

## Evidence News 10/09 7<sup>th</sup> October 2009 – Vestigial Organs

**WELCOME TO A VESTIGIAL Evidence News 10/09** with EDitorial COMment. One reader asks: “I read an evolutionist blog the other day on creation science arguments. One was on vestigial organs vs genetic loss. He said that creationists say there are no vestigial organs but there are examples of things that do not fully function i.e. beetles of the same species: some have wings and some don't....The evolutionist said creationists mince words when organs rendered useless by genetic loss and vestigial organs are the same thing – useless. Can you succinctly explain the difference or refer me to a book or article that gives an explanation as to the difference?”

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This week's Evidence News Index follows - to view the entire e-news please click <http://www.creationresearch.net/enews/ENEWS1009-091007-VESTIGIAL.PDF> (if the link doesn't work just copy and paste it into your web browser).

(Please Note: within the PDF file you can click on the Index Line to go directly to the news item.)

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**1. UK READERS DON'T MISS John Mackay in the UK** from 31st October to 29th November details <http://www.amen.org.uk/cr/where>

**2. DR. DAVID STEWART SCHOLARSHIP PRIZES AWARDED** this week in Hungary as John Mackay meets with Hungarian creationists to encourage and share with them our geology research in a weekend Creation Conference. Donations to these student scholarships are tax deductible in UK and USA. Get behind them now. If you haven't yet met the Romanian winners **CLICK HERE:** [http://www.creationresearch.net/team/Scholarship\\_page.htm#scholar](http://www.creationresearch.net/team/Scholarship_page.htm#scholar)

**3. UK TV APPEARANCES** John Mackay's next three appearances on Genesis TV (Sky Channel 592 or [www.revelationtv.com](http://www.revelationtv.com) commence Tuesday (6th Oct.) at 9 PM.

**4. NEW DVD** 'Darwin's Evolution A Very Unnatural Selection' featuring some well published scientists who firmly believe in Creation and are brave enough to say so as well as the evidence of what natural selection and mutation really achieves worldwide is finished and will be available at the end of October. This is the third part of our "Darwin on the Rocks" project and it is in HD wide screen. We have screened it in Canada,

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the USA and the UK and response has public response been great. ORDER YOUR COPY NOW on website: [http://www.creationresearch.net/secure/Darwin\\_Rocks\\_Part3\\_Order\\_Form.htm](http://www.creationresearch.net/secure/Darwin_Rocks_Part3_Order_Form.htm)

**5. ARE THERE VESTIGIAL ORGANS?** One of our readers asks: "I read an evolutionist blog the other day on creation science arguments. One was on vestigial organs vs genetic loss. He said that creationists say there are no vestigial organs (which is true), but there are examples of things that do not fully function i.e. beetles of the same species; some have wings and some don't. Another example is the earwig. Some earwigs have wings but as far as I know they don't fly. They stay in moist undergrowth and under rocks etc.

The evolutionist said that creationists mince words when really organs rendered useless by genetic loss and vestigial organs are the same thing – useless. This is something I want to address. Can you succinctly explain the difference or refer me to a book or article that gives an explanation as to the difference?"

ED.COM. The short answer is that most of what evolutionists have called vestigial (organs which have supposedly lost their function such as the classic appendix) have turned out to be fully functional, and hence no use to the case for evolution. At the opposite end, in spite of what is presented in many creationist writings and websites, there are partly or fully vestigial organs or body structures that are at present defective in structure or function such as the world's only nocturnal ground dwelling or flightless Parrots in New Zealand. But in every case they turn out to be wonderful evidence of change, but not of evolution – the change involved is always degenerate. The long answer is the rest of this Evidence News.

**6. VESTIGIAL DEFINITIONS:** Vestigial organs have always been defined as; "**An organ that is functionless and generally reduced in size, but bears some resemblance to the corresponding fully functioning organs found in related organisms**" Dictionary of Biology, Intercontinental Book Productions, p198 We commented on the human examples in Evidence News 11 Jun 2008.

See: [http://evidencweb.net/factfile\\_search\\_results.php?p\\_PRIKEY=1577&p\\_SEARCHTYPE=Fact\\_File](http://evidencweb.net/factfile_search_results.php?p_PRIKEY=1577&p_SEARCHTYPE=Fact_File)

VESTIGIAL ORGANS are now officially defined in terms of evolution. The *Compact Oxford English Dictionary* defines the word *vestigial* as: "(of an organ or part of the body) degenerate, rudimentary, or atrophied, having lost its function in the course of evolution."

FOR PREVIOUS VESTIGIAL ITEMS go to [www.creationresearch.net](http://www.creationresearch.net) click SEARCH then EVIDENCE SEARCH then insert VESTIGIAL.

**7. DARWIN'S VESTIGIAL YEAR:** As a contribution to the 2009 Charles Darwin anniversary, the website *Live Science* has a series entitled "Top 10 Useless Limbs (and Other Vestigial Organs)" which it introduces as follows: "In Charles Darwin's *On the Origin of Species* (1859) and in his later works, he referred to several "vestiges" in human anatomy that were left over from the course of evolution. These vestigial organs, Darwin argued, are evidence of evolution and represent a function that was once necessary for survival, but over time that function became either diminished or nonexistent.

The presence of an organ in one organism that resembles one found in another has led biologists to conclude that these two might have shared a common ancestor. Vestigial organs have demonstrated remarkably how species are related to one another, and has given solid ground for the idea of common descent to stand on. From common descent, it is predicted that organisms should retain these vestigial organs as structural remnants of lost functions. It is only because of macro-evolutionary theory, or evolution that takes place over very long periods of time, that these vestiges appear." *Live Science*: [http://www.livescience.com/animals/top10\\_vestigial\\_organs.html](http://www.livescience.com/animals/top10_vestigial_organs.html)

Last year *New Scientist* published an article entitled "Vestigial organs: Remnants of evolution" which concludes: "Whether we are talking about useless vestiges or anatomical structures that have taken on a new lease of life, however, it is hard to ignore the evidence that human beings are walking records of their evolutionary past." *New Scientist*, 17 May 2008, pp42-45.

In response to readers' questions (as above) and claims like those on *Live Science* and *New Scientist*, let's look at some commonly claimed vestigial organs and see what they are really evidence of.

**8. FLIGHTLESS BIRDS:** *Live Science* writes: "Ostriches and cassowaries are among several birds that have wings that are vestigial. Besides the cassowary, other flightless birds with vestigial wings are the kiwi,

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and the kakapo (the only known flightless and nocturnal parrot), among others. In general, wings of a bird are considered complex structures that are specifically adapted for flight and those belonging to these flightless birds are no different. They are, anatomically, rudimentary wings, but they could never give these bulky birds flight. The wings are not completely useless, as they are used for balance during running and in flagging down the honeys during courtship displays.”

In May 2008 *New Scientist* wrote “The existence of something as spectacularly *de trop* as the ostrich wing is only a problem for those who believe in an intelligent designer.”

ED. COM. The best comment on the ‘vestigialness’ of ostrich wings comes from a letter to *New Scientist* by Sibbele Hietkamp, an ostrich farmer in South Africa, who wrote: “Laura Spinney describes ostrich wings as ‘spectacularly *de trop*’ (17 May, p 42). I have kept ostriches for 18 years and can testify otherwise.” He goes on to describe how ostriches use their wings for many important functions: thermoregulation; providing stability when running and enabling rapid right angle turns; courtship displays and stability while mating; warning signals and other communication; nest building; and providing shade and shelter for young. (*New Scientist* letters 21 Jun 2008, p24).

Sibbele Hietkamp’s observations also remind us that practical observations and experience from those who work with living things or in a particular environment are more of use to science than the beliefs of journalists and academics who are not. Even though they can’t fly ostriches are particular efficient runners and are able to function well in a variety of environments.

If you consider the overall anatomy and physiology of the ostrich, rather than just its wings, you will see that it is a functioning creature that works well, so the *New Scientist* quip against intelligent design wasn’t very intelligent. The wings of other large flightless birds, e.g. emus, cassowaries, penguins, rheas, fit into the same category as ostrich wings – an extreme variation of wings, but still functional and useful structures that are part of a fully functional creature whose fossils show no evidence the bird has ever flown and perhaps was never meant to fly – but which seem very intelligently designed for running, cooling, mating and protecting young.

There are some birds that seem to have lost the ability to fly due to defects in their wings but they have survived in a small protected environment, e.g. flightless cormorants in the Galapagos Islands or the Titicaca Flightless Grebe. These are usually classified a separate species within a genus of similar flying birds, suggesting that they are descended from a flying bird that suffered some genetic defect in the past. Because the defective birds find it easier to mate with each other, they soon become genetically isolated and effectively become a separate species. The wings of these disabled birds could be called “vestigial” but this loss of function is not evolution – it is degenerate loss, which is the opposite of evolution. The kiwi of New Zealand seems to be an extreme example of loss. It has small wings, but no wing muscles, which means it has no muscle covering over its chest and is easily killed by dogs and other animals. It has only survived by living a secluded nocturnal life in forests where there were no predatory mammals before humans accompanied by their cat/dog pets came to live in New Zealand.

Penguin wings are sometimes called vestigial, but even though they are flightless, penguin wings are well suited for their aquatic lifestyle. Their wings function as efficient flippers with powerful muscles and that enable them to move through the water with a movement that is similar to flying and the abundant fossil record of Penguins shows they were once much larger but show no evidence of ever having larger wings. (Ref. ratites, Apteryx, Aves)

VESTIGIAL PUNCH LINE Any real or partial vestigial organ is a reminder that the real history of the world is Descent with Modification from an initial created perfection. It was followed by the degeneration caused by the fall of Man which bought about God’s cursing of the ground, and the later judgement of Noah’s Flood. This caused massive degradation of the environment, and was followed by genetic isolation and resultant inbreeding amongst all living groups (man included) as they spread out across the globe after the flood. This in turn has resulted in a great increase in genetic defects and loss of function - the latest being the loss of wing use observed in the hatchlings of many ducks and wild birds following the introduction of DDT. The remnant pitiable wing structures their offspring had are no use in flight so they are condemned to spend their futures on ground, water, or climbing trees – if they don’t get eaten first. (Ref.

Philosophy, classification, devolution)

**9. CREATIONIST CHALLENGE:** Sibbele Hietkamp's observations about the remaining functions of ostrich wings in the item above bring to light a gap in scientific nomenclature which needs to be resolved. It is worth pondering the option that some organs originally had more than one function, and can actually survive considerable loss of function, while continuing to exist with much reduced functional roles. An example is the present day dwarf legs in many reptiles, whose fossils show they once had full legs. Such degenerate organs are no longer any use in walking, but are still large enough to hold on to a female in mating.

Such organs cannot be considered totally vestigial till all function has been lost, so we propose a new term be created to describe we recommend such functionally reduced organs be labelled as **dystrophic** which we define as an originally multifunctional appendage or organ which has lost some of its original function or functions, but has not yet become nonfunctional. We derive the word **dystrophic** from the disease muscular dystrophy, a degenerative disease that causes loss of function in muscles because one structural protein is missing;

OUR ADDITIONAL PREDICTION - original organs will in most cases be discovered to have been multifunctional as well as having backup (via what are commonly viewed as redundant support systems) and thus are capable of considerable loss of function before becoming useless and a detriment to the creature.

**10. PELVIC AND LEG BONES IN WHALES** *Live Science* writes: "Despite the apparent uselessness, evolution left traces of hind legs behind, and these vestigial limbs can still be seen in the modern whale."

ED. COM. "Apparent uselessness" is the appropriate expression. These bones may look useless when you see them in a museum display of a whale skeleton where they look like useless fragments of bones totally detached from the rest of the skeleton. However, if you put the flesh onto the bones you would see that they form attachment sites for the whale's reproductive organs. Providing support and stability for soft tissue structures and organs is just as important a function for bones as is their more obvious functions of serving as levers for movement. Some fossil whales such as *Basilosaurus* had tiny hind limbs but these also had a function in mating, as described by palaeontologist Philip Gingerich, who wrote: "The Pelvis of modern whales serves to anchor reproductive organs even though functional hind limbs are lacking. Thus hind limbs of *Basilosaurus* are most plausibly interpreted as accessories facilitating reproduction. Abduction of the femur and plantar flexion of the foot, with the knee locked in extension probably enabled hind limbs to be used as guides during copulation which may otherwise have been difficult in a serpentine aquatic animal." Now you know – if these whale bones were truly vestigial – then the whale would be extinct. Gingerich, *et al*, *Science*, vol. 249, pp154-157, 13 Jul 1990. (Ref. cetaceans, vestigial, mammals)

**11. WINGLESS INSECTS** In spite of their appearance most earwigs do have wings. When they are not flying, the wings are neatly folded up and protected by wing cases. They don't fly much so most people only see them when they are crawling around with their wings out of sight. There are a few wingless earwigs. These often have diminished forceps (the pincer like projections at the base of the abdomen) and one group of wingless earwigs (the Arixeniidae) are parasites rather than eating plants, detritus or catching prey. See article on earwigs: <http://australianmuseum.net.au/Earwigs>

Many types of insects have wingless varieties, and these are claimed to have evolved to suit unusual environments, e.g. in a book entitled *An Inordinate Fondness for Beetles*, Arthur Evans & Charles Bellamy write: "The combination of New Zealand's cool temperate climates with glaciation, volcanism and tectonic movements has created numerous ecological niches favouring the evolution of many unusual beetles. Strong winds, stable habitats and the lack of predators have encouraged the development of many large wingless species." (p183)

ED. COM. Beetles with diminished or absent wings are examples of genuine vestigial organs which all research shows are the result of genetic defects, i.e. loss of genetic information, a degenerative process that is the opposite of evolution. A windy environment that has few predators may enable wingless beetles to survive, but that does not explain the origin of beetles or beetle wings, so is no help to the theory of evolution. Furthermore, as in the case of some New Zealand flightless beetles, when ground dwelling

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predators like rats were introduced, wingless beetles were no longer the fittest and so did not survive. Their 'vestigial-ness' was a major contributor to their extinction. (Ref. vestigial, arthropods, flight)

**12. THE HUMAN APPENDIX** This is the classic vestigial organ that everyone seems to know about. *Live Science* writes: "In plant-eating vertebrates, the appendix is much larger and its main function is to help digest a largely herbivorous diet. The human appendix is a small pouch attached to the large intestine where it joins the small intestine and does not directly assist digestion. Biologists believe it is a vestigial organ left behind from a plant-eating ancestor."

ED. COM. The appendix does not have a primary role in digestion, but that does not make it useless. Its location at the junction of the small and large intestine is a clue to its function, as is the collections of lymphocytes (body defence cells) in its lining. The appendix is part of a system that determines which microbes are allowed to live in the intestines and which ones are not. The large intestine needs to have a healthy population of harmless bacteria living on its inner surface. Babies develop in a germ-free environment in their mother's womb so during infancy and childhood the immune system has to learn which microbes can live on the body surfaces and which cannot. Even the good microbes need to be kept in their place and your immune system helps keep them there throughout your life. This means the appendix had a function in the original very good world, and still has this same function. It also means that it does most of its work in the early years of life, and losing it later in life does not affect the overall immune function. There is also plenty of other immune tissue around the intestines to compensate for the loss. Now that the world is no longer very good, the appendix is prone to disease, because our bodies are not as efficient at keeping microbes in their place, and our digestive systems are not as efficient. However, this makes it no different to any other organ that gets diseased and therefore needs to be removed in order to save someone's life. The fallen nature of the world has also given the appendix another function. When the large bowel becomes inflamed and its population of good bacteria is lost due to outpouring fluid that is part of the inflammatory response to injury and infection, the appendix acts as a "safe house" for good bacteria, which can then repopulate the large bowel when the inflammation is over. For more information on this function see article in *Science Daily*, 8 Oct 2007:

<http://www.sciencedaily.com/releases/2007/10/071008102334.htm>

In summary: the appendix is a fully functional, but poorly understood organ, with nothing vestigial about it, which is why surgeons who used to chop out even healthy appendices on the evolutionary assumption it was useless - no longer do so. Of course if they had used the creation based assumption that God made man and we need all our bits they would have saved a lot of healthy people some useless suffering. (Ref. vestigial, gastrointestinal, medicine)

**13. OUTBACK AUSSIE TOUR 2010** - August 5-18. Are you interested in a trip to the Australian Outback at the best time to travel our wild west looking at the evidence of God's brilliance as Creator, as well as seeing His wonderful sense of humour exhibited in Aussie animals, plus see the rocks and landscape show the real history of Creation? To enjoy 2 great weeks with Creation Research and John Mackay get your preliminary expression of interest in now and ask for details. Trip starts and finishes at Brisbane Queensland Australia – hurry numbers are limited!

**14. ARM SWINGING NOT VESTIGIAL** according to reports in *The Independent*, *Royal Society News* and *Reuters*, 29 July 2009. Swinging your arms when you walk has been considered an evolutionary leftover from when people used to be four legged creatures. Researchers from the University of Michigan, USA and Delft University of Technology, Netherlands have carried out a study to see the effects of arm swinging on how much energy is used when walking. In a series of experiments reminiscent of Monty Python's Ministry of Silly Walks, they got human volunteers to walk in the natural manner with arms swinging opposite arm to leg, and then in unnatural ways with arms held still by the sides or arms swinging with the same side leg. They found the normal arm swinging saved energy and helped counteract the twisting of the body that occurs as weight shifts from one leg to the other. Steven Collins, a biomechanical engineer at Delft University of Technology, explained that the experiments "showed that normal arm swinging made walking much easier. Holding the arms at one's sides increased the effort of walking – measured by metabolic rate – by 12 per cent, which is quite a lot of walking, about the same as walking 20 per cent faster or carrying a 10 kg backpack." In their report in the Proceedings of the Royal Society, the researchers wrote: "Although arm swinging is relatively easy to achieve, its effect on energy use during gait is significant. Rather than a facultative relic of the locomotion needs of our quadrupedal ancestors, arm



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swinging is an integral part of the energy economy of human gait." Steven Collins commented: "This puts to rest the theory that arm swinging is a vestigial relic from our quadrupedal ancestors."

Royal Society: <http://royalsociety.org/news.asp?id=8702>

Reuters: <http://www.reuters.com/article/lifestyleMolt/idUSTRE56S15L20090729>

Independent: <http://www.independent.co.uk/news/science/mystery-solved-ndash-by-ministry-of-silly-walks-1764014.html>

ED. COM. Here is another example of how evolutionary belief in vestigial organs is bad for science. The discovery described above was made in spite of evolutionary theory, not because of it. If you don't know why something happens the scientific approach is to do more research and find out. The results of these experiments confirm the belief that human beings are designed to walk upright which means that a creation starting point is a much better basis for science. (Ref. Man, gait, locomotion)

**15. DAWKINS VS MACKAY AGAIN UK** next Sunday at 7pm channel 4 11<sup>th</sup> October

Then check copy on You Tube – link from our website <http://www.creationresearch.net> left hand side scroll down.

**16. BODY HAIR AND ERECTOR MUSCLES** *Live Science* writes: "The erector pili are smooth muscle fibres that give humans "goose bumps". If the erector pili are activated, the hairs that come out of the nearby follicles stand up and give an animal a larger appearance that might scare off potential enemies, and a coat that is thicker and warmer. ... Of course, some body hair is helpful to humans; eye brows can keep sweat out of the eyes and facial hair might influence a woman's choice of sexual partner. All the rest of that hair, though, is essentially useless."

ED. COM. Human hair and the erector pili muscles are not useless. Even where it does not have an obvious protective function such as eyebrows or on the top on the head, body hair contributes to our sense of touch. Hair follicles have nerve endings wound around their bases. Whenever a hair is moved the nerve ending is stimulated. The erector pili muscles anchor the hair follicles in the skin and their contractions help expel secretions from the oil glands that keep the skin and hair from drying out. Normally these contractions go unnoticed. We only notice them when our autonomic nervous system, which controls them, reacts strongly to stress. When subject to strong stresses, such as fear or cold, autonomic nervous system reflexes tend to over-react and the hairs stand on end. The fact that we are subject to strong stresses is a reminder that we no longer live in the "very good" world God originally created, but the degenerate world that followed the Fall of Man and God's judgement on the whole creation, including human bodies. (Ref. vestigial, dermatology, epidermis)

**17. THE HUMAN TAILBONE (COCCYX)** *Live Science* writes: "These fused vertebrae are the only vestiges that are left of the tail that other mammals still use for balance, communication, and in some primates, as a prehensile limb. As our ancestors were learning to walk upright, their tail became useless, and it slowly disappeared. It has been suggested that the coccyx helps to anchor minor muscles and may support pelvic organs. However, there have been many well documented medical cases where the tailbone has been surgically removed with little or no adverse effects. There have been documented cases of infants born with tails, an extended version of the tailbone that is composed of extra vertebrae."

ED. COM. One of the editors of this newsletter has had the very painful and debilitating experience of tearing the ligaments from the coccyx and wrote in a previous Evidence news (11 June 2008): "when that happens - if you were standing (or sitting) – that's where you stayed, as the muscles that helped you sit or stand all gained their ability to move by their attachment to the tail bone, so to call it vestigial and without function – what a painfully false statement." The coccyx is part of a system of bones and ligaments that act as muscle attachment for the pelvic floor muscles and is only surgically removed if it has been badly damaged and can no longer function as part of the system.

We would like to know where *Live Science* found "documented cases of infants born with tails, an extended version of the tailbone that is composed of extra vertebrae." There are documented cases of infants born with "caudal appendages" which are a birth defect caused by an overgrowth of skin and fibrous-fatty tissue near the base of the spine. These are sometimes associated with more serious developmental defects of the spine, or may be part of a tumour called a sacrococcygeal teratoma. Either way they are not functional

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or even partially functional tails with vertebral bones and attached muscles like an animal tail. (Ref. vestigial, teratology, orthopaedics)

**18. IDA FOSSIL IS IRRELEVANT** claims *Scientific American* August 2009 in an article entitled “Weak Link: Fossil *Darwinius* Has Its 15 Minutes”. Ida is the nickname of a remarkably well preserved fossil of a small mammal whose discovery was announced to the world in May 2009 with a blaze of publicity and extraordinary claims including the “the eighth wonder of the world,” “the Holy Grail,” and “a Rosetta Stone”. The lemur-like fossil creature was given the scientific name *Darwinius masillae* and was claimed to be the evolutionary link between primates and humans.

However, behind the media circus, fossil experts made more sober assessments of the animal. The fossil is dated at 47 million years old – too long ago in the evolutionary timetable to have direct relevance to human evolution. The creature belongs to an extinct group of animals called adapids, which some (a minority) evolutionists believe to have given rise to anthropoid apes or “higher primates”. However, palaeontologists point out that Ida does not have a distinctive feature of the anthropoids: a bony wall at the back of the eye socket, even though she had an anthropoid-like teeth and jaw, and does not have a grooming claw (a distinctive feature of lemurs but not anthropoids). Robert Martin of the Field Museum in Chicago commented “I am utterly convinced that *Darwinius* has nothing whatsoever to do with the origin of higher primates.” Most primate fossil experts believe anthropoids evolved from a group of tarsier-like creatures known as the omomyiforms, not from adapids. According to Richard Kay of Duke University, adapids “are related to the strepsirrhine group of living primates that include lemurs from Madagascar and galagos (bush babies) and lorises from Africa and Asia. They are decidedly not in the direct line leading to living monkeys, apes and humans.” *Scientific American* concludes: “If the detractors are right, Ida is irrelevant to the question of anthropoid—and thus, human—origins.”

Another critical review of the publicity that accompanied Ida is a book review of *The Link*, the popular science book that was part of the media blitz, in *American Scientist* September-October 2009. In an article entitled “The Weakest Link” Chris Beard, Chair of Vertebrate Paleontology at the Carnegie Museum of Natural History, writes: “The idea that adapiforms might somehow be ancestral to anthropoids was taken seriously as recently as a couple of decades ago. However, I think it is fair to say that this hypothesis now lies well outside the scientific mainstream, and the discovery and description of Ida have done little to rehabilitate it.”

Scientific American: <http://www.scientificamerican.com/article.cfm?id=weak-link-fossil-darwinius>

American Scientist: <http://www.americanscientist.org/bookshelf/pub/the-weakest-link>

ED. COM. “Attenborough publically apologises that he led the public astray!” - now when do you expect to see this on the front page of your daily newspaper? IDA is not the worst example of overblown claims about fossil proof of evolution – at least Ida’s fossil is genuine, unlike *Archeoraptor* and Piltdown Man. However, the outrageous claims about this fossil indicate the desperation of scientists and journalists to use any excuse to promote evolution in the public eye. This time they went overboard and it is good to see that even secular scientists are critical of the methods used by Ida proponents. Let’s hope that the contrast between overblown claims and the more reasoned assessment of this fossil will stimulate some people to recognise that the evidence for evolution is hot air rather than hard facts. (Ref. palaeontology, prosimians, propaganda)

**19. BLIND CAVE FISH** *Live Science* writes: “In an experiment designed by nature, the species of fish known as *Astyanax mexicanus*, dwelling in caves deep underground off the coast of Mexico, cannot see. The pale fish has eyes, but as it is developing in the egg, the eyes begin to degenerate, and the fish is born with a collapsed remnant of an eye covered by flap of skin. These vestigial eyes probably formed after hundreds or even thousands of years of living in total darkness. As for the experiment, a control is needed; and luckily for us, fish of the same species live right above, near the surface, where there is plenty of light, and these fish have fully functioning eyes. To test if the eyes of the blind *A. mexicanus* could function if given the right environment, scientists removed the lens from the eye of the surface-dwelling fish and implanted it into the eye of the blind fish. It was observed that within eight days an eye started to develop beneath the skin, and after two months the fish had developed a large functioning eye with a pupil, cornea, and iris. The fish were blind, but now they see.”

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ED. COM. In the totally dark environment of the caves the developing fish do not get the right stimulus for the eyes to properly develop, even though the genes for eyes are there. In fact, it seems to be the darkness that turns the eye genes off. When they get the right signals, via tissue taken from a fish that developed in light conditions, the eyes develop.

The remnants of the eyes in the adult cave fish could be called vestigial, but this is nothing to do with evolution. As the intelligent scientists who designed the experiment have noted, fish of the same species that develop and live in lighted conditions do have eyes. Therefore, the incompletely formed eyes of the cave fish are a loss of function brought about by an unusual environment, and provide no evidence for how eyes came to exist. Again they are change without evolution. For more details of the experiment described by *Live Science* see *ScienceNOW* 12 Oct 2004 and *Nature* 13 Oct 2004. We suspect you will probably conclude with us that this experiment designed by human scientists, (not an imaginary goddess called “nature”) provides evidence that embryonic development in fish shows that genes alone do not determine results. Correct gene expression involves the interaction of genes with the right environment to produce the right results. (Ref. vestigial, embryology, ichthyology)

**20. DESEXED DANDELIONS** *Live Science* writes: “Dandelions, like all flowers, have the proper organs (stamen and pistil) necessary for sexual reproduction, but do not use them. Dandelions reproduce without fertilization; they basically clone themselves, and they are quite successful at it. Look at any lawn for the proof. If dandelions were to revert to sexual reproduction, they might not retain whatever traits they have that allow them to be pests to gardeners everywhere.”

ED. COM. The Dandelion is a good example where reproduction can be achieved in many ways and one dominates. Likewise grapes can take root wherever a vine touches the ground and can spread successfully this way as well as being propagated by seed. Dandelions can reproduce sexually and their stamens and pistils are fully formed and functional, so there is nothing vestigial about them. However, dandelions can reproduce themselves without being fertilised by a pollen carrying insect, by a process called apomixis. Such means of reproduction is a back-up system in many plants. The fact that dandelions do it in a particularly efficient way does not make their flower parts vestigial. Dandelions that reproduce by apomixis are triploid, i.e. have three sets of chromosomes, instead of the normal two. As explained in an article on the *Killer Plants* website: “At the base of each flower is a single ovule which will develop into a seed. If the dandelion has a normal complement of chromosomes, it is a diploid. These diploids undergo meiosis, the reduction process where only one half of the chromosomes remain in the cell. They produce seeds by the fertilization of the ovule with the gametes (sex cells) from the pollen grain. But many dandelions are polyploid, usually triploid. These triploids (3 sets of chromosomes) do not undergo meiosis. Most triploid plants can never produce seed, but the dandelion sets seed by a process called apomixis (*apo-* away from; *mixis*, act of mixing). The triploid ovule avoids meiosis, keeping the complete complement of the mother's chromosomes. The unreduced egg cell develops into an embryo. The embryo (young plant) within the seed is a natural clone, genetically identical to the mother plant.” *Killer Plants*: <http://www.killerplants.com/weird-plants/20020131.asp> (Ref. botany, weeds, vestigial)

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