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TAXONOMY ALIVE AND KICKING: OR HOW TAXONOMY CAN HELP DEBUNKING CREATIONIST THINKING

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ABSTRACT

The present work aims at illustrating how taxonomy can provide an essential contribution to debunk creationist anti-evolutionary arguments. It does so by scrutinizing the taxonomic basis of the "*Atlas of Creation*", the major opus of the Turkish creationist consortium operating under the pen name Harun Yahya. The basic aim of the Atlas of Creation is to prove that evolution does not occur by showing that fossil and recent organisms are identical, i.e. have not changed since their divine creation. However, the taxonomic foundation onto which this argument is built is completely flawed, up to the point of being hilarious. As such the Atlas of Creation has not the slightest biological credibility, let alone that it would represent a serious challenge for evolutionary theory. So taxonomy can indeed effectively contribute to countering creationist theories.

RESUMO

Este trabalho pretende ilustrar como a taxonomia pode trazer um contributo importante para desacreditar argumentos criacionistas anti-evolução. Fá-lo investigando a base taxonómica do "*Atlas of Creation*", a obra principal do consórcio criacionista Turco operando sob o nome artístico de Harun Yahya. A finalidade básica do Atlas da Criação é provar que a evolução não acontece, mostrando que as espécies fósseis e as recentes são idênticas, isto é, não mudaram desde a sua criação divina. No entanto, o fundamento taxonómico no qual este argumento

é construído é tão completamente falho ao ponto de ser ridículo. Como tal, o Atlas da Criação não tem a mínima credibilidade biológica, muito menos representa um desafio sério à teoria da evolução. Assim, a taxonomia pode de facto contribuir efectivamente para contrariar as teorias criacionistas.

INTRODUCTION

Taxonomy, i.e. the theory and practice of describing and classifying biological diversity (e.g. Bromham, 2008; Schuh & Brower, 2009; Hawksworth, 2010), is often perceived as a threatened research discipline with little scientific interest, relevance, or even worse, with little scientific foundation (e.g. Vernon, 1993; Agnarsson & Kunter, 2007). This latter critique is due to, amongst many others, the fact that there still is no general consensus about the meaning (definition) of the basic unit with which biodiversity is commonly measured, viz. the "species" (e.g. Baum, 2009; Brooks & Helgen, 2011). Indeed, with currently more than 25 different, and sometimes mutually inconsistent, species concepts (e.g. Mayden, 1997; Richards, 2010), and with an overwhelming majority of taxonomists describing species without explicitly formulating the species concept under which their species descriptions have to be interpreted, it is not surprising that doubts may arise as to the degree in which taxonomy allows for hypothesis testing. However, as has been pointed out repeatedly, species descriptions formulated within the framework of explicitly defined species concepts offer a wealth of testable hypotheses and arguments, so that taxonomy does fit perfectly into good and solid scientific practice (e.g. Wheeler & Valdecasas, 2007; Bininda-Emonds, 2011; Haszprunar, 2011).

Even if taxonomy has a solid scientific basis, one may of course still wonder to what extent it is a worthwhile endeavour. In this context we want to focus on one particular, often underappreciated, value of taxonomy, viz. its fundamental importance in dealing with misguided, so-called scientific, arguments proposed by those who reject evolutionary theory, such as creationists and intelligent design adepts. Indeed, the fundamental importance of a sound taxonomic knowledge to understand the basics of evolutionary theory, was already recognized by Charles Darwin himself! After all,

in contrast to wide held romantic myths, Darwin was not suddenly enlightened by his evolutionary insights during his visit to the Galapagos Islands. On the contrary, he only started to abandon his belief in the immutable nature of species more than a year and a half after leaving this emblematic archipelago (Sulloway, 1982b, 1984). It was back home in England that Darwin converted to evolutionary theory, after close collaboration with several taxonomists, who, amongst others, corrected several of Darwin's misidentifications and messy classifications (Sulloway,1282a, b). Darwin's need of sound taxonomic advice (even if it came from taxonomists who themselves often adhered creationist beliefs) is well-illustrated by his initially erroneous and confusing interpretations of both the birds and the giant tortoises from the Galapagos (Sulloway, 1982a, b, 1983; Steinheimer, 2004; Sulloway, 2009) [Note: once again in contrast to a widespread myth, Darwin did not rely on the finches named after him (Darwin's finches), but rather on mockingbirds, to formulate his evolutionary thoughts (Sulloway, 1982a, 1983; Steinheimer, 2004)].

The importance of taxonomy for evolutionary thinking is also evidenced by the fact that Darwin himself became a taxonomist, specialized in barnacles. As such he described 62 new barnacle species (Castilla, 2009) and although it is not entirely clear whether Darwin's taxonomic interest in barnacles was a matter of trying to gain scientific credibility (e.g. Yoon, 2009: 62) or a reflection of his long-standing, genuine curiosity in these animals (e.g. Love, 2002; Van Wyhe, 2007), there is little doubt that his barnacle work provided him with important extra ammunition to develop his ideas about evolution (e.g. Love, 2002; Van Wyhe, 2007).

So, given that taxonomy is an indispensable research discipline to underpin evolutionary theory, the present contribution aims at illustrating how taxonomy can therefore also help debunking the anti-evolutionary thinking advocated by creationist and intelligent design movements throughout the world. In particular, we will demonstrate the misleading, if not nonsensical, taxonomic and biological basis onto which the refutation of evolutionary theory is founded in some recent publications of the Turkish Islamic creationist Harun Yahya (HY). As such we will particularly focus on the infamous

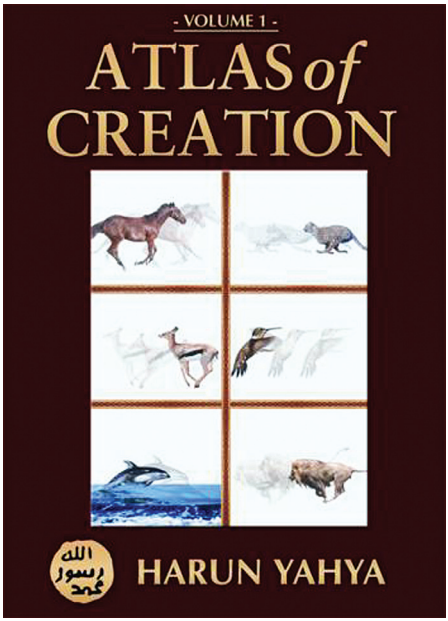

FIGURE 1. The Atlas of Creation (AoC).

"Atlas of Creation" (AoC) (Figure 1) and related books, as well as on the virtual fossil museum (http://www.fossil-museum.com/) that HY created to further supplement the AoC.

We are aware of the fact that the AoC has already been tackled cogently before us (e.g. Decleir, 2008; Musaji, 2009), yet a majority of previous critical responses were formulated in a rather disparate way (e.g. in newspapers, magazines, radio or TV interviews, websites, ...) and/or dealt with only few of the many, blatant errors, false interpretations and misleading conclusions that abound in the AoC (e.g. Anthis, 2007b; Glaubrecht, 2007; Myers, 2008; Dawkins, 2008; Hameed, 2009). This is understandable since the scientific credibility of the AoC is near to zero (see further below). Hence, most biologists may not find it worthwhile to invest time and energy for nothing else than to denounce the obvious and fundamental flaws in HY's publications. Yet, given that the AoC received considerable attention in Europe, particularly among Muslims, even up to the point that it was discussed at the level of several national Ministries of Education, as well as by the Council of Europe (2007), we feel that it may be useful to provide teachers and educators with some more extensive background on the AoC, so as to better prepare them for answering questions from students who might take the AoC serious. After all, even if creationism is banned from the European school science curricula, it is to be expected that outside the classrooms students may be confronted with creationist ideas such as those expressed in the AoC. Even worse, both in the US and Europe, creationist movements prepare "ready-for-use" questions with which students are supposed to "unmask" and "embarrass" their biology teachers,

and to "squeeze" the truth out of them (Wells, 2001; Dembski, 2004-2011, 2006; Colson, 2011). Not unexpectedly, also HY produced such a pre-chewed list of questions with the advice

> "*Students, ask your teachers these questions and see the helplessness of Darwinism*" (Harun Yahya, 2011a; see further Harun Yahya, 2003).

Of course, there is nothing wrong with asking questions, on the contrary, yet questions pre-chewed and twisted by creationists may be overwhelming if one is not prepared for them. Therefore, the present paper aims at providing a simple tool and documentation that may help teachers and educators to refute the ill-founded, creationist prose of HY and his AoC. Yet, for specific answers to the aforementioned "ready-for-use" questions we refer to e.g. Pigliucci (2002: 252-259), Isaak (2007) and NCSE (2008).

Throughout this contribution we will use the term "creationism" (and its derivatives) in a wide sense, i.e. covering the whole plethora of intelligent design beliefs that reject evolutionary theory (for an overview of the creation/evolution continuum see Scott, 2009).

At several places in this paper we will refer to websites with commentaries, blogs, downloads or specific photographs. These latter may be copyright protected even if this seems not to have bothered HY, who used many of them without permission of the copyright owners and/or proper acknowledgements. Even worse, in the virtual fossil museum, HY claims the copyright of these photographs himself! Links to the relevant websites are provided after the "Literature cited".

HARUN YAHYA (HY)

The name Harun Yahya is a combination of the names of two prophets, viz. Aaron (Harun), the brother of Moses (Musa) (Quran Sura 20: 30), and John (Yahya), the son of Zachary (Zakariya or Zayd ibn Ali) (Quran Sura 3: 38-41 and Sura 19: 2-15), who both fought against their people's lack of faith. In the same tradition HY aims at conveying the message of the Quran to people and as such he wants to

> "*disprove each fundamental tenet of irreligious ideologies and to have the 'last word', so as to completely silence the objections raised against religion*" (from "About the author" in the AoC).

Actually "Harun Yahya" is said to be the pen name for Adnan Oktar (born in Ankara, 1956), also known as Adnan Hodja

("Preacher Adnan") or Adnan Agabey ("Big brother Adnan") (Arda, 2009), author of a series of books centered around four interconnected themes: (1) Islamic faith, the Quran and the return of the Mahdi, (2) anti-religious conspiracy theories (HY is anti-semitic and anti-masonic; up to 2002 he also denied the Holocaust, see Hopkins (2003), Bartholomew (2009) and website 32), (3) neo-Ottomanism (Turkish nationalism), and (4) refuting evolutionary theory (Darwinism) (Riexinger, 2008). Within this fourth category, the AoC is undoubtedly the "masterpiece", for according to HY himself, in 2007 alone, about 8,000,000 copies of the book were sold in Turkey and still another 2,000,000 copies were sold abroad, while in 2008 sales were even doubled (Steinvorth, 2008; but see also Schneider, 2011)! Impressive and hardly credible figures indeed.

The overall output of HY is overwhelming, with >300 published books in >70 languages (several books are also available as audio cassettes), >100 "documentary" films in DVD, VCD and VHS format, a monthly journal ("Ilmi Mercek"), and numerous well-maintained websites (see website 34). Clearly this is not the work of a single person and there is little doubt that Adnan Oktar does not write or produce all the HY material himself (Bogaerts, 2005; Edis, 2007: 129; Schneider, 2011). Rather his output is supported by "*countless ghostwriters*" (Lumbard & Nayed, 2010: 87), often from social higher, wealthy classes like lawyers and medical doctors (Bogaerts, 2005; Schneider, 2011), who may, or may not, be members of the organization that in 1990 was established around Adnan Oktar (Numbers, 2006: 422). This organization is called "Bilim Araştirma Vakfi" (BAV) or "Science Research Foundation" (SRF; website 35) and the aim of its scientific activities is to

> "*concentrate particularly on the origin of the universe, living things and mankind. The SRF emphasizes that 19th century positivism, rejecting religious beliefs and basing science on atheism, is flawed, and defends instead the "intelligent design" view of the origin of living things and mankind, a stance which has its roots in contemporary scientific findings.*"

or in short: promoting an immaterial cosmology and opposing evolution (Numbers, 2006: 422). In concreto the SRF simply advertises HY's publications and organizes (mass) public "scientific" events to spread HY's anti-evolutionary ideas.

Despite Adnan Oktar has many collaborators and ghostwriters, it is only his pen name "Harun Yahya" that figures on all of his output. This is consistent with the traditional Islamic religious image of a sect leader, whose allegedly superior intellectual capabilities and stature of charismatic teacher are reflected in his prodigious writings (Edis, 2007). Hence, because the name "Harun Yahya" does not refer to a single author, but to a collective of authors, we have treated it as a brand label in the "Literature cited" (which is also why it is mentioned under the "H" and not under the "Y").

Irrespective of who are the authors of HY's books, sure is that Adnan Oktar himself has no background in science. Instead, he studied fine arts (interior design) and philosophy in Istanbul (Numbers, 2006: 422). Yet, because (1) HY's anti-evolutionary output has a flashy, modern and "scientific" appearance, (2) his books are published in many languages and distributed all over the world, (3) he makes full use of all media, particularly of the internet (Edis, 2007; Riexinger, 2002, 2008), and (4) he presents a Quran-based world view, it should not come as a surprise that HY has become the most popular and loudest anti-evolutionary voice in the Muslim world (Edis, 2007; Hameed, 2007, 2008, 2010; Wiles, 2011). As such, one of the popular introductory books on Islam describes HY as one of

> "*the top two scientific researchers in the Muslim world today, who hold opposing views on the evolution or instant creation of human beings,...*"

and

> "*both lay-out well-reasoned arguments and have contributed to a great deal to the richness of the current debate among Muslims.*" (Emerick, 2002: 81).

In the same spirit HY is included in the lists of the 500 most influential Muslims in the world (Esposito & Kalin, 2009; Lumbard & Nayed, 2010; Schleifer, 2011) for his scientific influence and for being

> "*The world's foremost authority on creationism and Islam, has a huge fan base of more than 1.6 million people*" (Lumbard & Nayed, 2010).

Moreover, Islam academicians sometimes cite HY as a serious scientific source (e.g. Majid, 2002; Nasr, 2006: 342), while in some countries (e.g. Indonesia, Nigeria) teachers and educators use HY's material for their science classes (Butt, 2009; Islamic Education Trust, 2009; Lemu, 2009). In the UK, the Muslim Council of

Britain (2007: 64) even rated the HY website for schools as a

> "*Useful web site for exploring Islamic perspectives on aspects of science and intellectual enquiry, for example in relation to theories of evolution.*"

Still, the intellectual influence of HY on Muslim scholars is said to be limited (Ghaly, 2010; Wiles, 2011). Nonetheless, Muslim students are usually well-acquainted with HY's material and they do refer to it when confronted with evolutionary questions (e.g. Bogaerts, 2005; Koning, 2006; Jacobsen, 2011: 287-287). This is, of course, another good reason to expose the misleading and nonsensical nature of HY's "scientific" contributions, such as the AoC.

THE ATLAS OF CREATION (AoC)

The AoC is not a single book, but a series of books of which for the time being (December 2011) three volumes have been published in English, though (many?) more volumes are anticipated. The books are huge, measuring 38 x 28 x 5 cm, weighing >5 kg, and comprising approximately 750 to 950 pages each, depending on volume and edition. They are attractive, well-produced, with a hard cover, richly illustrated with colour photographs, and printed on high-quality glossy paper. As far as we could trace, the first English edition of volume 1 dates from October 2006, but in the meantime this volume is already in its 13th edition (November 2008). Volume 2 had its first English edition in February 2007 and currently is in its 5th edition (October 2008), whereas volume 3 only exists in its first English edition (August 2007). The books are clearly intended to reach a very wide audience, for besides the original Turkish versions, there are translations in many other languages. Volume 1 stands out in this respect, since it has been translated into English, French, German, Spanish, Italian, Czech, Chinese, Japanese, Russian, Arabic, Indonesian, Hindi and Urdu, though we expect it may appear in still other languages!

Probably the most astonishing aspect of the AoC books is that, although their production costs must be very high (Anthis, 2007a; Dawkins, 2008 video) and their "normal" price in the bookstore is US $ 99.00 per piece, they can be purchased at the special rate of US $ 39.00 (Official Harun Yahya Store, 2011) or they can simply be downloaded for free (Harun Yahya, 2010). Yet, it remains unclear how HY manages to finance

this endeavour. This is the more remarkable as in the course of 2007 HY provoked quite a stir in European educational systems by distributing, unsolicited free hardcopies of the first volume of the AoC to teachers and professors at secondary schools and universities (Enserink, 2007). As such, also one of the authors of the present contribution (TB) did receive a free copy of AoC volume 1 (2nd edition). The postal charges for sending several thousands of copies of these books around Europe must have been considerable, but once again, money does not seem to be an issue for HY, since in the same spirit, he extended his action by shipping free hardcopies of the AoC to the US (e.g. Dean, 2007; Hameed, 2007). By the way, money neither appeared to be a problem when HY offered a price of 8,010,890,000,000 US $ to anyone who would show him an intermediate fossil (Butt, 2008; Dawkins, 2008 video; Musaji, 2009). This kind of ridiculous rhetoric is a suitable prelude to what will follow about the AoC.

Each volume of the AoC consists of three parts: (1) a relatively short introdution about fossils, with a very brief overview of life during the main geological periods and some sort of general statement that fossils reject evolution and confirm creation, (2) a major part in which HY presents his fossil "evidence" showing that life does not evolve, but that instead all species were created by god and have remained unchanged since then, and (3) a long appendix or aftermath comprising a series of chapters dealing with classical anti-evolutionary arguments such as, the 2nd law of thermodynamics, the alleged lack of transitional fossils, the forgeries and frauds committed by Darwinists (e.g. about human evolution, the drawings of Haeckel, ...), the unreliability of radiometric dating, the design argument (e.g. in biological structures, cosmology,...), irreducible complexity, the improbability that chance can produce functional proteins or DNA sequences, the inadequacy of the Miller-Urey experiment, the claim that variation within species does not imply evolution, the imaginary evolution of birds and mammals, the "myth" of homology, and more of this sort. Although most of these ideas are borrowed from the Christian creationist literature, there are three particularities to HY's anti-evolutionary rhetoric: (1) It is not embedded in a Christian religious framework, but instead reflects an Islamic point of view based on the Quran, (2) HY's creationism does recognize

the old age of the earth and universe, up to the point of the Big Bang, and (3) HY sees evolutionary theory (Darwinism) as the source of all evil in the world, such as racism, nazism, communism, marxism, etc. With respect to this latter issue, HY even shows in the AoC a photograph of the attack on the World Trade Center in New York (11 September 2001), claiming that terrorists are in reality Darwinists (p. 725 in 13th edition of AoC volume 1; p. 621 in 4th edition; p. 589 in 2nd edition) (see also Steinvorth, 2008)!

In the present paper we will only deal with the 2nd part of the AoC, i.e. HY's fossil evidence that is supposed to refute evolution. Because we have insufficient botanical expertise, we will thereby limit ourselves to the animals. For the remainder we think that HY's anti-evolutionary claims in parts 1 and 3 of the AoC are sufficiently well-countered in the vast literature on this subject (e.g. Pigliucci, 2002; Shanks, 2004; Young & Edis, 2004; Isaak, 2007; Sarkar, 2007; Coyne, 2009; Schneiderman & Allmon, 2009; Scott, 2009). Moreover, seriously documented answers to creationists' arguments are provided at the websites of "The Talk Origins Archive" (http://www.talkorigins.org/) and "The Panda's Thumb" (http://www.pandasthumb.org/).

When discussing the AoC, we will focus on six books (abbreviated as indicated in parentheses): volume 1 - 2nd edition (V1-2) (Harun Yahya, 2007a), volume 1 - 4th edition (V1-4) (Harun Yahya, 2007b), volume 1 - 13th edition (V1-13) (Harun Yahya, 2008a), volume 2 - 1st edition (V2-1) (Harun Yahya, 2007c), volume 2 - 5th edition (V2-5) (Harun Yahya, 2008b) and volume 3 - 1st edition (V3) (Harun Yahya, 2007d); V1 or V2 indicate all editions of the concerned volume. At the same time we will refer to photographs in HY's online "Fossil Museum" (FM) with the abbreviation "FM-code", where "code" is the reference number of the entry in the FM. The reason for comparing these different materials is simple: HY regularly changes, substitutes or removes items in his books, without issuing a "correction statement" explaining why these changes were made (Musaji, 2009). Indeed, in contrast to good scientific practice, HY does not seem to be able to admit his (many) mistakes and misinterpretations.

THE ATLAS OF CREATION AND ITS TAXONOMIC DEFICIT

As pointed out before, the main part (i.e. part 2) of the AoC aims at providing HY's "over-

whelming" fossil evidence showing that all species were created as they are nowadays, and hence that evolution never took place. In a serious scientific publication such a conclusion would have to be supported by a detailed explanation of how the relevant data were collected, analyzed and interpreted. Moreover, this information should be provided in such a way that the reader can repeat and verify the work, so as to decide for him/herself whether the interpretations and conclusions of the author are solid. The "evidence" in the AoC, however, is not even remotely presented and handled like this. On the contrary, what HY does is simply showing hundreds of (sometimes very nice) photographs of fossils, with on the same pages photographs of living specimens of the same "species". These "comparative" photographs are further accompanied by a caption, providing (1) the vernacular English name of the "species", (2) the origin, the age and eventually the size of the fossil, and (3) a short text which in various wordings repeats the same overall message, viz. the fossil and the recent specimens are identical, hence evolution did not occur.

A fundamental problem here is that HY does not seem to bother about taxonomic accuracy and this of course leads to some completely erroneous, if not ridiculous, "similarities". Many before us have already exposed this issue by referring to HY's fossil crinoids, which, according to HY, were "identical" to recent ones. Yet, the recent "crinoids" shown by HY in V1-2 (pp. 55, 368, 415 and 574) were in fact sabellid fan worms (Figure 2), i.e. not only a different phylum (Echinodermata *vs*. Annelida), but even a different "superphylum" (Deuterostomia *vs*. Protostomia or Lophotrochozoa) (Dawkins,

FIGURE 2. Fossil crinoid and recent sabellid fan worms on p. 55 in AoC V1-2 and V1-4.

2008)! In the 2008 editions HY did correct this error by removing all crinoid fossils from V1, though he did retain one example in V2 (p. 167), about which he wrote

> "*Pictured is a perfectly preserved 345-million-year-old fossil crinoid. All the details of this creature show that there is no difference between it and the crinoid still alive today*" (see also FM-SY0708).

Unfortunately, HY erred again, for his recent "crinoid", is a sea tulip, *Pyura spinifera*, a sessile ascidian belonging to the phylum Chordata (Figure 3)! What is strange here, is that this photograph with the correct species identification (although incorrectly referred to as a marine plant), can be found at website 1. Most surprisingly, however, is that HY did not even learn from the crinoid vs sabellid worm story, for in his FM he still shows crinoid fossils FM-SY0858 and FM-SY0835 together with sabellid fan worms (Figure 4) (though the other photographs are indeed true crinoids (websites 15-16)!

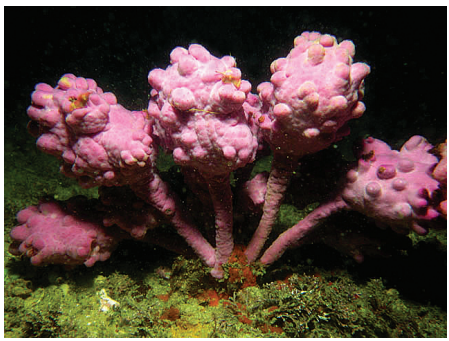

FIGURE 3. The sea tullip, *Pyura spinifera*, shown as recent crinoid on p. 167 in AoC V2 and in FM-SY0708 (Reproduced with permission of David Harasti, website 1).

FIGURE 4. The recent sabellid fan worms pictured by HY as recent "crinoids" in FM-SY0835.

Within the realm of the Echinodermata, HY also seems to have problems with distinguishing between the class Asteroidea (sea stars, starfish) and Ophiuroidea (brittle stars). This was already noted by Dawkins (2008 video), who observed that on p. 403 in V1-2 and V1-4 the fossil brittle stars of which HY writes

> "*These animals, no different to those living today, once again reveal the invalidity of evolution*",

are shown as if they are identical to a starfish. Although this error was corrected in V1-13 by replacing the starfish photograph by two photographs of true brittle stars, the confusion has remained in V3, where on pp. 120 and 130 HY shows both fossil and recent brittle stars under the name "*Starfish*". This could be a lapsus, of course, were it not that exactly the same fossils (FM-SY0794 and FM-SY0795) are shown together with recent starfish, claiming that

> "*Starfish, which have remained unchanged over the intervening 490 million years, have dealt a major blow to evolution*".

Another well-known taxonomic blooper of HY is his fossil eel on pp. 468-469 in V1-2 and V1-4, where he associates with a sea snake, probably *Laticauda sp.* (Dawkins, 2008) (Figure 5; website 2). Obviously these are two very different taxa (bony fishes *vs* snakes)! This error was corrected (Hameed, 2009) in V1-13 by replacing the photograph of the sea snake by two photographs of recent, but still very different "eel" species for the same fossil (Figure 6), which on p. 469 of V1 is further associated with some young eels (elvers).

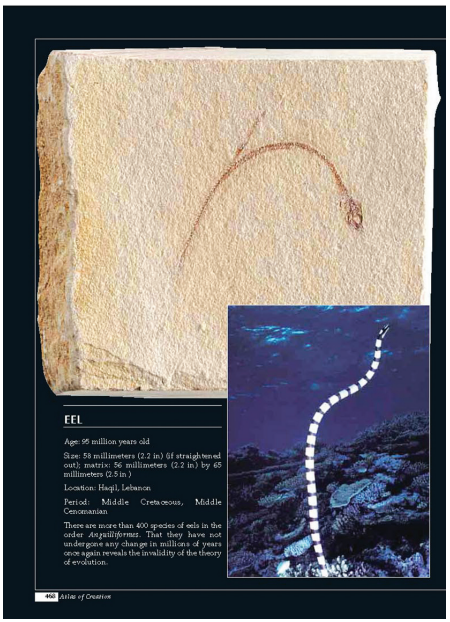

FIGURE 5. Fossil eel and recent sea snake (*Laticauda* sp.) on p. 468 in V1-2 and V1-4 of the AoC, and in FM-SF0134, FM-SF0135 (From website 2; reproduced with permission of Carl Roessler represented by Philip T. Edgerly).

Yet, despite the error with the sea snake was disclosed by Dawkins (2008) the sea snake photograph is still presented as a recent eel in the entries FM-SF0134 and FM-SF0135. Finally, HY makes the confusion complete by associating a fossil eel with a recent lamprey in V3 (p. 284) and FM-SC0909 (Figure 7), stating

> "*Scientific data and findings show that eels have always existed as eels*"!

Obviously, using recent lampreys (chordate class Petromyzontida)

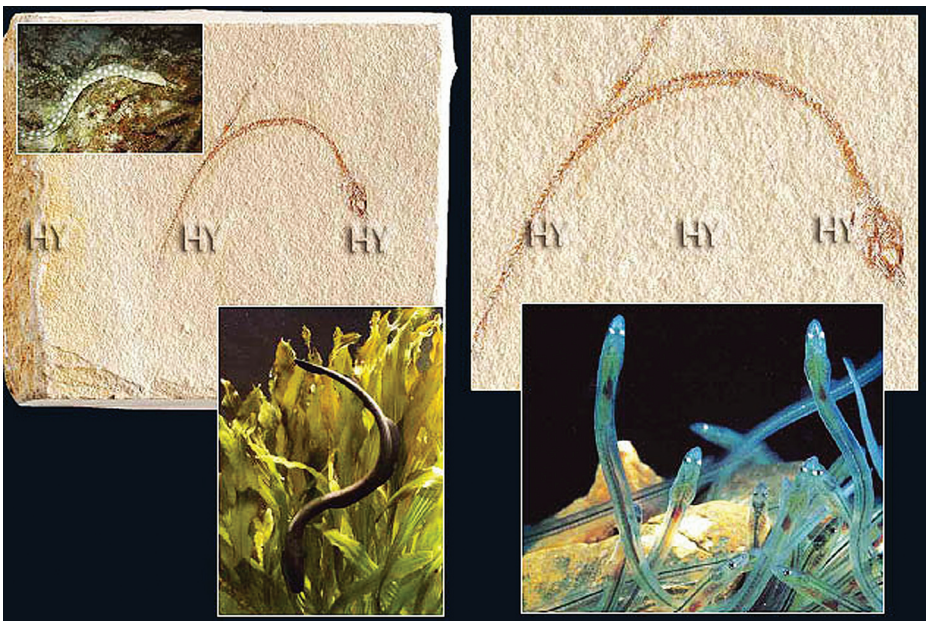

FIGURE 6. Fossil eel from Figure 5 but with the sea snake replaced by two recent eels on pp. 468-469 in AoC V1-13. Note the elvers on p. 469.

to suggest that eels (chordate class Actinopterygii) have always been eels, is as silly, as claiming that eels and sea snakes (chordate "class" Reptilia) are identical! The fact that HY used the very same lamprey photograph in association with a possible fossil lamprey (FM-SF0005) to claim that

> *"lampreys have always remained the same. There exists no difference between a lamprey that lived millions of years ago and those that live today"*,

only makes things worse for it means either that HY tries to confuse his readers by suggesting that eels and lampreys are identical or that he has no idea of what lampreys and eels really are.

FIGURE 7. Lampreys associated with a fossil eel on p. 284 in AoC V3 p. 284 and in FM-SC0909.

While the previous examples of HY's blatant errors have been partly exposed before us, there are many more that are not less astonishing, but that did not get the same attention in the press. We will not attempt to present them all (our list is far too long and still incomplete anyway), but we will briefly discuss a few of them, just to show that previous critics are not exceptional cases though instead reflect the general nature of the AoC.

One surprising observation in the AoC is the extreme underrepresentation of molluscs, and in particular of gastropods and bivalves. After all, in view of (1) their extensive and often well-preserved fossil record, (2) their high species number and diversity, and (3) the relative ease by which they can be roughly identified on the basis of their shell features, one would expect to see far more gastropod and bivalve examples in the AoC than is currently the case. Actually, HY shows only two gastropod fossils on pp. 376-377 in V1 and a third example on p. 618 in V1-13. They are labelled as "*Gastropod*" and "*Snail shell*". For a group of organisms with >100,000

FIGURE 8. "*Shell and oyster*" on pp. 178-179 in AoC V1 (recent pectinid bivalve on the left).

recent species and a about 13,000 named genera (recent and fossil together) (Lindberg *et al*., 2004), it is obvious that HY has done a poor job, both with respect to the representation of this species-rich group and the meaningless identifications. So nothing more can be said here.

More interesting are HY's bivalve examples on p. 178-179 in V1 (Figure 8). Here he shows a recent Pectinidae species (scallop) and an alleged bivalve from 410-360 Ma, which lacks the typical pectinid auricles around the top and which is far too old for a Pectinidae anyway. Indeed, the oldest fossil Pectinidae date from the Triassic, i.e. <250 Ma ago (Hertlein, 1969). In V1-2 HY identifies this material as "*Shell and oyster*" about which he then writes

> "*Oysters that have remained the same for at least 360 million years challenge evolutionists who assert that species evolved gradually from one another*".

Obviously, the specimens shown have nothing to do with oysters and hence HY "corrected" this in V1-4 and V1-13 by changing the identification into "*Bivalve*" and by using "*Bivalves*" instead of "*Oysters*" in the text... as if it does not matter what taxon name is mentioned here. Despite this correction, however, HY returns to his oyster identification for the "*Scallop*" he shows in V3 (pp. 222-223) (Figure 9), since there again he writes

> "*There are an estimated 15,000 extinct species of oysters,... and some 11,000 species still live today. The fossil pictured here, a member of the family Pectinidae, shows that the mollusks in question have remained unaltered for hundreds of millions of years*".

So apparently, HY sees "oysters" and "bivalves" as synonymous and hence the Pectinidae is a family of "oysters". This is implicitly confirmed by fossil entry FM-SC0204, where HY shows a true fossil oyster together with photographs of a recent Pectinidae (photograph taken from website 8) and Tridacnidae. Irrespective of this bad taxonomy and nomenclature, one may wonder whether HY has seen the "scallops" on pp. 222-223 of V3, for stating that the fossil and recent specimens remained unaltered is simply wrong, since also this fossil lacks any indication of the characteristic pectinid auricles, which are clearly present in the recent specimens (Figure 9)! Moreover, the fossil on pp. 222-223 of V3 is again too old

(300 Ma) to be a Pectinidae (see above). So, the recent Pectinidae and fossils shown in Figures 8-9 are definitely not identical!

The previous story becomes still more perplexing if one looks at pp. 104-105 of V2 (Figure 10), because there HY shows the same fossil specimen from p. 179 of V1 (Figure 8, upside down), and which he again identifies as "*Oyster*" noting that

> "*Oyster is a generic name given to a group of shelled mollusks that live in the ocean,... Those oysters that lived 490 million years ago or 150 million years ago are no different from those alive today. This fact completely nullifies the claims of evolution that creatures evolved in stages, in a succession of tiny changes. The fossil record shows that creatures have not gone through any process of evolution and that Almighty God created them*".

We are not sure what HY means by "generic name", but "*oyster*" is of course definitely not a generic name in a taxonomic sense, where "generic" refers to a genus-group name. In fact "oyster" is simply a vernacular English name for a number of quite different bivalve groups such as Ostreidae (true

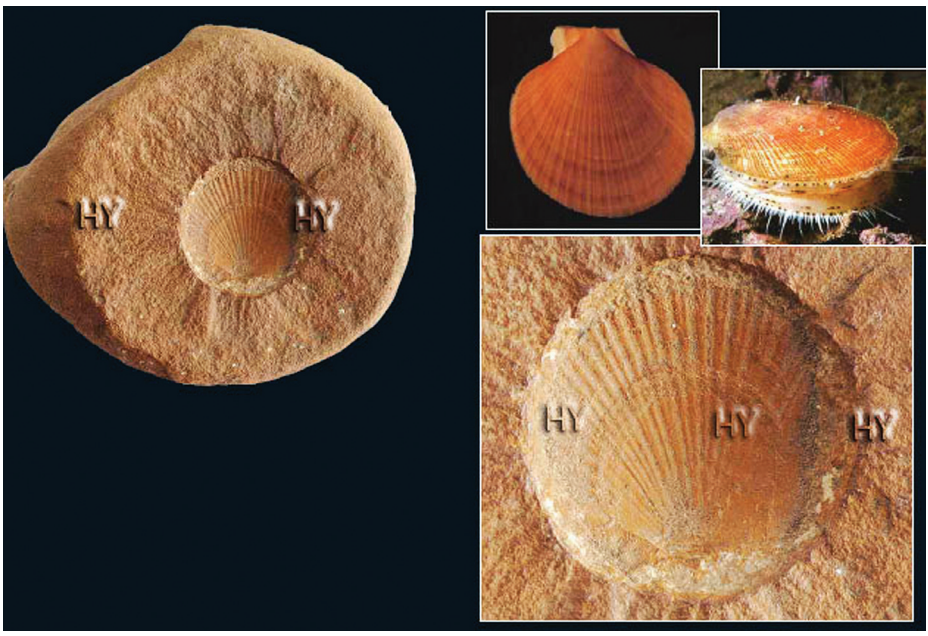

FIGURE 9. Recent and fossil scallops on pp. 222-223 in AoC V3.

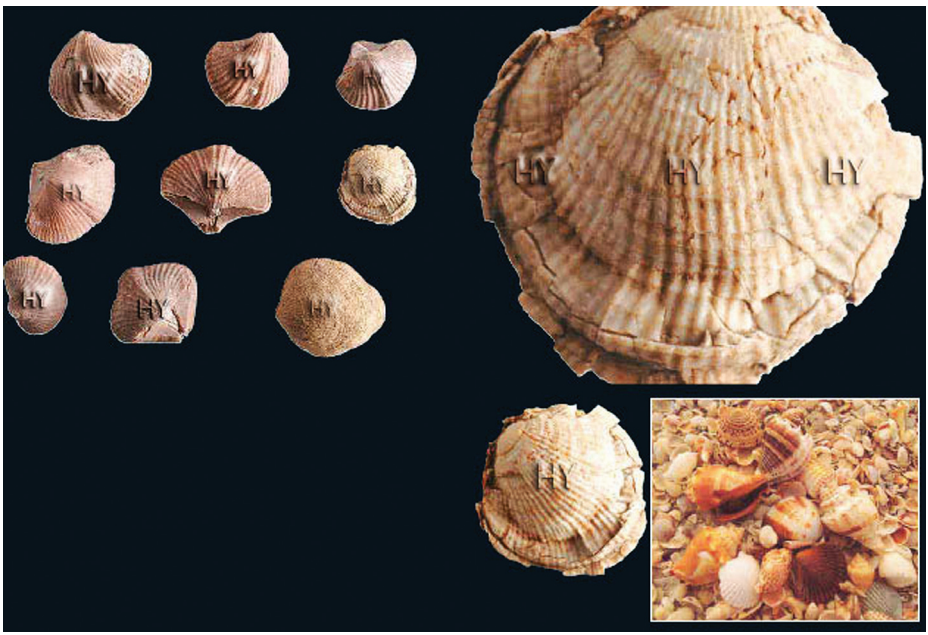

FIGURE 10. "*Oyster*" on pp. 104-105 in AoC V2, with on the left brachiopod fossils and in the lower right corner a bunch of bivalve and gastropod shells as recent representatives (see Figure 11 for details).

oysters), Pteriidae (e.g. pearl oysters), and Anomiidae (e.g. saddle oysters). Yet, the true joke here is that while we are uncertain about the identity of the fossil on p. 105 (= the specimen of p. 179 in V1), most of the other fossils shown on p. 104 are beyond any doubt neither oysters, nor Pectinidae, bivalves or even molluscs, but Brachiopoda, an entirely different animal phylum (Figure 10)! Nonetheless, the recent "*oyster*" specimens that according to HY do not differ from the fossils are a bunch of dead mollusc shells of two different Molluscan classes (Gastropoda and Bivalvia) (Figure 11)! Moreover, the photograph of these molluscs was printed as a mirror image, for all the gastropods appear as if they are sinistral, while in reality they are all dextral species. Still, the blunders do not stop here, for the fossil specimens of Figure 10 are also exhibited individually in the FM with the same erroneous entry as "*Oysters*" and with the same erroneous association with Pectinidae and/

FIGURE 11. Detail of the mix of bivalve and gastropod shells shown on p. 105 in AoC V2 (see Figure 10). Note that the picture is a mirror image since all gastropods appear sinistral.

or the mollusc shells shown in Figure 11, but with in addition the suggestion that fossils FM-SY0392 and FM-SY0387 are identical to a recent *Tridacna* species (Figure 12)... or how brachiopods of a few cm are "identical" to a bivalve of up to 120 cm!

FIGURE 12. *Tridacna* sp. (Bivalvia) associated with fossil brachiopods in FM-SY0392 and FM-SY0387.

Clearly, bivalves are not HY's speciality. Take for example the bivalve on pp. 406-407 in V1 (Figure 13). As Glaubrecht (2007) already reported, the fossil specimen is a typical *Gryphaea* species with a large, curved cup-like left valve ("toenail") and a small, flat right valve that closes the cup. According to HY this fossil is identical to the common blue mussel (*Mytilus* sp.), which has nicely symmetrical valves. Again the two taxa do not only belong to different families, but also to different orders (Ostreida *vs* Mytilida) (Carter *et al*., 2011). HY goes even one step further with bivalve fossil FM-SC0274 (= *Gryphaea* of Figure 13), which now is not only identical to blue mussels, but also to a clam (Veneridae) and the ocean quahog (*Arctica islandica*), both belonging to still a third order (Cardiida) (Carter *et al*., 2011) (websites 4-5). In the same line of erring, HY shows on pp. 494-495 of V1 another fossil bivalve of which he writes

> "*There is no difference between the bivalve shown, which lived between 208 and 146 million years ago, and bivalves alive today*",

a conclusion based on a comparison with a pile of recent bivalve shells of various families (and orders), including at

FIGURE 13. "*Bivalve*" on pp. 406-407 in AoC V1, with a fossil *Gryphaea* on the left and a recent *Mytilus* sp. on the lower right side.

least Mytilidae, Spondylidae, Tridacnidae, Veneridae and Psammobiidae (Figure 14). The same fossil also figures under entry FM-SY0362, where it is claimed to be identical to still two other families, viz. Arcticidae (website 4) and Limidae. A similar fossil bivalve (from the same site and age) on pp. 502-503 in V1 is not only said to be similar to Veneridae, but is according to entry of FM-SC0351 also identical to Arcticidae and Astartidae (website 7). But as we said from the start, bivalves are not HY's thing, after all, on pp. 502-503 he wrote about the fossil bivalve that

> "*Marine crustaceans have maintained the same characteristics in the fossil record for hundreds of millions of years. One example is the double-shelled bivalve. The one shown here lived between 208 and 146 million years ago; it represents a challenge to the theory of evolution because it is the same as present-day bivalves*".

Thus, according to HY all bivalves are the same (what do the thousands of bivalve species then mean?) and bivalves are crustaceans...

With the crustaceans we have arrived at the arthropods, the most speciose animal phylum with

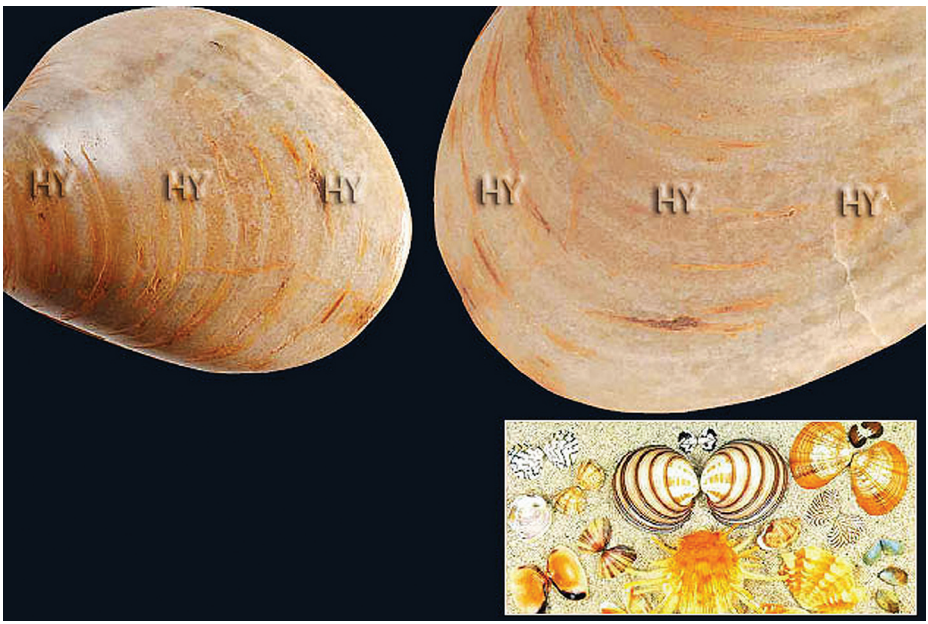

FIGURE 14. "*Bivalve*" on pp. 494-495 in AoC V1, with a collection of various recent bivalve shells in the lower richt corner (p. 495).

more than a million described species and probably still several millions more that remain to be described, particularly among the insects (Foottit & Adler, 2009). Of course HY's scenario is the same here: show a fossil specimen next to a recent one and declare them identical to "prove" that they were created by god and did not evolve. Evidently, HY made the same sort of errors as illustrated before. Take, for example, p. 237 in V1 where HY shows a bark beetle fossil in amber, stating that

> "*barkbeetles of 25 million years ago were the same as those today... showing that living things did not evolve, but were created*".

However, the recent "bark beetle" on p. 237 of V1 is not even a beetle, but a pentatomid stink bug (*Notius consputus*) (Figure 15; website 9). This latter belongs to the order Hemiptera or Heteroptera (depending on which taxonomic classification one follows), while beetles belong to the order Coleoptera. If one has doubts that these two orders differ fundamentally, then keep in mind that Hemiptera have a hemimetabolous development (incomplete metamorphosis with egg, nymph and adult), whereas

FIGURE 15. "*Barkbeetle*" on p. 237 in AoC V1 associated with a recent pentatomid stink bug (*Notius consputus*) (website 9).

Coleoptera are holometabolous (complete metamorphosis with egg, larva, pupa and adult). We admit, however, that the same fossil bark beetle of FM-AI0048 is no longer associated with a bug, but with three recent bark beetles (Scolytidae; now considered as a subfamily of the Curculionidae). Conversely, "*bark beetle*" fossil FM-AI0302 is shown with photographs of a recent scolytid (*Pityogenes chalcographus*; website 11) and of the recent flat bark beetle *Dendrophagus crenatus* (Cucujidae; website 10), i.e. a different beetle family.

Not unexpectedly, taxonomic inaccuracies and misidentifications with respect to insects abound in the AoC. We illustrate this with just a few examples. (1) The recent specimen of the "*Lauxaniid flies*" on p. 427 of V2-5 is in fact a species of Syrphidae (most probably *Episyrphus balteatus*). (2) The recent "*Webspinner*" on p. 433 of V2-5 (order Embioptera; website 18) is correct, but HY refers to it as "beetles". (3) The "*True bug*" on p. 379 of V3 is supposed to be a species of Enicocephalidae (order Heteroptera or Hemiptera) (not "*encophalid*" as HY writes), yet the fossil is unrecognizable, while the recent specimen is definitely not an enicocephalid, but rather a dipteran species. (4) The fossil "*Moth*" on p. 430 of V1 and FM-AI0199 are associated with a skipper butterfly (Rhopalocera; Hesperiidae), which is not a moth, while FM-AI0199 associates the fossil with an additional photograph of a skipper butterfly (website 20) and a noctuid moth species (Heterocera; Noctuidae) (website 19). The antennae of the fossil lack the typical Rhopaloceran terminal knob and thus show that an association with a skipper butterfly is erroneous. (5) The fossil of the "*Black fly*" on p. 425 of V2 may belong to the Simuliidae (we cannot judge this from the picture), but

the recent specimen definitely does not, since it is a Calliphoridae. The same fossil and recent specimens are shown in FM-AI0440, with the addition of two other Calliphoridae species (websites 21-22). (6) The recent specimen of the "*Ant lion*" on p. 295 of V1 is indeed correctly identified, yet the fossil in amber is definitely not the "*ant lion's head*", but simply an ant itself. This may be not very clear in V1-2, but in V1-13 HY added a detailed picture of the fossil which leaves little doubt (Figure 16; compare with the ant shown in website 23). Although we can go on like this, we feel that the few examples provided above should suffice.

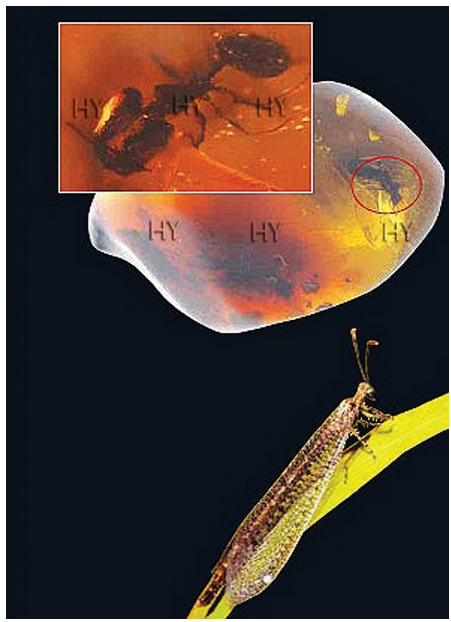

FIGURE 16. "*Ant lion*" on p. 295 in AoC V1, with detail of the "head" of the ant lion in the amber fossil, which turns out te be an ant (compare with website 23).

One of the problems with the insect fossils in amber in the AoC is that they are often in too poor shape to identify them properly. This is the case for the "*True bug*" on p. 246 of V1. In V1-2 this fossil is associated with a recent carnivorous bug (Reduviidae), while in V1-13 HY added a second blurry fossil and a photograph of the pied shieldbug *Tritomegas bicolor* (Cydnidae; website 14). However, the same fossil in entry FM-AI0055 is shown with the mirid bug, *Phytocoris lasiomerus* and the lygaeid bug, *Zeridoneus costalis* (websites 12-13). Still, HY claims that "*...these insects refute evolution*" since they "*survived unchanged*". In other words, the fossil(s) is(are) supposed to be identical to not less than four different families, one of which is strictly carnivorous, whereas the other three are herbivorous. In the text accompanying the photographs on p. 246 in V1, HY further notes that

> "*Insects of the genus Hemiptera, of which there are more than 48,000 species...*",

which testifies that he has little understanding of what a taxonomic classification means, for Hemiptera is an insect order, not a genus.

Evidently, several of the fossil prints in stone offer the same kind of

problems as the amber fossils. The "*Caterpillar*" fossil on p. 50-51 of V1-2, for example, is simply unrecognizable (Figure 17). Yet, HY associates it with a recent caterpillar. However, the fossil dates from the Pennsylvanian (Upper Carboniferous, approx. 300 Ma ago), while the oldest butterfly fossils only appear in the Early Jurassic (approx 190 Ma ago) with taxa such as *Archaeolepis* (Grimaldi & Engel, 2005). So it is very unlikely that HY's fossil has anything to do with caterpillars. Nevertheless, HY remarks

> "*Like all other living beings, caterpillars too did not evolve, but were created*".

Thus, it seems as if HY interprets caterpillars (and other insect larvae) as some sort of "species" category on their own, rather than as a developmental life stage. Should we thus now conclude that in the "logic" of HY each individual butterfly is the result of at least four independent divine creation acts that produce consecutively the egg, the caterpillar, the pupa and the imago? We thought that different life stages reflect phases in a natural developmental process that starts with a zygote and that eventually leads to a reproducing adult individual. For the sake of completeness we should add that on pp. 72-73 in V1-13 the same cat-

FIGURE 17. Fossil print variously identified in the AoC as "*Caterpillar*" (pp. 50-51 in V1-2) or "*Millipede*" (pp. 72-73 in V1-13).

erpillar fossil is shown as a "*Millipede*" (Figure 17)!

Luckily several insect fossils in the AoC do allow a correct gross identification. Nevertheless, even then HY sometimes manages to completely miss the point. The recent fly on p. 314 of V1 is indeed a dipteran (*Pachygaster* sp., Stratiomyidae) (website 17). The "*fossilized fly*", however, shows an insect with long antennae, an elongated hindleg with a thickened femur, and a conspicuously long ovipositor at the end of the abdomen (Figure 18). Hence, this fossil surely is not a fly (let alone a stratiomyid), but is undoubtedly an orthopteran (e.g. cricket, grasshopper, ...). Why HY has placed these two specimens together as proof of no evolution is a mystery to us, nor do we understand why he decided to use these two winged specimens to illustrate his thesis that

> "*The fossil record shows that the winged insects appeared simultaneously with wingless ones, both at once*".

Similar to the previous example, are the "*Adult stone fly*" (order Plecoptera) on pp. 526-527 of V1-2 and the "*Mayfly*" (order Ephemeroptera) on the same pages in V1-4 and V1-13 (Figure 19). The recent specimens are in both these cases correctly identified (at ordinal level), although they are associated with exactly the same fossil. This latter has (1) an abdomen that is much shorter than the wings and that lacks terminal cerci, and (2) large, ovally rounded wings that are kept vertically over the abdomen. As such, it resembles neither a stone fly, nor a mayfly, but rather some sort of lacewing (e.g. *Chrysopa*; order Neuroptera) like the specimens on p. 318-319 in V1-13 and p. 387 in V2-5 (Figure 20)! Whatever the correct identification may be, HY cannot maintain two entirely different

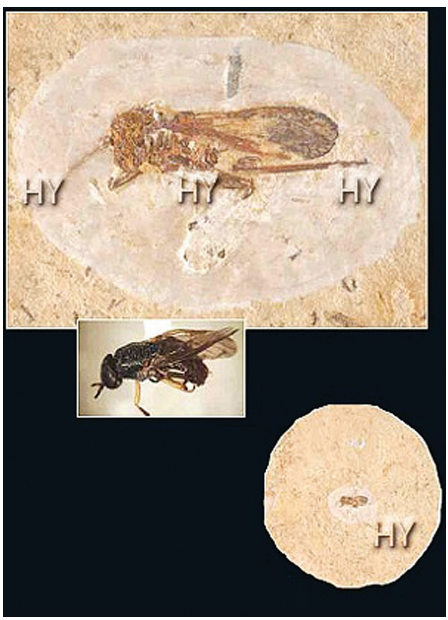

FIGURE 18. "*Fossilized fly*" on p. 314 in AoC V1, showing a recent stratiomyid fly (*Pachygaster* sp.; from website 17) associated with a fossil orthopteran.

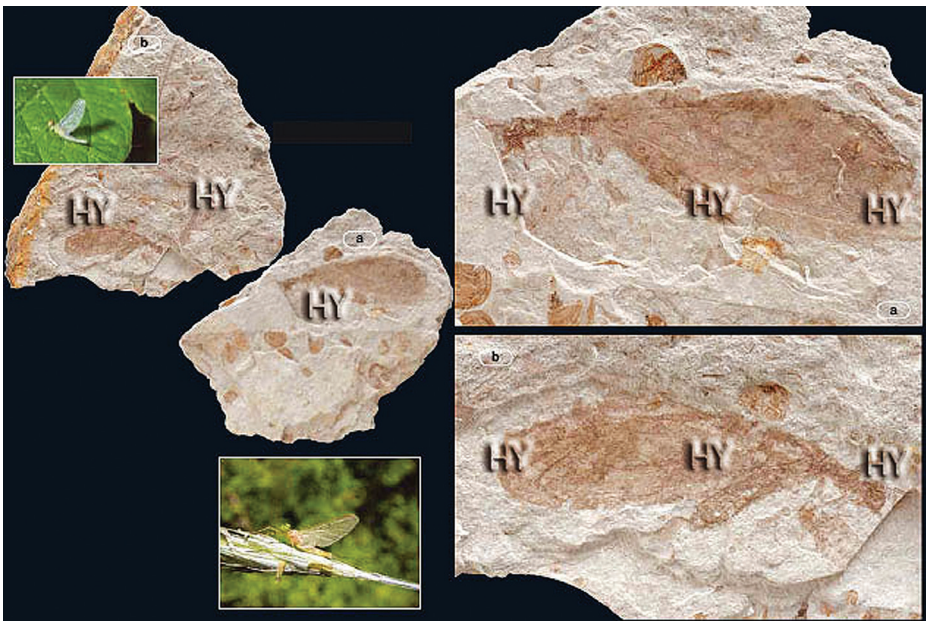

FIGURE 19. "*Mayfly*" on pp. 526-527 in AoC V1-13 (in V1-2 the same fossil is associated with a stone fly). Compare fossil print with Figure 20.

interpretations for the same fossil. Nonetheless he does so without any explanation.

Next to insects, the AoC of course also deals with other arthropod groups, but this does not make a difference when it comes to taxonomic errors and inaccuracies. A silly example is the "*Centipede*" on p. 372 in V2, for although the text correctly points out that the body segments of centipedes bear a single pair of legs, the fossil and recent specimens shown clearly bear two pairs of legs per segment and hence are millipedes. Another detail is the "*Spider*" on p. 397 of V2, the fossil of which is uninterpretable from the picture, but the recent specimens are unmistakably acarids. HY does mention the name "*Acarina*" without further explanation, but in his text he simply continues talking about "*spiders*". Finally, one of the most striking and funny examples of HY's mistakes with respect to non-insect arthropods, is the fossil "*Crab spider*" in amber on p. 422 in V1, for this fossil species is "*...identical to contemporary crab spiders*". However, the recent crab spider

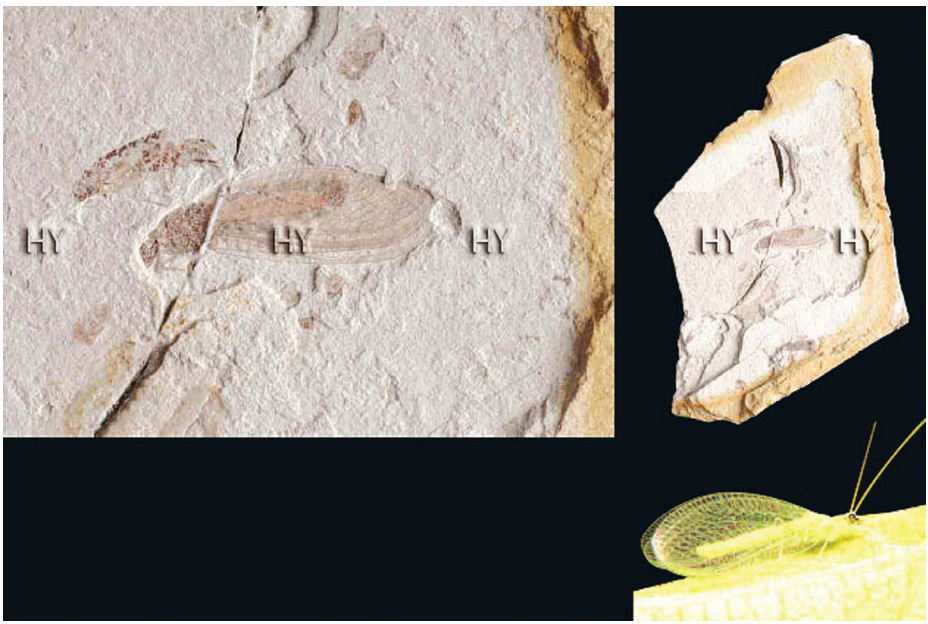

FIGURE 20. "*Lacewing*" (*Chrysopa* sp.) on pp. 386-387 in AoC V2-5. Compare with Figure 19.

is actually a beautiful specimen of a spider crab (probably *Hyas araneus*) (website 3) (Figure 21)! Even if both taxa are arthropods, one cannot escape from the fact that spiders belong to the subphylum Chelicerata, whereas crabs belong to the subphylum Crustacea. How can one then seriously claim that the fossil and recent taxa shown by HY are identical? The same question can be asked for the crab fossil on p. 349 in V1-2 and V1-4, for HY writes

> "*Remained unchanged for millions of years, this crab confirms once again that the species didn't evolve, since the fossil is no different from crabs still living today*".

Yet, though the fossil looks somewhat like a common green crab (e.g. *Carcinus* sp.) with symmetrical claws and eyes positioned at the margin of the carapace, the recent specimen is a fiddler crab (*Uca* sp.) with highly asymmetrical claws and eyes on long steels. It is true that both are "crabs", but they definitely are not the same species! Apparently, HY must have realized this since in V1-13 he replaced the fiddler crab by a recent *Carcinus*

FIGURE 21. Fossil "*Crab spider*" in amber on p. 422 in AoC V1, associated with a living spider crab (probably *Hyas araneus*) (see website 3).

sp. (or a related form) (website 30), though without any explanation. Even if the fossil and recent specimens now look far more similar, there are still no *a priori* reasons to believe that they belong to the same species. Indeed, such a conclusion would require a detailed morphological comparison, which HY does not provide. This is a recurrent fundamental problem in the AoC. What are HY's criteria to decide when fossil and recent species or specimens are identical and when they are not?

We now come to some taxonomic observations on the vertebrates in the AoC, for also in this group HY manages to blunder. On p. 150 of V1, for example, HY shows a "*Pipefish*" fossil (order Syngnathiformes: Syngnathidae) which is supposed to be "*identical with those of today*". Yet, the recent specimen is not a pipefish, but a garfish (e.g. *Belone belone*; order Beloniformes) (Figure 22). This brings us to another fundamental problem of the AoC, viz. the use of vernacular English names and the consistent neglect or incapacity of HY to apply the internationally recognized and ruled scientific nomenclature (except for some flagship fossils such as *Pikaia*, *Archaeopteryx*, *Wiwaxia*, ...). The vernacular name garfish is a case in point, for in V1 this name is used for the fossils shown on pp. 48-49 and 364-365, while in V1-2 and V1-4, there is an extra fossil with this name on pp. 318-319 (see in addition entries FM-SF0066 and FM-SF0133). However, both the fossils and recent material at these pages and FM entries are not garfish (order Beloniformes), but "gar" species (order Lepisosteiformes: Lepisosteidae). Yet, even this is not unequivocal, since "gar" refers to both species of Lepisosteidae and Beloniformes (see Froese & Pauly, 2011). A short survey of Fishbase (Froese & Pauly, 2011) indeed shows that the name

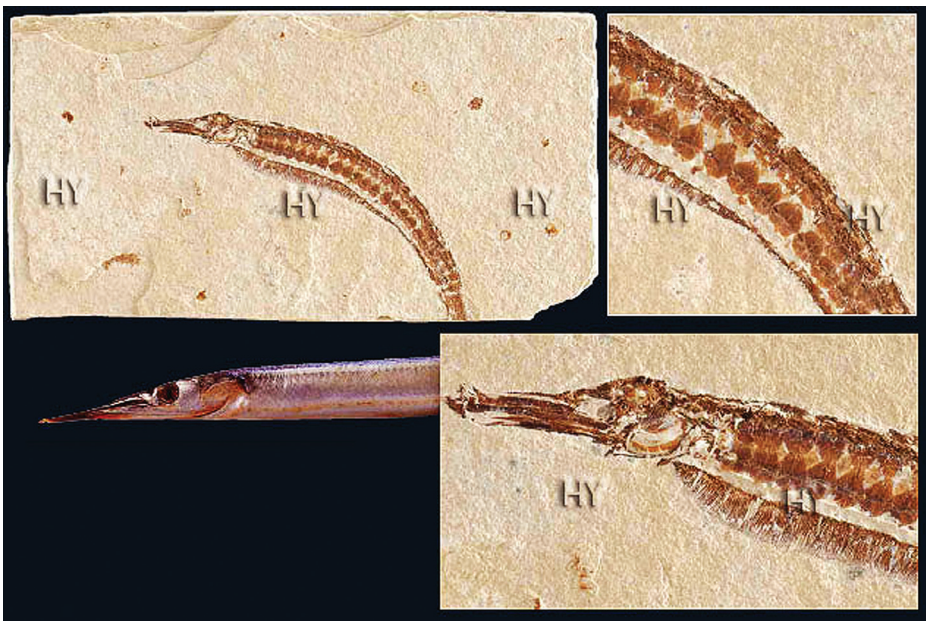

FIGURE 22. Fossil *"Pipefish"* on pp. 150-151 in AoC V1, associated with a recent garfish (possibly *Belone belone*).

gar is used for at least five different species representing two very different orders (Beloniformes and Lepisosteiformes) and three families (Lepisosteidae, Hemiramphidae and Belonidae). The interpretation of garfish is just as confusing since it refers to at least 19 different species belonging to three families, but luckily they all represent one and the same order (Beloniformes) (Froese & Pauly, 2011). As a last example of the confusion that vernacular names may cause, take the *"sandfish"* on pp. 190-191 in V3, we cannot say much about the fossil, but the recent specimen shown is a *Synodus intermedius* or sand diver (website 38), not a sandfish! The name sand diver is used for at least five fish species of three families (Trichonotidae, Creediidae and Synodontidae) and two different orders (Perciformes and Aulopiformes), while the name sandfish is used for at least seven fish species of four families (Trichodontidae, Serranidae, Malacanthidae and Gonorynchidae) and two orders (Perciformes and Gonorynchiformes) (Froese & Pauly, 2011), but also for the desert skink *Scincus scincus* (a lizard) (e.g. Baumgartner *et al*., 2008).

Evidently, since HY only uses generalized vernacular names, his identifications are bound to be too inaccurate to allow detailed comparisons. For example HY shows repeatedly a *"herring"*, but this name applies to >25 different species of at least four different families (Clupeidae, Engraulidae, Arripidae and Pristigasteridae) (Froese & Pauly, 2011). So, which of these species is HY then referring to? How does he decide that the fossil and recent specimens are identical? No need to emphasize that this issue alone suffices to make the AoC utterly useless.

HARUN YAHYA AND HIS MAMMAL SKULLS

While in the previous section we mainly dealt with purely taxonomic issues, we need to expand our discussion when looking at the mammal skulls in the AoC. Of course also here we are confronted with HY's taxonomic confusion, such as for the skull on pp. 152-153 in V1-4 and V1-13, which in V1-4 is presented as the skull of a *"Leopard"*, while the same skull is assigned to a *"Grizzly bear"* in V1-13 (Figure 23). Obviously, at least one of these two identifica-

FIGURE 23. Fossil skull on pp. 152-153 in AoC V1-4 ("*Leopard*") and AoC V1-13 ("*Grizzly bear*"). The skull is supposed to be 89 Ma old (Cretaceous) and was found in China.

tions must be wrong, and if we look at website 31, then we would not be surprised if both identifications were wrong. Moreover, as an illustration of HY's sloppiness just note that although this fossil skull was collected in China, it was placed in the AoC among "Fossil specimens discovered in the USA" (because it replaces a supposedly fossil lama from Wyoming in V1-2). Anyway, as he does so often, HY changes his interpretation of a fossil without giving any explanation. In contrast, we have no doubts about HY's erroneous identification of the "*Tibetan sand fox*" on p. 92-93 in V3 and in FM-SM1183, for the recent animals shown there are unmistakably desert foxes (fennec: *Vulpes zerda*) (websites 36-37), not Tibetan sand foxes (*Vulpes ferrilata*) (Figure 24).

The most perplexing about many of the skull fossils in the AoC, and by extension in Harun Yahya's book "The skulls that demolish Darwin" (2008c), is not so much their taxonomic interpretation, but rather their geological age. This was already noted in the previous section when discussing the ages of some scallop and caterpillar fossils in the AoC. Yet, the

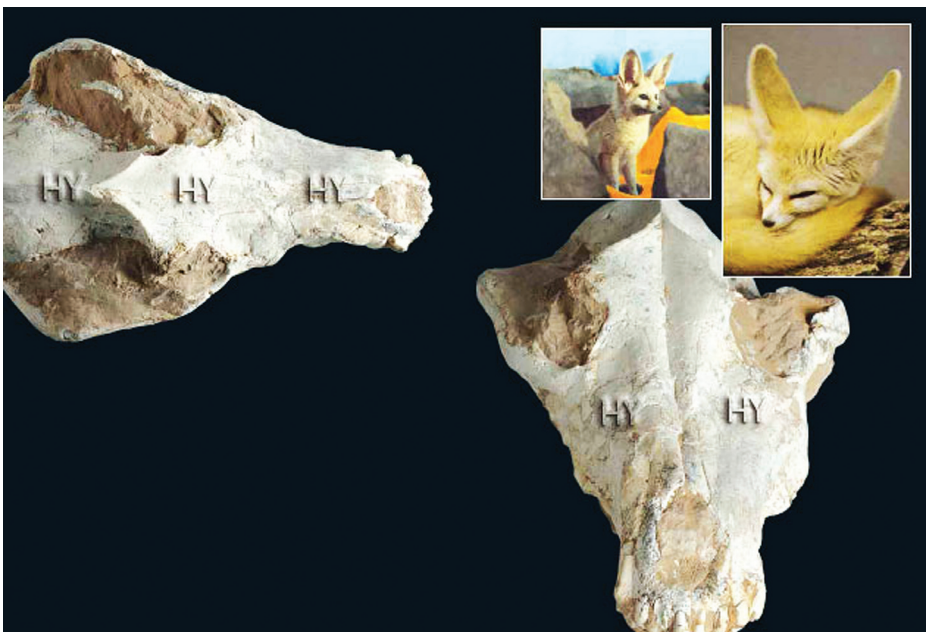

FIGURE 24 . Alleged fossil skull of a "*Tibetan sand fox*" (*Vulpes ferrilata*) on pp. 92-93 in AoC V3, but with a living fennec (*Vulpes zerda*) as recent counterpart (websites 36-37).

geological ages that HY claims for many of his mammal skull fossils are so far over the edge that they must have been fabricated. This is, by the way, also very well possible with the fossil skulls themselves. In this context, we refer to website 31 for a more detailed analysis of the physical characteristics of HY's fossil skulls and the possibility that several of them may have been forged. By this we do not a priori claim that HY did this himself, but we do point out that there is a serious problem with forged fossils, particularly from China (e.g. Dalton, 2000; Stone, 2010), where most of HY's fossil skulls come from. Briefly, many skulls of mammals such as the tiger, the lion, the wolf, the polar bear, and the leopard or grizzly bear mentioned above, are dated far back into the Cretaceous from China, suggesting that these species already existed more than 60 Ma ago and thus must have lived together with dinosaurs! Table 1 lists a number of extravagant examples for which we roughly traced the known fossil record. This shows that actually none of these species goes further back than the Pliocene, i.e. <5 Ma ago and even that is already much older than the age of the first fossils of most of them. HY's most amazing records in this series are undoubtedly the (1) Tibetan sand fox skull of 86 Ma, while in fact no reliable fossils are known of this species (Clark *et al*., 2008), (2) the wolf skull of no less than 120 Ma, while the known fossil record of this species does not go beyond the Pleistocene (Mech, 1974) (3), the panda bear skull of 96 Ma old, while also for this species the fossil record does not reach beyond the Pleistocene (Chorn & Hoffmann, 1978; Jin *et al*., 2007), and (4) the duo of the polar bear (74 Ma) and the snow leopard (67 Ma), which both are actually only known from the late Pleistocene, i.e. roughly some 150,000 years ago (Hemmer, 1972; Ingolfsson & Wiig, 2008). So if HY's skull fossils are genuine and correctly dated, then he is sitting on a goldmine of "Nature" or "Science" papers! Unfortunately, as outlined in website 31, HY's fossil skulls inspire little or no confidence at all. Note that, although we selected the most conspicuous cases, we suspect that also among the younger fossil skulls of HY, there may be several whose age is still overestimated. For example, the "*Cheetah*" skull on p. 109 in Harun Yahya (2008c) is estimated to have an age of 7.3 Ma (Miocene), whereas according to Krausman & Morales

TABLE 1. Examples of age estimations of Cretaceous fossil mammal skulls in the AoC and Harun Yahya (2008c) (=Skulls)

Vernacular name	Scientific name	HY reference	HY age	Known age	References
Brown bear	*Ursus arctos*	V1-13: 596-597	90 Ma	500,000 a	Pasitschniak-Arts (1993)
		V3-1: 94-95	75 Ma		
Coyote	*Canis latrans*	V1-13: 667	65 Ma	Pleistocene	Bekoff (1977)
Fisher	*Martes pennanti*	Skulls: 183	78 Ma	Late Pleistocene	Powel (1981)
Giraffe	*Giraffa camelopardalis*	V1-13: 656-657	65 Ma	Pleistocene	Dagg (1971)
Hyena	*Hyaena hyaena*	V1-13: 634-635	73 Ma	Lower Pliocene	Rieger (1981)
		V3-1: 32-33	85 Ma		
		V3-1:70-71	80 Ma		
		V3-1: 102-103	90 Ma		
Lion	*Panthera leo*	Skulls: 71	82 Ma	Late Pliocene 3.5 Ma	Haas *et al*. (2005)
		Skulls: 82	82 Ma		
		Skulls: 103	82 Ma		
		Skulls: 110	85 Ma		
		Skulls: 119	65 Ma		
		Skulls: 140	65 Ma		
Panda bear	*Ailuropoda melanoleuca*	V1-13: 602-603	88 Ma	Pleistocene	Chorn & Hoffmann (1978); see also Jin *et al*. (2007)
		V3-1: 96-97	96 Ma		
Polar bear	*Ursus maritimus*	Skulls: 114	74 Ma	Late Pleistocene 130,000 a	Ingolfsson & Wiig (2008)
Snow leopard	*Uncia uncia*	Skulls: 37	67 Ma	Late Pleistocene	Hemmer (1972)
Tibetan sand fox	*Vulpes ferrilata*	V3-1: 92-93	86 Ma	No fossils known !	Clark *et al.* (2008)
Tiger	*Panthera tigris*	V1-13: 592-593	79 Ma	Lower Pleistocene	Mazak *et al*. (2011)
		V1-13: 604-605	78 Ma		
		V3-1: 30-31	80 Ma		
		V3-1: 58-59	90 Ma		
		V3-1: 62-63	89 Ma		
		V3-1: 64-65	89 Ma		
		V3-1: 66-67	89 Ma		
		V3-1: 78-79	80 Ma		
Wolf (gray?)	*Canis lupus*	V3-1: 40-41	80 Ma	Pleistocene	Mech (1974)
		V3-1: 68-69	120 Ma		
		V3-1: 98-99	65 Ma		

(2005) the oldest cheetah fossils would be no more than 3.5-3.0 Ma old. Obviously, with such incredible, and possibly forged, fossils, we rest our case.

THE AoC HIGHLIGHTS: HARUN YAHYA'S FAKE EVIDENCE

However hilarious some of the blunders described in the preceding sections may be, we guess that if HY will leave a historic mark, then it will be due to the fake evidence he produced in the AoC. Indeed, soon after the AoC was distributed in Europe, it was noted that the "*Spider*" on pp. 240-241 of V1-2 and V1-4 looked quite particular for it did not correspond to any known species. Particularly its wasp-like abdomen with a sting, its two beady red eyes, and its grasping mouth pincers made this spider unique (Figure 25; website 24) for it was a completely imaginary animal created by Graham Owen, an artist specialized in the production of decorative realistic animal models and fish lures. With this spider he

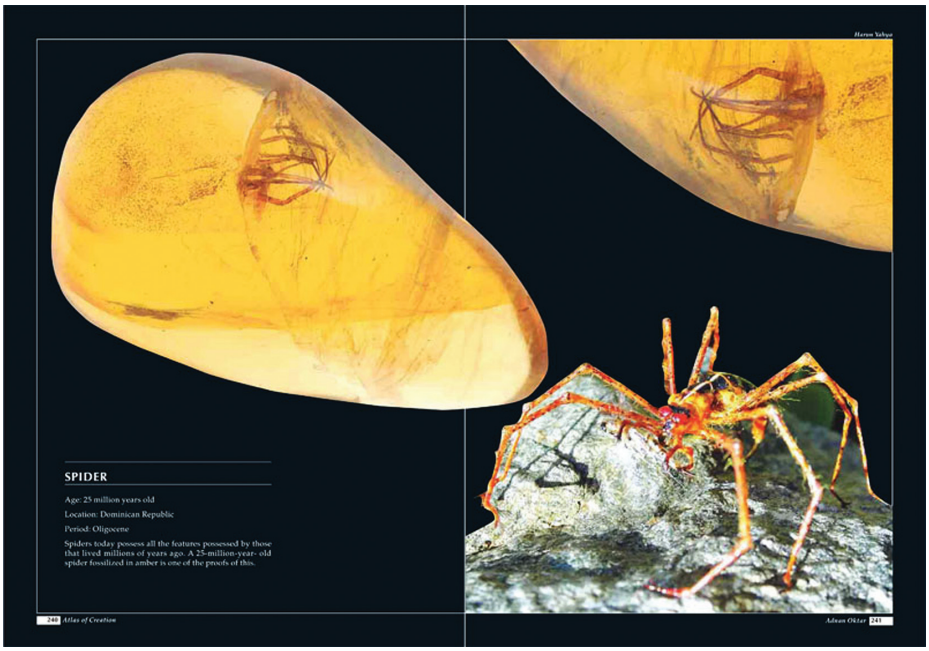

FIGURE 25. Imaginary spider lure used by HY on pp. 240-241 in AoC V1-2 and V1-4 (Reproduced with permission of Graham Owen; see website 24).

actually wanted to create an imaginary animal (for a Hardy-Greys advertisement), rather than replicating an existing species, as he had been doing up to then (website 24). However," HY used it as a living specimen to support his claim that

> "*Spiders today possess all the features possessed by those that lived millions of years ago*"!

Anyway, HY's fossil spider in amber is such a blur, that in fact it is compatible with nearly anything that has six to eight legs (Figure 25). It may be funny to note that Graham Owen's imaginary spider holds a lure in the shape of a midge in its mouth pincers (website 24). Nevertheless, also this midge lure has been used to illustrate a living species, viz. a gnat (in the "Khmer Online Dictionary" and in a news heading about midges in the "Edinburgh Napier News"; see website 25). Hence, also others have been tempted to use Graham Owen's lures to illustrate living animals!

Next to the spider lure, HY used two other lures from the Graham Owen collection, viz. one of a caddisfly on p. 244 in V1-2 and V1-4, and one of a mayfly on p. 282 in V1 (Figures 26-27; website 24). In both cases the hook of the lure is clearly visible in the AoC. Still, HY writes for the caddisfly

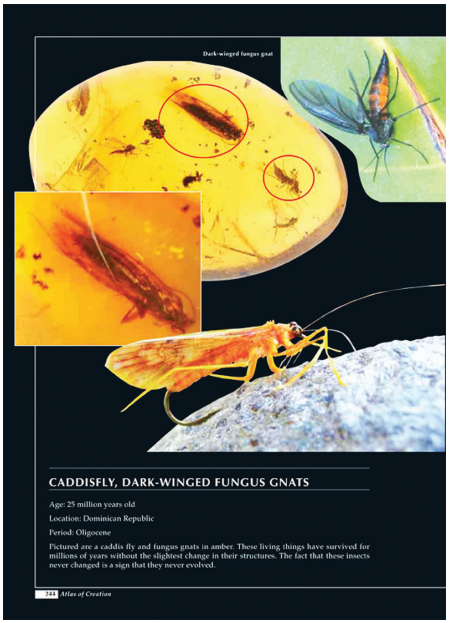

FIGURE 26. Caddisfly lure used by HY on p. 244 in AoC V1-2 and V1-4 (Reproduced with permission of Graham Owen; see website 24).

> "*Pictured are a caddis fly and fungus gnats in amber. These living things have survived for millions of years without the slightest change in their structures. The fact that these insects never changed is a sign that they never evolved*".

In a similar sense, HY states for the mayfly

> "*There are more than 2,500 known species of mayfly. These insects, with their very short adult lifespans, have maintained their structures unaltered for millions of years. The pictured mayfly in*

FIGURE 27. Mayfly lure used by HY on p. 282 in AoC V1 (Reproduced with permission of Graham Owen; see website 24).

amber is 25 million years old. Any creatures that have stayed the same for 25 million years tell us that they did not evolve, but were created".

If one can make these claims while showing lures with a conspicuous fish hook under the abdomen, well then one can wonder as to what must happen before HY would indeed accept that some structures have changed. On the other hand, we must admit that these particular caddisfly and mayfly lures are indeed not the result of evolution, but were intentionally created... though not by god.

After a complaint about copyrights from Graham Owen, and after the use of the lures in the AoC had been exposed on the internet, both the spider and the caddisfly lures were replaced by photographs of living specimens (websites 26-27). Yet, to our surprise the mayfly lure was not replaced and is still present in V1-13 (though as a mirror image of the photograph in V1-2). The reason for maintaining this idiocy escapes us, though HY himself has shed some light on this in his replies to Dawkins' (websites 28-29). Indeed, in 2008 HY wrote (website 28; our emphasis in bold):

> "*The model insect pictured in the Atlas of Creation is that of an organism that is still alive today and of which fossil specimens dating back millions of years have also been found.* ***Whether or not it is a model makes no difference****. What matters is that this insect that lived millions of years in the past is still living, in exactly the same form, today.*"

and a bit further he concludes:

> "*Dawkins has eventually managed to track down a picture of a model in the Atlas of Creation, whose three volumes totalling 2300 pages contain hundreds of living fossils that definitively refute evolu-*

tion, and is attempting to portray this as a mistake. ***Evolutionists are unable to swallow the fact that there is not a single mistake in the book****, which proves that organisms living millions of years ago are still living today. Dawkins' fruitless endeavour merely shows how accurate and effective the Atlas of Creation is. This goes to show that the Atlas of Creation has been instrumental in evolution's heading for a total collaps.*"

In his 2009 reply (website 29), HY expands further on these topics by stating that:

"*Since the plastic model is identical to a picture of the living life form in question of course I can use whatever I wish.*"

and about Dawkins himself and his critiques on the lures (and other aspects of the AoC) (our emphasis in bold):

"*I am now in the course of preparing the 4th and 5th volumes of the work,* ***and I have used plastic models of frogs,*** *for instance. They look different and nice, and there is also a bit of a jest in them.* ***I have led that person to take the bait. This is the only subject he criticizes. I deliberately put the hook. There was a hook there, clearly visible. I put the insect on the hook and he went for it****. He is now talking about it everywhere, showing people the insect on the hook*".

So, if we must believe HY, then the lures were deliberately used in the AoC to "catch" Richard Dawkins (although it is unclear what would be the point of this)! HY's reply that Dawkins only criticized the lures is even more astonishing, for in fact Dawkins started by pinpointing HY's erroneous claims about crinoids, eels and starfish, and he only included the lures as a hilarious anecdote. But as we stated earlier, HY does not want to admit his mistakes, let alone that he would admit how fundamentally wrong his approach and interpretations are. After all "*there is not a single mistake in the book*" (website 28)! We hope that our contribution at least shows that this is not entirely true, to put it euphemistically.

Anyway, assuming that we understand HY correctly, then he used the lures as some sort of didactic models to make his point clear. If so, then we wonder why he makes an ever increasing fuzz about the allegedly forged embryo illustrations of Ernst Haeckel, for the number of pages that HY spends to this issue increases with each volume of the AoC (see V1-13 pp. 843-844; V2-5 pp. 722-724; V3 pp. 503-507; see also Harun Yahya, 2003). Without expanding on this topic, we emphasize that

recent reviews of Haeckel's work demonstrate that there is no serious ground to accuse Haeckel of intentional fraud, for even if he did err in some points (which he admitted and corrected), the so-called falsifications of his embryo drawings rather involved didactic and practical simplifications ("schematizations") aimed at making his point clear to a wide, non-specialist audience (Bender, 1998; Hopwood, 2006; Richards, 2008, 2009).

Finally, since HY asserts that if a plastic model is identical to a picture of the living form, he can use whatever he wishes to make his point, we would like to contribute to the next volumes of the AoC with a *"Gastropod"* based on the Ordovician fossil *Loxoplocus* sp. from the Drake Formation, Kentucky and "its living, identical counterpart" in Belgian sea fruit chocolate (Figure 28; website 33). We hope that this irony sufficiently illustrates the ludicrous nature of HY's defense of using fabricated "evidence" to reject evolution.

FIGURE 28. Ironic suggestion for the next volume of the AoC: fossil gastropod (*Loxoplocus* sp.; Ordovicium) (upper shell) and its recent "unchanged" counterpart in the form of a Belgian sea fruit chocolate (lower shell) (Reproduced with permission of Michael Popp; see website 33).

EPILOGUE

The basic argument of HY's proof that evolution does not occur, is that recent species have remained unchanged over geological times (i.e. since their divine creation). Hence the cornerstone of HY's idea is that fossil and recent species should be identical. Proving this, requires a sound taxonomic foundation. However, even without attempting to pinpoint all errors in the AoC, the present contribution has clearly demonstrated that from this point of view the AoC utterly fails in every possible way. Indeed, the taxonomic basis of the AoC is completely flawed by HY's neglect to comply with the basic scientific rules of nomenclature, taxonomic identifications, classification and data analysis. Fossils and recent taxa are simply compared and judged by visual inspection of gross, external features. Different taxa are lumped together under loose and ill-defined vernacular names. As such, snails

are snails, spiders are spiders, herrings are herrings, and so on. This approach is applied to various taxonomic levels ranging from entire phyla, over classes, orders, families, up to supposed species, and all this is then invariantly described as having remained the same, even if the fossils and their associated recent counterparts are already at first glance blatantly different! In fact, if HY can claim that there is no difference between a fossil brachiopod and a mollusc, between an eel and a lamprey, or between a fish lure and fossil mayfly, we wonder on what grounds HY can maintain a distinction between man and chimpanzee? Or as we pointed out before in more general terms, how does HY detect changes, i.e. which criteria does he use to decide whether two species or specimens are different or identical? And even so, what is the logical basis to reject evolution and accept creation, simply because two organisms are similar by their external appearance? How would HY interpret the similarity between a pill millipede (Arthropoda, Diplopoda: *Glomeris* sp.) and the pillbug (Arthropoda, Crustacea: *Armadillidium* sp.) in Figure 29? Of course we do not know, but no need to say that HY does not even consider, let alone discusses, such fundamental questions in the AoC.

FIGURE 29. Recent pill millipede (*Glomeris* sp.; Diplopoda) (upper animal) vs. pillbug (*Armadillidium* sp.; Crustacea) (lower animal). How would HY interpret them?

Obviously, HY's approach is a form of baraminology, i.e. an attempt to delimit god's created kinds (Wood, 2002; Prothero, 2009), without of course its implicit evolutionary conotations to explain variation and differences within these kinds (baramins) (cf. Prothero, 2009). Yet, even baraminologists try to use "objective" procedures and apply nomenclatural rules (Wood, 2002). HY, on the contrary, is particularly reluctant to use anyscientific terminology (although he uses it too when it suits him), because he sees this as a deceptive technique of Darwinists (Harun Yahya, 2011b):

> *"...the Darwinists' main vehicle of deception is science. They are unwilling to abandon this indoctrination. That is why they utilize plenty of scientific terminology and formulae in the deceptive reports they publish in Darwinist science magazines in order to give the impression they are providing readers with highly significant, inaccessible, and complex information.*
>
> *Latin words are the star performers among the Darwinists' repertoire of deceptive techniques. Darwinists imagine that by bestowing Latin names on false fossils or freshly minted false theories that this will somehow enhance their credibility. Yet there is no scientific evidence behind anything they say.*"

Unfortunately for HY, it is exactly his refusal to apply rigorous taxonomic methods and nomenclatural rules, that makes his whole endeavour so ridiculous.

Perhaps the most amazing part of HY's battle against Darwinism are two other claims, viz. (1) the fact that Darwinists focus too much on "details" that distract people from the reality (we guess that the points raised in this paper fall into this category), and (2) "*They try to use similarities as evidence*" (Harun Yahya, 2011b). Particularly this latter point is perplexing, as it completely undermines HY's own arguments against evolution for the AoC is exactly all about demonstrating that fossil and recent species are similar (identical) and thus have not changed since their creation. So, is HY then not using similarities as evidence here?! By the way, evolutionary theory does not use "similarities" *in se*, but relies on, amongst others, shared apomorphies (= synapomorphies) to deduce common descent. But this is of course deceptive scientific terminology in the eyes of HY. Thus, once again we rest our case, though we hope that our contribution at least has provided an illustration as to how taxonomy can be crucial to help debunking creationist theories such as those of HY.

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ADDITIONAL WEBSITES MENTIONED IN THE TEXT

Website 1: The sea tullip, *Pyura spinifera* shown by HY in V2-5 (p. 167) and FM-SY0708: http://www.scuba-equipment-usa.com/marine/JUN06/index.html; copyright owned by Dave Harasti (http://www.daveharasti.com/photographer/photographer.htm)

Website 2: The sea snake, *Laticauda sp.* shown by HY on p. 468 of V1-2 and V1-4, and FM-SF0134, FM-SF0135: http://www.divexprt.com/photogal/fiji/fiji.html; copyright owned by Carl Roessler and managed by Philip T. Edgerly at www.philipedgerly.com)

Website 3: The spider crab, probably *Hyas araneus*, shown by HY on p. 422 in V1: http://en.wikipedia.org/wiki/File:41794428_spidercrab_noaa_203.jpg; the

photograph was used in the BBC News of 23 June 2006 "Warm species invading Antarctica" by Paul Rincon: http://news.bbc.co.uk/2/hi/5101790.stm

Website 4: The ocean quahog, *Arctica islandica*, shown by HY in FM-SC0274: http://www.seawater.no/fauna/mollusca/islandica.html

Website 5: The clam shown by HY in FM-SC0274: http://www.junglewalk.com/photos/clam-pictures-I8080.htm

Website 6: The Limidae species ("Rough file clam") shown by HY in FM-SC0362: http://www.junglewalk.com/photos/clam-pictures-I8120.htm

Website 7: The Astartidae shown by HY in FM-SC0351: http://www.seawater.no/fauna/mollusca/casina.html (note that the identification as "Cockle – *Venus casina*" on this website is erroneous)

Website 8: The scallop shown by HY in FM-SC0204: http://www.seawater.no/fauna/mollusca/maximus.html

Website 9: The pentatomid stinkbug, *Notius consputus*, shown by HY on p. 237 of V1: http://www.brisbaneinsects.com/brisbane_stinkbugs/images/IMGc.jpg enlarged from http://www.brisbaneinsects.com/brisbane_stinkbugs/YellowDottedGumTreeBug.htm

Website 10: The cucujid beetle, *Dendrophagus crenatus*, shown by HY in FM-AI0302: http://www.zin.ru/animalia/coleoptera/eng/dencredg.htm

Website 11: The scolytid beetle, *Pityogenes chalcographu,* shown by HY in FM-AI0302: http://www.zin.ru/Animalia/Coleoptera/eng/pitchadg.htm

Website 12: The mirid bug, *Phytocoris lasiomerus*, shown by HY in FM-AI0055: http://www.cedarcreek.umn.edu/insects/newslides/020023176004bpl.jpg enlarged from http://www.cedarcreek.umn.edu/insects/album/020023176ap.html

Website 13: The lygaeid bug, *Zeridoneus costalis*, shown by HY in FM-AI0055: http://www.cedarcreek.umn.edu/insects/album/020007058ap.html

Website 14: The pied shieldbug bug, *Tritomegas bicolor*, shown by HY in V1-13 p. 246: http://www.blackstein.de/tagebuch/2002/mai2002/wanze-499a.jpg enlarged from http://www.blackstein.de/tiere/wanzen.html

Website 15: The crinoid (possibly *Endoxocrinus parrae*), shown by HY in FM-SY0858: http://oceanexplorer.noaa.gov/explorations/04fire/logs/april02/media/crinoid.html

Website 16: The crinoid, *Comanthina schlegeli*, shown by HY in FM-SY0835: http://www.nhm.ac.uk/hosted_sites/iczn/Crinoid.htm

Website 17: The stratiomyid fly, *Pachygaster* sp., shown by HY on p. 314 of V1: http://www.cedarcreek.umn.edu/insects/album/029031026ap.html enlarged from http://www.cedarcreek.umn.edu/insects/albumframes/029frame.html

Website 18: The webspinner, order Embioptera, shown by HY on p. 433 of V2-5: http://www.cals.ncsu.edu/course/ent425/library/spotid/embioptera/embioptera.html

Website 19: The Noctuidae moth species shown by HY in FM-AI0199: http://www.use.com/ugly_moth_287df9aecadf8ece7b68

Website 20: The skipper butterfly, family Hesperiidae, shown by HY in FM-AI0199: http://quizlet.com/3959758/arthropods-flashcards-flash-cards/

Website 21: The green bottle fly, possibly *Lucilia sericata* (Calliphoridae), shown by HY in FM-AI0440: http://en.wikipedia.org/wiki/File:Diptera_02gg.jpg

Website 22: The calliphorid fly, shown by HY in FM-AI0440: http://aramel.free.fr/INSECTES15-5.shtml

Website 23: A soldier of a tropical fire ant (*Solenopsis geminata*) to show the resemblance to the fossil shown by HY under the caption "*Ant lion*" in V1-13: http://www.alexanderwild.com/keyword/soldier%20ant#1263035422_4t9rpCs-A-LB enlarged from http://www.alexanderwild.com/keyword/soldier%20ant#1263035422_4t9rpCs

Website 24: Graham Owen's webpage "Atlas of Creation – Realistic fishing flies Mistaken for the Real Thing" explaining his view of HY's use of the artificial spider and the two fish lures in the AoC: http://www.grahamowengallery.com/fishing/Atlas-of-Creation.html; copyrights owned by Gaham Owen.

Website 25: The Khmer Online Dictionary entry for "Gnat" with the photograph of the midge in the mouth pincers of Graham Owen's imaginary spider (compare with website 24): http://dictionary.tovnah.com/topic/animal/Gnat; the illustration also appeared in an "Edinburgh Napier News" heading of 25 November 2008 on the impact of midges: http://edinburghnapiernews.com/2008/11/25/

Website 26: Photograph of the spider shown by HY on p. 241 in V1-13 to replace the spider/midge lure of Graham Owen (this photograph is widely used on the internet): http://downloadwallpaperz.blogspot.com/2011/06/top-hd-wallpaper-of-nature.html; see also http://iexespiritoguerreiro.blogspot.com/2009_03_01_archive.html and http://schokolademaedchen.blogspot.com/2007_08_01_archive.html

Website 27: Photograph of a little black caddis (caddisfly: *Agapetus* or *Glossosoma* sp.) shown by HY on p. 244 in V1-13 to replace the caddisfly lure of Graham Owen: http://www.headwatersoutfitters.com/graphics/fishing/bugs/little-black-caddis.jpg enlarged from http://www.headwatersoutfitters.com/fly-fishing_spring_hatch_charts.html

Website 28: "Richard Dawkins' and daily Hürriyet's ignorance", internet article

in which HY replies to the lure critics of Richard Dawkins (4 October 2008): http://us3.harunyahya.com/Detail/T/EDCRFV/productId/9601/RICHARD_DAWKINS__AND_DAILY_HURRIYET_S_IGNORANCE

Website 29: "Dawkins has taken the bait" HY's reply to the lure critics on the AoC, based on a TV interview of 28 September 2009: http://us1.harunyahya.com/Detail/T/EDCRFV/productId/17945/

Website 30: The crab (probably *Carcinus* sp.) shown by HY on p. 349 of V1-13: http://www.feathersfinsandfur.com/fascinating-facts-about-crabs/

Website 31: Critical assessment of the fossil vertebrate skulls and other remains used by HY in the AoC and particularly in Harun Yahya (2008c), by "Aka Sojo", 10 April 2009: http://purplekoolaid.typepad.com/my_weblog/the-skulls-that-make-harun-yahya-look-like-a-bonehead-and-fraud-huckster-hypocrite-etc.html

Website 32: Online version of HY's book "The Holocaust Deception" (= "The Holocaust Hoax") in which he denies the Holocaust: http://members.fortunecity.com/vural/bks/HOLOCAUST.HTML and http://www.codoh.com/inter/inturk/inturk.html; a PDF of the English text of this book can be downloaded from http://www.bibliotecapleyades.net/archivos_pdf/holocaust_deception.pdf; an earlier, related book of HY, "New Masonic Order", with a chapter on Holocaust denial, is advertised here http://members.fortunecity.com/vural/bks/NMO.HTML

Website 33: Selection of Belgian sea fruit chocolates and comparison of the snail praline with the fossil *Loxoplocus* from the Ordovician of the Drake Formation, Kentucky, 5 November 2009: http://louisvillefossils.blogspot.com/2009/11/chocolate-fossil.html; copyright owned by Michael Popp (http://louisvillefossils.com/).

Website 34: Harun Yahya's main website: http://www.harunyahya.com/index.php

Website 35: Website of the "Bilim Araştirma Vakfi" (BAV) or "Science Research Foundation": http://www.srf-tr.org/about.htm

Website 36: The desert fox (fennec: *Vulpes zerda*) used by HY on p. 93 of V3-1: http://piccoloprincipe.unicatt.it/kaleb/Autore/Curiosita/324.htm

Website 37: The desert fox (fennec: *Vulpes zerda*) used by HY in FM-SM1183: http://mynarskiforest.purrsia.com/ev28wrld.htm

Website 38: The sand diver (*Synodus intermedius*) used by HY on pp. 191 in V3-1: http://www.cs.brown.edu/~twd/fish/Curacao/doeppne-022.jpg enlarged from http://www.cs.brown.edu/~twd/fish/Curacao/Curacao.htm