-Hailed-As-Mans-Earliest-Anccestor/Article/200905315284582)>). "You're looking at one of our ancestors." "She is according to scientists a direct relative." "Ida and her descendants evolved into humans." "Since Darwin mankind has been looking for the missing link, the primate that is at the root of our creation. And this is she." The report goes on: "Ida is a transitional species that developed into a fully fledged primate and eventually into humans." "The link with our past. Perhaps the beginning of the story of our development." "She could rewrite science. She could confirm Darwinian theory and debunk creationism. She could also question religion itself." In a video report on *Ida*'s website Sir David Attenborough said: "This little creature is going to show us our connection with the rest of all the mammals," "It is not a question of deduction, not a question of imagination, not a question of suggestions. It's fact. There it is." "Now people can say, 'Ok, we're primates like monkeys and apes and that we came from very simple and generalized mammals. Show us the link.' The link they would have said until now is missing. Well, it is no longer missing" (<www.revealingthelink.com/the-implications/>). Given that Sir David emerged as Britain's "most trusted person" in a *Reader's Digest* poll several years ago, 12 places ahead of even the Queen, his pronouncements carry a heavy weight in our mediocracy.



It is not easy to communicate notions about evolutionary ancestry in an accurate way to lay people, but a brief online search revealed that many reports about Ida were not even accompanied by the basic concepts that can provide context to the news. On 12th June 2009, I Googled the following in Google News: “Ida missing link,” which yielded 1,040 hits (464,000 in Google). This reduced to 366 when I added “between” to the query (457,000 in Google), which suggests that in many cases it is implicit between which organisms Ida is a missing link. Even more extreme reductions resulted when I added “tree” (78), “phylogeny” (3), or “phylogenetic” (7) to the query. Similar reductions in the number of hits resulted when including “stem” or “sister.”

I will not insult the phylogenetic know-how of the average reader of the *Newsletter* by listing all the problems with the above statements. Worryingly, news reports such as these do claim that “scientists claimed...,” which suggests that we scientists may have played more than just a passive role in the media distortion of research in this case, and perhaps in others. Even in this case we can hardly blame the scientists for not having been able to fully control the media’s demagogic dribble. Yet, when Hurum was asked whether the phrase ‘missing link’ was appropriate for Ida, he answered: “Why not? I think we could use that phrase for this kind of specimen.” “[People] have a feeling that if something is important it is a missing link” (Randerson, 2009). Okay... and as for trying to avoid unnecessarily anthropocentric and imprecisely evocative language in the press, Hurum states: “It’s hard to discuss haplorhines and strepsirrhines in a press release. You need to link it to us” (Gibbons, 2009b). I really would have hoped that in this Darwin year we would no longer feel that ancient and quaint need to see ourselves as the measure of all things. Hurum continues: “Yes, I am shaking things up. If you want kids to be interested in science, we need to start packaging it in many ways” (Gibbons, 2009b). I’m all for trying to package science more as entertainment (see my essay in issue 63 of this *Newsletter*) to reach a larger audience, but I strongly feel that too much of a *Jurassic Park* ploy only leads to the intellectual equivalent of the showy but shallow beauty of cosmetic breast implants, detracting from the ‘real thing.’ But given today’s glamour-obsessed, ADHD society, the real thing may be of secondary importance.

But, of course, such media attention may well pay off financially, as in Ida’s case it apparently did. In a video link on the website of Norway’s Ministry of Education and Research, minister of Higher Education and Research Tora Aasland proudly pledged \$350,000 to further research on Ida, claiming that Ida “gives us new insights about the ancestors of human beings” and that “this project will give the world new knowledge of our ancestors” (<<http://www.regjeringen.no/en/dep/kd.html?id=586>>).

Innocent victims

Ida’s website <www.revealingthelink.com> optimistically claims that “Ida has already inspired millions of people to take an interest in our evolution, and in how our world developed over millions of years.” Quite apart from how they know how efficient their campaign has been (and I genuinely hope it was successful) I fear that for many people their fascination will not last very long, and perhaps their lasting memory will be an impression of the intensity of the wave of corrective commentary that was necessary to reign in the excessive media hype.

I just hope that the backlash on the Internet has not completely blinded the public to the potential evolutionary significance of Ida. Although the web swells with razor sharp verdicts that dismiss her worth as a missing link and a human ancestor, the fact remains that she still has potential. The phylogenetic position of Ida needs further research, and may yet turn out to illuminate aspects of



our ancestry. Willi Hennig embodied the potential homology of character states, until disproved by phylogenetic analysis, in his 'auxiliary principle.' I propose we adopt a similar principle for the ability of entire taxa, fossil and living, to affect character state optimizations along a cladogram's internodes. When the placement of a taxon can influence character state optimization along internodes, that taxon could legitimately be called a missing link, even if it was only missing from its proper place in the tree. Let's call this Ida's principle, which she may or may not come to illustrate.

Let us hope that the flurry of critical commentary has not bred a more cynical public. Let us hope that the public doesn't think we are simply after a free ride on that already crowded roller coaster called "Celebrities without Talent." Many talented scientists and science writers continue to do an admirable job communicating science to us all, and in this particular case they have played an important role in correcting and clarifying the less than transparent media claims made by the scientists themselves. However, I want to end this essay by pointing out that *Idal*atry is simply a highly visible example of a more widespread phenomenon that usually stays hidden from view between the dusty covers of our professional literature. This does not exculpate Ida's describers from being guilty of hyperbole, but it does show that they are not uniquely guilty.

Judge not lest ye be judged

In 1873, 23-year-old Nicolaas Dirk Doedes, a Dutch natural history student, wrote Charles Darwin a letter from my alma mater in Utrecht in the Netherlands to ask him about his thoughts about religion and the existence of God. Darwin kindly replied, and with respect to the origins of things wrote "I am aware that if we admit a first cause, the mind still craves to know whence it came and how it arose" (see <www.darwinproject.ac.uk>) (Doedes later incurred the wrath of Darwin's son Francis when he decided to publish the letter in a Dutch freethinking journal shortly after Darwin's death. Francis was angry that the public came to know Darwin's religious thoughts in this way: Van der Heide, 2006). This reply could well be the motto of modern evolutionary biology. A preoccupation with the origins of things is one of our distinctively human characteristics.

Ancestritis is particularly common among phylogeneticists, and has been ever since the origin of the discipline. Mayr & Bock (2002: 175) defined phylogenetics as "so to speak, a backward looking endeavour, the search for and study of common ancestors." Things are of course different now. Attempts to expunge our fascination with ancestors and ancestor-descendant relationships have been a conspicuous component of the cladistic revolution in systematics. Yet, despite this cleansing exercise many of us still try to glimpse ancestral outlines through the dense phylogenetic foliage of sister group relationships. And I think that is only natural. Origins are just too damn interesting!

Ida's describers simply tried to convey their fascination with reconstructing evolutionary origins to the general public. Unfortunately they did this by coming very close to reifying Ida as a human ancestor, and by using evocative language. As a result "Dr Hurum has caused a self-inflicted wound to his own reputation," according to P. Z. Myers on his *Pharyngula* blog. Maybe so, but this 'crime' is almost routinely perpetrated by our best and brightest in the most prominent journals.

The smoking gun is the use of evocative, but ill-defined language that labels the organisms under study as early, archaic, ancient, primitive, basal, prototypical, classic, *etc.* Often these labels are restricted to the title and/or abstract of the paper, without any explicit justification in the text. To give just two examples from my bulging file, a recent paper in *Evolution and Development*



that was highlighted in the *Faculty of 1000 Biology* was titled “Functional analysis of Pitx during asexual regeneration in a basal chordate” (Tiozzo & De Tomaso, 2009). The chordate in question is a colonial ascidian. Quite apart from their position within tunicates, current consensus places Tunicata as the sister group to Vertebrata, and Cephalochordata as the sister to this clade. Is that basal? All that this term does is create the false impression that the tunicates under study may be more likely to possess primitive character states, or represent a set of ancestral characteristics, than other chordate taxa. That is highly misleading. Not straying far into the tree, Garcia-Fernández & Benito-Gutiérrez (2009) claim “amphioxus (lancelet) is now recognised as the closest extant relative to the stem chordate.” No it is not. All extant chordates are equally closely related to any taxa in their stem lineage. And amphioxus is also not “the earliest chordate” as is claimed.

As for labelling particular fossil taxa as ancestors, remember the vetulicolians? In a *New Scientist* piece from 2001 titled “The giant tadpole that spawned us all” written by Joanna Marchant, Professor Simon Conway Morris is quoted as saying “We’re confident they are the ancestors of the group that includes vertebrates.” This is pictorially summarized in another *New Scientist* piece from 2003 that was authored by Conway Morris and titled “Once we were worms.” The figure shows a chordate cladogram sprouting from a vetulicolian.

Maybe these are errors, but for better or worse, we are fascinated with origins and ancestors. We also want to publish our work in good journals, we have to compete for grant proposals (the white papers of genome sequencing projects in particular are a veritable treasure trove for examples of pimped up language), and we want the general public to know that we are doing important and cool research. It is then not too surprising that we sometimes succumb to pimpin’ our organisms. But it would be hypocritical to publicly condemn one research team for doing this in public, while ignoring our own sins.

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