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30 March 2006 (last update **19 October 2010** on the recurrent laryngeal nerve, p. 30), former updates 11 May 2006, 7 May 2007, and some language corrections 30 September 2008. A note of 9 October (last modified 16 November) 2008 on a recently claimed, but doubtful "missing link", see page 23 below.

The Evolution of the Long-Necked Giraffe (*Giraffa camelopardalis* L.) – What Do We Really Know? (Part 1)

As for Part 2 of the article of 2007 see
<http://www.weloennig.de/GiraffaSecondPartEnglish.pdf>

Giraffe, maximum values: life expectancy 34 years, height 5.80m [5.82], weight 1200 kg, speed 52 km/hr, [and general data:] ruminant, dental formula 0033/3133 (like the chamois), 66 heartbeats/minute, blood pressure in mm Hg: **systole 340, diastole 230** (average), age of sexual maturity: 6-7 years, gestation period 431-465 days (data so far according to Rainer Flindt 2000), 8 neck vertebrae (!), not 7 as reported in almost all textbooks (Nikos Solounias 1999, 2000), chromosome number $2n=30$ (okapi $2n=44$, 45 46).

**"No data from giraffes then [in Darwin's time] existed to support one theory of causes over another, and none exist now."
"...ancestral species are relatively short necked, and the spotty evidence gives no insight into how the long-necked modern species arose."
"The standard story, in fact, is both fatuous and unsupported."**

Stephen Jay Gould

Summary: In the following article the assertions of three supporters of the synthetic theory concerning the evolution of the long-necked giraffe will be discussed: the statements of Ulrich Kutschera, Richard Dawkins and Kathleen Hunt.

1. Ulrich Kutschera made the following statement regarding the origin of the giraffe, on 29 November 2005 in 3SAT (a German TV channel): "...the evolution of the long-necked giraffe can be reconstructed from fossils." According to today's best giraffe researchers, *all fossil links that could show us the gradual evolution of the long-necked giraffe from the short-necked giraffe are missing*, apart from the insufficiently answered question of causes. Some paleontologists postulate a "neck elongation macromutation" to explain the origin of the long-necked giraffe.
2. Richard Dawkins likewise considers – in a striking exception to his usual theoretical framework – the origin of the long-necked giraffe through a macromutation. *This exception would, of course, be entirely superfluous if the gradual evolution of the long-necked giraffe could really be reconstructed from fossils*, especially since he much prefers the gradualist view. Dawkins draws the okapi, in relation to the giraffe, nearly twice as large as it really is. In this way, the problem of its evolution (the gap between the two forms) appears only about half as large. One may well ask if this technique is really useful in the search for truth.

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3. Kathleen Hunt however, in her often-cited work *Transitional Vertebrate Fossils FAQ*, leaves no doubt that the origin of the giraffe is clearly and completely solved by the synthetic theory (gradual evolution by mutations, recombination and selection). When one looks at her reasoning more closely, however, one encounters numerous holes and problems and *the fossil evidence for the gradual evolution of the long-necked giraffe is — as expected — completely lacking*. A detailed analysis of her work shows, therefore, that the strong impression that one receives on a first reading concerning the continuous evolution of the giraffe stands in stark contrast to the current paleological facts.

The data so far obtained show that there are many suggestive but untestable hypotheses on this topic and that we really know nothing about the evolution of the long-necked giraffes. Moreover, a close examination of the evidence reveals several deep problems for any of the current hypotheses explaining the origin of these species exclusively by mutations, recombination and selection.

1a. Ulrich Kutschera on the Evolution of the Giraffe

On the evolution of the giraffe, Ulrich Kutschera asserted in the German TV-3SAT-science programme *Nano*, 19 November 2005⁽¹⁾, reacting to a clip from the film by Fritz Poppenberg *Is the Bible right after all?* – in which the origin of the long-necked giraffe is presented as a problem for the synthetic theory of evolution – the following points (my emphasis according to the oral TV-statement):

"We know 20-million-year-old fossils, fossil giraffes, short-necked forms, from which the long-necked giraffes inhabiting the savannah, as well as the short-necked giraffes which inhabit the forest, have evolved. That is, *the evolution of the long-necked giraffe can be reconstructed from fossils*. We are dealing with a false statement in this film."

Before and after the "false statement", Kutschera made a short pause for stronger emphasis (however, a clarification of the question as to the origin of synorganization (co-adaptation) of the giraffe's organ systems and why the bull giraffes are generally more than 1 m taller than the cows, was not offered.)

Let us look more closely at the currently known facts, and let the reader decide, based on these facts, who has – according to the current state of knowledge – actually made unproven assertions in this matter. Regarding the fully inappropriate concept of the "false statement" ("consciously false statement (punishable)" – Wahrig) – see the detailed Note^(1a). (The first part of this text is in several points taken from the document <http://www.weloennig.de/Giraffe.html>, though expanded and modified).

In comparison to the long-necked giraffe, Petzsch remarked about the okapi (Urania/Rowohlt: Säugetiere Bd. 3, 1974, p. 412): "Completely different, the appearance of the short-necked, or forest giraffe, is more similar to the horse, cow or antelope." The okapi has a height of 150-170 cm, the Giraffe 390-450 cm (cow) and 450-580 cm (bull).

According to the theory of additive typogenesis (G. Heberer) by many small steps of adaptive character and, as Mayr says, by mutations with "*slight or even invisible effects on the phenotype*", numerous intermediate forms must be postulated just for the height difference between *Okapia* (or rather, a postulated *Okapia*-like ancestor) and *Giraffa*. "Macroevolution (evolution between species) is composed of **numerous**

small microevolutionary steps (additive typogenesis)" – Kutschera 2001, p. 250. Or: "**Uncountable successive small microevolutionary steps** have led to large changes in the body forms of organisms in the course of millions of years (**macroevolution, concept of additive typogenesis**)" – Kutschera 2006, p. 204 (my boldface).

Darwin had already postulated "infinitesimally small inherited variations", "steps not greater than those separating fine varieties" and "insensibly fine steps" for evolution, "for natural selection can act only by taking advantage of slight successive variations; **she can never take a leap**, but must advance by the shortest and slowest steps" (for further details see page 22, Note^(1a2)).

Ulrich Kutschera (2006, pp. 34/35) speaks of "the phylogenetic development of the body form of the African long-necked giraffe according to the principle of Darwin/Wallace of natural selection" as follows:

"Starting from the short-necked giraffe, which is found in the fossil record (for example, okapi-like forms such as *Palaeotragus*, about 20 million years old), Darwin (and Wallace) proposed the following scenario: The original short-necked forms comprised large, variable populations. Under the selection pressure of droughts and leaf shortages, those variations with longer necks and forelegs survived and reproduced preferentially. In this way, over the course of generations, these large mammals have arisen, being adapted to their special environment (DARWIN 1859/1872 and 1871). More recent research has shown that sexual selection has also played a role: male giraffes with especially long necks are dominant and mate with more fertile females than their shorter-necked competitors. In accordance with this naturalistic model, the long-necked varieties have gradually established themselves over thousands of generations throughout the African giraffe population."

Since Kutschera himself offers no naturalistic alternative to this example, but only adds the hypothesis of sexual selection^(1b) to the gradual evolution over thousands of generations, and as he refers approvingly to the thesis of additive typogenesis in various places in his work (see for example the citations above), one is not unjustified in assuming that he favors this explanation, in agreement with his TV-3SAT-statement^(1c).

The question of selection pressure and sexual selection, mentioned in the above citation, will be more closely considered in the second part of this paper. (Supplement 9 May 2010: See, especially, **Mitchell et al. (2009): Sexual selection is not the origin of long necks in giraffes.**) Concerning the inquiry of to what extent Darwin was prone to a Lamarkian interpretation in his considerations, see <http://www.weloennig.de/Giraffe.html>.

So, how many intermediate forms should a hypothesis of gradual evolution lead us to expect?

If we estimate *only one intermediate form for each centimeter* and if we take into account the variations within each species, we conclude that there were, say, about **200 missing intermediate forms** (assuming only 2 m difference between "small giraffes" and large okapis). Since G. G. Simpson, one of the most renowned proponents and pioneers of the synthetic theory of evolution in paleontology, estimates a growth rate in horse teeth of about one millimeter per million years, and assumes that even this millimeter is gradually bridged by numerous intermediate forms (cf. Artbegriff 1993, p. 448), one can ask, to what extent this estimate could also be applied to the growth rate of the length of neck vertebrae and other bones.

Using such calculations, there are even more intermediate forms required: *According to the theory of gradual evolution at least 1000 intermediate links are missing between the okapioid ancestor and Giraffa, conservatively estimated!*

Yet, if one applies Simpson's considerations to the growth rate of the 7 (8) neck vertebrae, etc. – more literally, i.e. with numerous links per millimeter – one can even postulate 10,000 or more transitional links.

However, *this still does not take into consideration the many other anatomical, physiological and ethological differences between Giraffa and Okapia*, so that according to the theory of additive typogenesis **numerous further links** in other characters must be postulated between an okapi-like ancestor and the giraffe.

For every one of these links, on the one hand, literally thousands of components (in *rough numbers* some 25,000 protein-coding genes and due to alternative splicing 90,000 proteins, 200 joints, 300 bones associated with 1,000 ligaments and 4,000 tendons, 700 muscles, 100 billion neurons constituting the nervous system, 100,000 km of blood vessels etc.) must remain so fine-tuned with each other that a functional and survivable organism is always guaranteed. On the other hand, every one of these almost unnoticeable steps that is supposed to improve adaptation, must 'fit' into the existing framework, that is, be able to be fully integrated into the existing synorganized structures. We are expected to assume that, in this manner, by the addition of thousands upon thousands of small steps, new species, genera, families, etc., even new body plans could arise. And all of this, it is believed, happened by random mutations (non-directional by definition), independently of each other and at numerous different genetic loci! I have discussed the improbability of such a process in detail in my work on the eye (2nd edition 1989 – internet-edition 2003: <http://www.weloennig.de/AuIn.html>; see also Wittlich 1991/2002: <http://www.weloennig.de/NeoD.html> as well as my contribution of 1995/2003: http://www.weloennig.de/Gesetz_Rekurrente_Variation.html). *The result of these investigations is that the theory of additive typogenesis does not function, neither mathematically nor experimentally.*

Incidentally, the okapi already shows nicely the phenomenon of co-adaptation (synorganization). In the okapi not only the neck is somewhat lengthened, but also the legs, and all the anatomical and physiological features are fine-tuned to work harmoniously together.

When we now move to the paleontology of the giraffe and investigate Kutschera's above-cited claims, as well as his thesis of additive typogenesis, let me state that for this discussion that I accept all time stipulations as "given" and investigate the weak points and contradictions of the synthetic theory, essentially depending on mutations, recombination and selection, on this assumption. A critical scientific treatment of the time-question lies beyond the scope of the present work.

1b. On the Paleontology of the Giraffe

"Several distinct forms have been preserved as fossils, though most are still not very similar to the two modern representatives of the family" (Cox et al. 1989, p. 280). According to Carroll, long-necked giraffes first appear in the Middle Miocene era (Carroll 1993, p. 629; see also the discussion below on K. Hunt).

There are, however, many evolutionary statements that leave the impression that we already know the whole story: "The family of Giraffidae, which today is represented by only 2 genera (1 species each) in sub-Saharan Africa, arose from primitive, antlerless deer in the Miocene era" (Siewing 1985, p 553/554); Storch and Welsch claim 1991, p. 673 likewise, that giraffes "derive from primitive deer" (see also their edition of 2003). In Herder/Spektrum Biologielexikon (1994, Vol. 4, p. 67, also in the edition of 2001) the giraffe is perhaps more cautiously spoken of as an even-toed ungulate "which presumably developed in the Early Miocene from deer-like hoofed animals (Palaeomerycidae)" or more clearly with the words of a Spanish researcher "**Probably** the giraffe family evolved from the *Climacoceras*;...". Similarly, Mitchell and Skinner (2003) write, "These ancestors [of the modern giraffes] **appear** to have arisen from the gelocid ancestral assemblage of 20-25 Mya via the family Palaeomerycidae" (my boldface, in the following quotations as well). After the introductory remark "**The origin, phylogeny, and evolution of modern giraffes (*Giraffa camelopardalis*) is obscure**", they present, however, several questionable evolutionary hypotheses, which I will examine in the second part of this work.

The fact is, in any case, that *no continuous series of fossil links leads to the Giraffa or Okapia*. "The giraffe and the okapi of the Congo rain forest are considered as sister groups, **the origins of which are still not known**" (Devillers and Chaline 1993, p. 247). Similarly Starck 1995, p. 999 remarks: "**The ancestry of Giraffidae is disputed.**"

Wesson (1991, pp. 238/239) agrees with these statements about giraffe fossils, as follows (as ever, my boldface):

"The evolving giraffe line left no middling branches on the way, and **there is nothing, living or fossil, between the moderate neck of the okapi and the greatly elongated giraffe**. The several varieties of giraffe are all about the same height. There are a number of fossil giraffids with more or less the shape of the okapi; it would seem that one of them rather suddenly took off and grew to the practical limits of a giraffe."

But what scientific evidence is there for the claim that one of these varieties rather suddenly – or according to synthetic evolutionary theory, very gradually – took a new path that led to the to lofty giraffe height? I will come back to this question below and in Part 2.

I have written to a number of paleontologists who are most familiar with mammal paleontology asking them the following question: "Is there a series of intermediate fossil forms between the short-necked (like *Okapia*) and long-necked giraffes (*Giraffa*)?" None of these evolutionary biologists was able to answer 'yes', although no doubt they would gladly have done so, if such links existed – not to mention that, in this case, the intermediate fossil forms would be published in every evolutionary textbook.

Dr. X, a paleontologist and evolutionary biologist, who, according to his own statement has carefully studied and documented the fossil neck vertebrae of the Giraffidae, but would like to remain anonymous ("I am sure you understand how delicate this point is"), answered this question in an e-mail to me on March 3, 2006, as follows:

"They [the fossil cervical vertebrae] are all short except of those of *Bohlinia attica* from Pikermi (Miocene of Greece) and *Giraffa*. *Bohlinia* is just as long as *Giraffa* and certainly not an intermediate. There are differences in the short vertebrae of the various species. These vertebrae are a few and not connecting any of the fossil taxa to *Giraffa*. The okapi is not related in any way to any of the fossils and there are no fossil okapis."

And a couple of hours later: "The variation in the short-necked extinct forms is interesting **but not leading to long necks.**"

Dr. X is thus in agreement with Wesson, Devillers, Chaline, Starck and in general with those evolutionary biologists who have to date commented on this matter, but who have refrained from making firm but completely unproven statements about fossil links. (See also Dr. Y and Dr. Z, p. 18 of this article, last paragraph, and the supplement from April 23, and May 1, 2006, Note 1d and 3.)

The assertion of Charles Devillers (1914-1999) and Jean Chaline (1937-), however, that the oldest giraffes were the largest, is contested by Dr. X ("incorrect"). I have so far not been able to check the evidence on which Devillers and Chaline have based their following statement: "The oldest fossils attributed to the genus *Giraffa* date from the end of the upper Miocene in east Africa, some 10 million years ago. They are assigned to the species *Giraffa jumae*, which was larger than the largest present giraffe (*G. (c)amelopardalis*". "...the palaeontological record shows that in the oldest deposits, the giraffe was represented by specimens which exceeded in size even the largest current giraffes. This is in contradiction to what we might expect from theoretical considerations on evolutionary trends, such as an apparent general increase in size. The evolution of the giraffe therefore appears to represent a particular case" (Devillers and Chaline 1993, p. 247 and p. 207).

Under the assumption that these authors, both respected biologists with numerous publications - Devillers for example has co-authored with Grassé (Grassé, Pierre-P, and Charles Devillers, 1965, Zoologie. Vol. 2: Vertébrés, 1129 pp., Masson et Cie, Paris 1965; or Charles Devillers and P. Clairambault: Précis de zoologie: vertébrés, tome I: Anatomie comparée, Masson 1976, 2. Auflage) and Chaline is one of the more important vertebrate paleontologists of our time (http://fr.wikipedia.org/wiki/Jean_Chaline), - have not simply invented this claim, I will leave this contradictory statement at that for now and will examine some points later (see Part 2).

Supporters of the synthetic theory of evolution will probably object that the fossil material here is still much too fragmentary. *The sudden appearance of new forms is however also confirmed in the best-preserved animal groups.* The paleontologist Oskar Kuhn from the University of Munich remarked on this question already in 1965, p. 5 (similarly 1981 pp. 53/54; further documentation of mine 1993/2003, pp. 314 -324, and 1998/2003, italics and spacing by Kuhn):

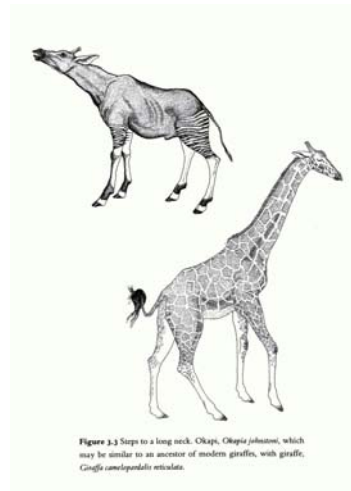
"The prejudice that the phylogenetic history of life could only be an accumulation of the smallest variational steps and that a more complete knowledge of the paleontological documents would prove [the assumed] gradual evolution, is deeply rooted and widely accepted. But the paleontological facts have long spoken *against this prejudice!* Especially German paleontologists such as B e u r l e n, D a c q u é and S c h i n d e w o l f have emphatically pointed out that in many animal groups such a rich, even *overwhelming amount of fossil material exists* (foraminifers, corals, brachiopods, bryozoans, cephalopods, ostracods, trilobites etc.), that the gaps between the types and subtypes *must be viewed as real*".

Moreover, it should be remarked that the paleological material in the case of the giraffe is likewise by no means as incomplete as is generally assumed. In fact, Mikael Fortelius, Professor of Evolutionary Palaeontology in Helsinki, provided a fossil list for the Giraffidae of some 62 pages, with more than 500 findings in hundreds of locations (partly from <http://www.helsinki.fi/science/now/>) and this list is still by no means complete. It is also noteworthy that numerous genera and species of this family are only known from fossils (see discussion on Hunt below).

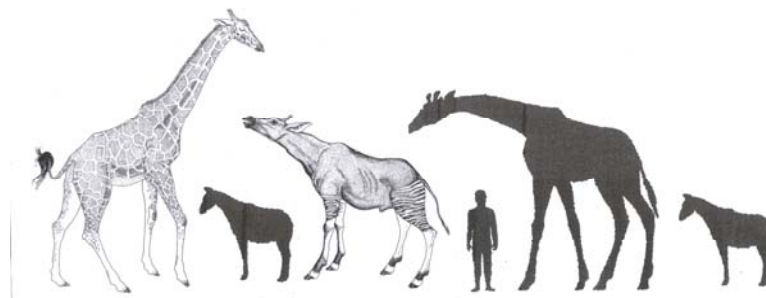
The interested reader can find several further interesting points about the giraffe (up to the year 2007) at http://en.wikipedia.org/wiki/Giraffa_camelopardalis (the comments on *Taxonomy and Evolution* should, however, be corrected in agreement with the facts and arguments presented below).

2. Richard Dawkins on the Evolution of the Giraffe

Dawkin's book *CLIMBING MOUNT IMPROBABLE*, original drawings by Lalla Ward, Viking, Published by the Penguin Group (1996), contains a discussion on the origins of the giraffe (pp. 91-93), which includes the following illustration (p. 92, strongly scaled down):



In the book *ANIMALS OF OUR WORLD* (1988), Bertelsmann Lexikothek, however, the true relative sizes are shown as follows (p. 512, the **silhouettes** on the right side, of man, giraffe and okapi):



On the left side I have placed Dawkin's illustration for comparison, but with the okapi placed on the same level as the giraffe (cf. Dawkins illustration above). In between, I have repeated the drawing of the okapi with its real relative size shown (silhouette).

From Dawkins' portrayal one gets the impression that the step from okapi to long-necked giraffe is slight, and the text reinforces this impression. The placement of the

okapi above the giraffe in Dawkin's book also makes it appear larger than if it were placed on the same level as the long-necked giraffe.

If an intelligent design proponent used such methods – what objections would be raised for example by the "AG Evolutionsbiologie", a group of German evolutionary biologists? [German: AG= Arbeitsgemeinschaft: team, study group.]

Here are some excerpts from Dawkins' text (p. 91) on the evolution of the giraffe, with comments from me:

"Giraffes have evolved from an ancestor rather like a modern okapi (Figure 3.3)."

Here Dawkins offers as fact a hypothesis which still needs to be scientifically investigated. This is not scientifically admissible, otherwise one could interchange all possible hypotheses with facts (current example: "It could be a case of bird flu", or "It is a case of bird flu" – an important difference!⁽²⁾). Even if "conceivable", there is still a categorical difference between a hypothesis and a scientifically proven fact. For example, it is also conceivable (though not in accord with the intentions of Dawkins), that the okapi arose "from an ancestor like a modern giraffe".

As mentioned above, Figure 3.3 presents the relative sizes unrealistically: The real okapi is substantially smaller in comparison to the giraffe than that presented by Dawkins to support its evolutionary derivation. Dawkins continues:

"The most conspicuous change is the elongation of the neck. Could this have come about in a single, large mutation? I hasten to say that I am sure it didn't."

Thus Dawkins believes also in this case in his idea of gradual evolution! In the next sentence, however, he qualifies this:

"But that is another matter from saying that it couldn't."

OK! In the following sentences, Dawkins develops a sort of macromutation theory on the origins of the giraffe, although he is sure that this theory is not correct (did the elongation of the neck come about by a single large mutation? "...I am sure it didn't"). He simplifies the biological problems to a degree that is tolerable for evolutionary theory, but not realistic with regard to the biological facts (italics by Dawkins):

"A Boeing 747 mutation like a brand-new complex eye - complete with iris diaphragm and refocusable lens, springing from nothing, like Pallas Athene from the brow of Zeus — that can *never* happen, not in a billion billion years. But, like the stretching of the DC8, the giraffe's neck could have sprung out in a single mutational step (though I bet it didn't). What is the difference? It isn't that the neck is noticeably less complicated than the eye. For all I know it may be more complicated. No, what matters is the complexity of the *difference* between the earlier neck and the later one. This difference is slight, at least when compared with the difference between no eye and a modern eye. The giraffe's neck has the same complicated arrangement of parts as the okapi (and presumably as the giraffe's own short-necked ancestor). There is the same sequence of seven [eight in *Giraffa* — note by W.-E. L.] vertebrae, each with its associated blood vessels, nerves, ligaments and blocks of muscle. The difference is that each vertebra is a lot longer, and all its associated parts are stretched or spaced out in proportion."

Only in the fantasy world of evolutionary theory are things as simple as that. In the world of biological realities, on the other hand, things are different:

"For rumination, semi-solid food [pulp, mash] must be forced over 3 m high from the reticulum stomach to the mouth!" (Bertelsmann Lexikon der Tiere 1992, p. 259.) For this, the giraffe is equipped with a *special muscular esophagus*. "The uniform circulation of blood to the different body parts makes several adaptations of the heart, arterial and venous systems necessary" (Marcon and Mongini: Die Grosse Encyclopedie der Tierwelt 1988, p. 303). To avoid bloodlessness by the movement of the head from drinking water at ground level to – seconds later – 5 m height, this animal is equipped with appropriate *muscular arteries*. Furthermore, it has a *complicated system of valves in the veins*, as well as a "*wundernetz*", a *rete mirabile, of blood-storing arteries at the brain base*. Also, the lengths, powers/strengths and functions of the skeletal, muscle and nervous systems, etc. must be precisely in tune with each other, if the animal is to be capable of survival.

Davis and Kenyon summarize the main points as follows (1993, p. 13):

"When standing upright, its blood pressure must be extremely high to force blood up its long neck; this in turn requires a very strong heart. But when the giraffe lowers its head to eat or drink, the blood rushes down and could produce such high pressure in the head that the blood vessels would burst. To counter this effect, the giraffe is equipped with a coordinated system of blood pressure controls. Pressure sensors along the neck's arteries monitor the blood pressure and activate contraction of the artery walls (along with other mechanisms) to counter the increase in pressure."

McGowan lists additional details (1991, pp.101/103):

"The blood leaving the giraffe's heart has to do more than just reach the level of the head, it has to be at a high enough pressure to pass through all the fine vessels, the capillaries, that supply the brain and other organs. To achieve this the blood leaves the heart at a pressure of 200-300 mm Hg [260-350 mm Hg according to Starck 1995, p. 206^(2a)], which is probably the highest blood pressure of any living animal (Warren, 1974; Hargens et al., 1987). A giraffe's blood pressure is so high that it would probably rupture the blood vessels of any other animal, but two mechanisms appear to prevent this. First, the arterial walls are much thicker than in other animals. Second, the fluid that bathes the cells of the body is maintained at a high pressure; this is largely achieved by the thick skin, which is tightly stretched over the body and which functions like the anti-gravity suit worn by pilots of fast aircraft.

...Another problem posed by the possession of a long neck is the large volume of air in the trachea, the tube that connects the back of the throat with the lungs. This air is unavailable for respiration and the space it occupies is consequently referred to as the dead space. The dead space has a volume of about five pints (2,5 l) in the giraffe. Since this air has to be moved each time the animal breathes, the rate of ventilation has to be increased to compensate for the reduced air flow. A resting giraffe takes about twenty breaths per minute, compared with our twelve and an elephant's ten; this is a very high respiration rate for such a large animal."

Correspondingly efficient and "big lungs" have the task of balancing respiration "through a 10 feet long tube; many muscles, tendons, and bones had to be modified harmoniously" (Wesson 1991, p. 226) (for full quotation see Note 2b).

Davis and Kenyon summarize the problems of the giraffe for the synthetic evolutionary theory as follows (1993, p. 13, my italics):

"In short, the giraffe represents *not a mere collection of individual traits but a package of interrelated adaptations*. It is put together according to an overall design that integrates all parts into a single pattern. Where did such an adaptational package come from?

According to Darwinian theory, the giraffe evolved to its present form by the accumulation of individual, random changes preserved by natural selection. *But it is difficult to explain how a random process could offer to natural selection an integrated package of adaptations, even over time*. Random mutations might adequately explain change in a relatively isolated trait, such as color. But major changes, like the macroevolution of the giraffe from some other animal, would require an extensive suite of coordinated adaptations."

All of these questions are completely ignored by Dawkins, and he continues:

"The point is that you may only have to change one thing in the developing embryo in order to quadruple the length of the neck. **Say you just have to change the rate at which the vertebral primordia grow, and everything else follows.**"

"... and everything else follows": Can one, in view of the above details, describe this conclusion perhaps as purely wishful thinking? And such and/or further wishful thinking on evolution passes today as science that must scarcely be questioned, or not at all. – Richard Dawkins continues:

"But in order to make an eye develop from bare skin you have to change, not one rate but hundreds (see Chapter 5). If an okapi mutated to produce a giraffe's neck it would be a Stretched DC8 macro-mutation, not a 747 macro-mutation. It is therefore a possibility which need not be totally ruled out. Nothing new is added, in the way of complication. The fuselage is elongated, with all that entails, but it is a stretching of existing complexity, not an introduction of new complexity."

"Nothing new is added, in the way of complication" – this claim is simply false (see details above). The subsequent comparison with the different numbers of vertebrae in snakes seems inappropriate, since the unique problems of the giraffe, cited above in some detail, cannot be applied here (however, possibly others could be found in snakes).

3a. Kathleen Hunt on the Evolution of the Giraffe

When one examines the assertions of zoologist Kathleen Hunt on one of the most frequently cited internet pages regarding the origin of the giraffe, *Transitional Vertebrate Fossils FAQ*, one immediately gets the impression that all questions and problems on the origin of the giraffe are completely resolved within the context of the synthetic theory of evolution – like the statements of Kutschera quoted above. It should be observed that this site, because of its seemingly stringent scientific level and way of reasoning, has perhaps convinced more readers of the correctness of the theory of evolution than many other internet sites. On the evolution of the giraffe, Hunt writes (1999):

"Giraffes: Branched off from the deer just after *Eumeryx*. The first giraffids were *Climacoceras* (very earliest Miocene) and then *Canthumeryx* (also very early Miocene), then *Paleomeryx* (early Miocene), then *Palaeotragus* (early Miocene) a short-necked

giraffid complete with short skin-covered horns. From here the giraffe lineage goes through *Samotherium* (late Miocene), another short-necked giraffe, and then split into *Okapia* (one species is still alive, the okapi, essentially a living Miocene short-necked giraffe), and *Giraffa* (Pliocene), the modern long-necked giraffe." (<http://www.talkorigins.org/faqs/faq-transitional/part2c.html>).

When we now look more closely at her exposition and examine the reasoning behind the individual statements, we should be aware of the following problem: we have to start from the current state of knowledge, which cannot be considered settled, since we do not know if and which further developments and findings may lead to revisions in certain questions.

But we obviously cannot start from fossil finds that perhaps some day will be discovered and described, applying the motto: "Faith is the substance of fossils hoped for, the evidence of links unseen" (according to A. Lunn^(2c)). Besides, it is possible that further fossil finds may even deepen the mystery of the giraffe ancestry – a possibility that most evolutionary theorists deem highly unlikely (unjustifiedly, as many paleontological examples show).

"Giraffes: Branched off from the deer just after *Eumeryx*."

This statement is not supported by any fossil finds. Thus, we might ask, if and from where K. Hunt and many other authors, who make similar and often even stronger assertions and apparently completely certain deductions, can know these things so definitively. In this connection we should further ask, what these first deer looked like and when they appeared. "The first deer emerged more than 30 million years ago in the Oligocene era, in Asia. The early deer *Eumeryx* had as yet no antlers on his long and primitive skull. The male animals had dagger-like eye teeth in the upper jaw, like today's water chevrotain" – Ernst Probst in: <http://www.fortunecity.de/lindenpark/wittgenstein/30/RekordederUrzeit.html>

In view of the complete lack of fossil evidence for the derivation of the giraffes from *Eumeryx*-relatives, one can justifiably ask whether such antlerless deer, with daggerlike eye-teeth, really have evolved by mutation, recombination and selection into giraffes. As for deer themselves, one may further ask: was does "emerge" mean? Where do these deer come from? Further, a transitional series leading to the *Prodremotherium* from the late Eocene is also lacking. Evolutionary claims are not supported, neither for the ancestry of the deer nor for the giraffe, by "very fine-grained sequences documenting the actual speciation events" (in accordance with Hunt's *Introduction*). Of such transitions, she further says:

"These species-to-species transitions are unmistakable when they are found. Throughout successive strata you see the population averages of teeth, feet, vertebrae, etc., changing from what is typical of the first species to what is typical of the next species."

In agreement with this statement the English zoologist Douglas Dewar wrote already decades ago (1957, p. 35):

"If the evolution theory be true, the record should exhibit the following features:

- I. Every class, order, family or genus would make its appearance in the form of a single species and exhibit no diversity until it has been in existence for a long time.
- II. The flora and fauna at any given geological horizon would differ but slightly from those immediately above and below except on the rare occasions when the local climate suddenly changed if the sea flowed over the land, or the sea had retreated.
- III. It should be possible to arrange chronological series of fossils showing, step by step, the origin of many of the classes and smaller groups of animals and plants. By means of these fossil series **it should be possible to draw up a pedigree accurately tracing the descent of most of the species now living from groups shown by the fossils to have been living in the Cambrian period.**
- IV. **The earliest fossils of each new group would be difficult to distinguish from those of the group from which it evolved, and the distinguishing features of the new group would be poorly developed,** e.g. the wings of birds or bats. "

And precisely these criteria are not fulfilled here. Otherwise we could follow the evolution of the long-necked giraffe, and the giraffes in general, back to their origins. Whether at least her description of the "general lineage" can be applied to the giraffes, will be discussed later.

Let us first look for descriptions of unmistakable "species-to-species transitions" in the giraffe's evolution (transitions which according to Hunt appear especially frequently in Part 2 of her work):

"The first giraffids were *Climacoceras* (very earliest Miocene)..."

The New Shorter Oxford Dictionary defines "giraffids" as follows: "...of or pertaining to, any animal of, the artiodactyl family Giraffidae, comprising the giraffe, okapi, and related extinct forms." *Webster* says about *Giraffa*: "...comprising the giraffes which together with the okapis and extinct related forms constitute a family and sometimes a superfamily of the Artiodactyla."

I would only like to remark here that *Climacoceras* does not belong to the Giraffidae family. This genus should rather be placed in its own family, Climacoceratidae (Hamilton 1978). Both families, however, belong to the superfamily Giraffoidea.

Neither in Benton's *The Fossil Record 2* (1993, pp. 756,758/759) is *Climacoceras* placed into the giraffe family nor by McKenna and Bell (1997/2000). Carroll 1988/1993 even assigns this genus to the deer family Palaeomerycidae – that is, a good bit further away outside the Giraffoidea (see also Thenius 1970/2000). In none of the newer sources known to me is the genus placed in the Giraffidae family.

If Hunt, by "giraffids", refers to the superfamily (which by the way would seem to be an unusual use of the term in English), then one may include *Climacoceras*. However, this choice of wording leaves the less-informed reader with the impression of a closer kinship to the giraffe family than exists in reality.

Incidentally, a horizontal evolution of special features from one family to another seems difficult to accept because of the the problem of *heterobathmy*. In addition there are some serious time problems, that we will address in detail later.



Climacoceras (about 100 kg and 1,50 m tall) according to^(2c1):

<http://images.google.de/images?imgurl=http://www.planetarios.com/cenozoico/37.jpg&imgrefurl=http://www.planetarios.com/spanishcenozoico.htm&h=554&w=355&sz=122&tbid=cT5MNV9m9fsvYIM.&tbid=130&btw=83&hl=de&start=1&prev=/images%3Fq%3DClimacoceras%26vnum%3D10%26hl%3Dde%26ie%3D%26ie%3DUTF-8%26sa%3DN>



Climacoceras according to^(2c2):

<http://images.google.de/images?imgurl=http://www.dinosaur.hpa.jg.com.br/GIFS.Casco.Climacoceras.gif&imgrefurl=http://www.dinosaur.hpa.jg.com.br/girafas.htm&h=497&w=312&sz=8&tbid=ix6y0CX1640M.&tbid=127&btw=79&hl=de&start=2&prev=/images%3Fq%3DClimacoceras%26vnum%3D10%26hl%3Dde%26ie%3D%26ie%3DUTF-8%26sa%3DN>

Furthermore, according to Stucky and McKenna (see Benton) the assignment of *Climacoceras* to the "very earliest Miocene" is false and correct is **Middle Miocene** (see also McKenna and Bell 1997/2000, p. 432). Carroll, on the other hand, only stipulates "Miocene".

In the original work by Hamilton (1978), the species *C. africanus* and *C. gentryi* were dated approximately 14 (13.8) million years back, that is the Middle Miocene (Miocene: begins 23.03 million years ago, ends 5.33 million years ago; **Middle Miocene: 16.3 to 10.4 million years ago**^(2d) – see Harland et al. 1990, Kearey 1993).

If the date of 13.8 million years is correct, the closest short-necked giraffe, *Canthumeryx*, dated by Hunt in the Early Miocene, is older than the Climacoceratidae, from which these giraffes supposedly evolved. In this case the children would have existed before the parents. Carroll (1988/1993, p. 629) puts the first fossil evidence for the genus *Giraffa* into the Middle Miocene. This is corroborated by fossils of *Giraffa priscilla* from the Middle Miocene of Ramnagar, India (Basu 2004, see Note^(2a1) in the second part of the paper). *Bohlinia* has a thus far maximum calculated age of 11.2 million years (see below). In this case,

Climacoceras and the long-necked giraffe would geologically appear much closer together, leaving hardly enough time for a gradual evolution through thousands of intermediate stages.

Thenius remarks in Grzimeks Tierleben (1970/2000, p. 255):

"...the giraffes were once a wide ranging family abundant in forms of even-toed ungulates. They evolved relatively late – presumably little less than 25 million years ago in the Early Miocene – from a group of deer-like (with respect to teeth) hoofed animals, to which the European genera *Lagomeryx*, *Procervulus* and *Climacoceras*, among others, belong. The Lagomerycides (Lagomerycidae family) had forked, branched, or stalked and branched flat-spread, bony skull protrusions, reminiscent of deer antlers, but which no doubt were permanently covered with skin, and could not be regenerated [exchanged]."

Note that Thenius also assigns *Climacoceras* to the Lagomerycidae. Yet the assumption that *Climacoceras* first emerged in the Early Miocene is clearly incorrect. Apart from the unproven claims regarding evolutionary derivations, most authors agree, however, that the short-necked giraffes appeared in the Early Miocene. "An older form, † *Zarafa* (= † *Canthumeryx*) belongs to the Early Miocene in North Africa. In the Late Miocene, Giraffidae († *Palaeotragus*, † *Giraffokeryx*) appear in Eurasia. **Along with these short-necked forms, the long-necked giraffes appear more or less at the same time**, as Savanna dwellers. († *Honanotherium* in Africa, Eurasia). In the Neogene another line of descent of the Giraffidae appears in Eurasia and Africa, the Sivatheriidae with † *Helladotherium*, and † *Sivatherium* among others. These were animals with heavy, cow-like body forms, and with branched, antler-like ossicones, which survived into the Pleistocene" (Starck 1995, p. 999). We have already noted above that the same author points out that "the ancestry of the Giraffidae is disputed". The reasons for this should now have become clearer. Starck is thus in agreement with all the other critical giraffe researchers, at least in principle.

To summarize: with respect to *Climacoceras* it should be stressed that a series of transitional forms from early antlerless deer (such as *Eumeryx*) to *Climacoceras* with its bony skull protrusions ("branched, antler-like ossicones") is completely lacking, and that according to current dating *Climacoceras* arose several million years too late to be considered a possible ancestor of *Canthumeryx* (the earliest genus unanimously assigned to the Giraffidae [see, however, below and Part 2]). But even if the assignment of *Climacoceras* to the "very earliest Miocene" were correct, this genus would still not be older than *Canthumeryx* and thus could hardly be its ancestor: even in this case the time would still not be sufficient for a gradual series of transitional forms from one genus to the other in a continuous evolutionary process over millions of years.

Neither the claim, put forth as fact, that *Climacoceras* arose from early antlerless deer, nor the idea, also presented as fact, that this genus is the starting point for further giraffe evolution, can in any way scientifically be firmly established.

"...and then *Canthumeryx* (also very early Miocene),..."

The oldest dating of a specimen of *Canthumeryx sirtensis* lies between 18 and 22.8 million years ago (according to the dating of Mikael Fortelius). If one dates the beginning of the Miocene at 23.03 million years, K. Hunt's assignment of

Canthumeryx to the "very early Miocene" is correct, but then this genus would be at least 8 million years older than the "forerunner" genus *Climacoceras*. (If one wants to be very critical, one could argue that the average estimate of 20.4 million years would be in the Miocene, but not "very early" Miocene.)

So far I did not find good illustrations of *Canthumeryx* (see, however, Part 2).

"...then *Palaemeryx* (early Miocene),..." [more accurately, *Palaeomeryx*]

In the recent technical literature, the deer *Palaeomeryx* is unanimously placed in Palaeomerycidae (a group which – as already mentioned above – lies outside Giraffoidea), being a family to which Carroll and Thenius have also assigned *Climacoceras*. These so-called "oldest relatives of the giraffe" (as claimed by the following internet source, in agreement with Hunt) are dated to be **15 million years** old and cannot fill the role claimed for them for chronological (compare Note ^(2a) in Part 2 of the paper) and morphological reasons, though the rest of the exposition may be correct:

"These animals, called *Palaeomeryx* had somewhat the same size as today's red deer. It is evident from skeleton remnants from China, that male specimens of *Palaeomeryx* had bony protrusions on the skull. *Palaeomeryx* inhabited the forest, and ate leaves" (<http://fossilien-news.blog.de/?tag=Palaeomeryx>).

So let me emphasize that according to the best sources known to me, *Palaeomeryx* first arose in the Middle Miocene (and not "early Miocene"), thus later than *Canthumeryx* and would in this respect fit chronologically, – except only that they do not belong to this family and superfamily at all. But even if *Palaeomeryx* could be assigned to the giraffes, this genus, 15 million years old, is still some 1.2 million years older than *Climacoceras* (13.8 million years), which again leads us to the above-mentioned time problem of the evolutionary derivations according to Hunt.



Recent deer, similar to the *Palaeomeryx*, according to <http://eo.wikipedia.org/wiki/Cervedoj>

It hardly needs to be mentioned, that the postulated "species-to-species transitions" are again completely absent, otherwise we would certainly not have the above mentioned chronological and further difficulties; remember please Hunt's words:

"These species-to-species transitions are unmistakable when they are found. Throughout successive strata you see the population averages of teeth, feet, vertebrae, etc., changing from what is typical of the first species to what is typical of the next species."

Hunt calculates something less than 1 million years for "species-to-species transitions". Transitional series between genera would correspondingly require several times as many years.

In place of *Palaeomeryx*, in the recent literature a genus called *Propalaeomeryx* is frequently mentioned, which unlike *Palaeomeryx* is assigned to the family Giraffidae. However, this "Pro" has nothing to do with an evolutionary first step to *Palaeomeryx*, since the latter belongs to the Palaeomerycidae and the former to Giraffidae. Regarding *Propalaeomeryx* McKenna and Bell remark (1997/2000, p. 432): "Proposed as a provisional name" by Lydekker 1883, pp. 173-174. Further hints: "[Including † *Progiraffa* Pilgrim, 1908: 148,155.]" This "Pro" in *Progiraffa* has likewise nothing to do with a link to *Giraffa*, since *Progiraffa* is "an uncertain large cervoid" [thus, a deer] (Berry et al. 2005), maximum age 18 million years.

"...then *Palaeotragus* (early Miocene) a short-necked giraffid complete with short skin-covered horns."

Palaeotragus is, to be sure, dated to be maximally 18 million years old (occurring in the Early Miocene), but again there is no known series of links to any forerunners, and this genus is, according to the current finds, also several million years older than the presumed ancestor *Climacoceras*, which is incorrectly arranged by Hunt as to the time of its first appearance as well as morphology and evolution.



Palaeotragus, according to <http://critters.pixel-shack.com/WebImages/crittersgallery/Palaeotragus.jpg>

A similar illustration can be found in Metcalf 2004, p. 37.

Further, Metcalf conveys the idea by his text and illustrations, that *Helladotherium* was a forerunner of *Palaeotragus*. The former, however, first appears in the Late Miocene, and thus from time considerations alone cannot be considered an ancestor of the latter. In addition, *Helladotherium* belongs to the Sivatheriinae, the above-mentioned animals with "heavy, cow-like body forms and with branched, antler-like skull ossicones, that survived into the Pleistocene".

The reconstruction of *Palaeotragus* looks somehow disproportionate as to its anatomy and is possibly built in part on evolutionary assumptions (yet the neck is in any case as short as it should be according to the fossils found).

Further, Kathleen Hunt writes about the next short-necked giraffe:

"...From here the giraffe lineage goes through *Samotherium* (late Miocene), another short-necked giraffe,..."



Samotherium according to:

<http://images.google.de/images?imgurl=http://www.dinosaur.net.cn/HeZhang/2003pic09.jpg&imgrefurl=http://www.dinosaur.net.cn/HeZhang/page07.htm&h=480&w=640&sz=79&tbnid=BsLcdOvzaQqM:&tbnh=101&tbrw=135&hl=de&start=2&prev=images%3Fq%3DSamotherium%26vnm%3D10%26hl%3Dde%26ie%3DUTF-8%26sa%3DG>

None of the other authors so far known to me places *Samotherium* (maximum 14.6 million years for this genus) into the "late Miocene", but rather into the **Middle Miocene**. The time between *Palaeotragus* and *Samotherium* is then some 3.4 million years, again relatively short for a gradual evolution in the sense of Darwin and the synthetic theory of evolution. Once again a transitional series is missing, and in addition, up to now we have **nothing but short-necked giraffes**.

The wording: "From here the giraffe lineage goes through *Samotherium*..." implies – even according to cladistic evolutionary assumptions – the unrealistic idea that the above-mentioned genera represent the "giraffe lineage". Already in 1978, Hamilton pointed out that in all these cases we are dealing only with "sister-groups": "The giraffines are identified as the sister-group of the *Palaeotragus* group using lengthening of the limbs and neck as a synapomorphy" (p. 220), and on p. 219 we read some similar arguments on the evolutionary relationships of these forms: "...*Canthumeryx* is identified as the sister-group of the giraffids and *Climacoceras* is the sister-group of *Canthumeryx* plus the giraffids."

What are "sister-groups"? According to evolutionary assumptions, they are defined as follows: "...sister groups are the two monophyletic groups produced by a single dichotomy; each is the other's nearest relative; sister species-groups" (Lincoln et al.: A Dictionary of Ecology, Evolution and Systematics). As repeatedly mentioned above, **the line itself with its numerous assumed speciation events has not been documented. Rather, according to Hamilton and many other authors, we know more or less only the tips of the twigs of the assumed evolutionary tree in the form of sister-groups.**

The giraffe lineage therefore does not go "through *Samotherium*", but rather, even according to evolutionary presumptions, **past *Samotherium*** .

"...and then split into *Okapia* (one species is still alive, the okapi, essentially a living Miocene short-necked giraffe),..."

The above sources place *Okapia* in the early Pleistocene. *Samotherium* however, according to current dating, lived 14.6 to 3.4 million years ago. The transitional series is missing, as in the afore-mentioned cases. And the okapi, "essentially a living Miocene short-necked giraffe" could – according to this assertion – be classified as a living fossil (basic form essentially unchanged for some 15 million years; on the topic of living fossils, cf. <http://www.weloennig.de/mendel20.htm>; see also Janis 1984 and the further points in the second part of the paper).

"...split into *Okapia* ...and *Giraffa* (Pliocene), the modern long-necked giraffe."

The long-necked giraffes first appear not in the Pliocene, but rather with *Bohlinia attica* (maximum 11.2 million years ago) and *Giraffa priscilla* (about 12 million years ago) already in the Middle Miocene. The end of the Middle Miocene is dated at 10.4 million years ago according to Harland et al. (1990) and Kearey (1993), thus the oldest estimates for *Bohlinia* and *Giraffa* reach back into the Middle Miocene. So far *both genera appear in the fossil record without a series of transitional stages with their very impressive heights of almost 6 meters*. Since the genus *Giraffa*, with an age of some 12 million years, is placed into the Middle Miocene, it can in any case be considered a living fossil.

Now at this point, where the most thrilling part for our basic question begins, i.e. at the point, where the gradual evolution of the long-necked giraffe is asserted to have been documented by intermediate fossil forms ("...the evolution of the long-necked giraffe can be reconstructed from fossils" – see Kutschera above), ***we no longer hear anything about the fossil evidence***, but only the assertion that this evolution has taken place ("...split into *Okapia* ...and *Giraffa*"). If, however, Kathleen Hunt could produce the fossil evidence for a gradual evolution, then, given her desire to show the public that all fundamental questions and problems on the origin of the long-necked giraffes have been completely solved in accord with the synthetic theory of evolution, so that only the ignoramuses and/or religious fanatics could doubt this fact, then surely she would have laid it out in detail. However, she does not present the evidence, because such a transitional series does not exist.

Recently this last point was confirmed by a fervent defender of evolutionary theory, we will call him Dr. Y, by answering my question "Is there a series of intermediate fossil forms between *Samotherium africanum* and *Bohlinia*?"⁽³⁾ clearly in the negative ("There is not an intermediate that I am aware of"). Another biologist – likewise a giraffe expert (Dr. Z) – said, to be sure, that the skull and teeth of *Bohlinia* are more primitive than those of *Giraffa* (when the term "primitive" is used, in my experience caution and further investigations are advisable), but he added: "...but it is true that the post-cranials are about as long as those of the living giraffe." This author questioned the evolution of the long-necked giraffe *Bohlinia* from *S. africanum* and from his following statement "The ancestors of *B. attica* should rather be sought in Eurasia..." it is easy to conclude that the assumed series of evolutionary ancestors and transitional forms are unknown (because clearly: if we already had them, there would be no reason to search for them – neither in Africa nor in Eurasia).

The majority of the corrections concerning Hunt's statements are based on data that were already known at the beginning of the 90s of the previous century – thus she (like Kutschera) has not done careful and critical research, but rather made statements designed to provide impressive support for the synthetic theory of evolution, yet incorrect in the essential points.

Thus, we come full circle back to the first part of our exposition: The assertion, made before an audience of altogether some 1 million viewers by Ulrich Kutschera that the difficulties for the synthetic theory of evolution presented in Fritz Poppenberg's film were "false statements" (see Kutschera above), is shown to be itself incorrect by the above data.

3b. General lineages

If the evidence for "species-to-species-transitions" for the giraffe is so completely lacking (although such cases should, according to her words, appear especially frequently in Part 2 of her work, in which the giraffe is also treated) – could not, at least, her second main assertion be correct, i. e. that evidence exists for a "general lineage", confirming the evolution of the Giraffidae indirectly? So, let us look more closely at her assertions on the matter of the "general lineage":

"This is a *sequence of similar genera or families*, linking an older group to a very different younger group."

However, this could just mean a purely morphological derivation, which cannot necessarily be identified with a series of evolutionary stages (Dacqué, Kuhn, Troll). She continues:

"Each step in the sequence consists of some fossils that represent a certain genus or family, and the whole sequence often covers a span of tens of millions of years."

Since the fossil evidence for Giraffidae stretches back some 23 million years, this assertion could be correct in principle. Interpreting the existing fossil genera as "steps" in a genetic-evolutionary sequence, however, runs into the above-discussed time and anatomical difficulties (see further points below). Hunt further defines:

"A lineage like this shows obvious morphological intermediates for every major structural change, and the fossils occur roughly (but often not exactly) in the expected order."

The evidence of "obvious morphological intermediates for *every major structural change*" does not exist for Giraffidae, neither within the short-necked giraffes nor for the decisive step to the long-necked giraffes, nor within the long-necked giraffes. And one would have to be unrealistically benevolent if one wants to claim that, in the sense of evolutionary connections, the fossils in this family appear "roughly (but often not exactly) in the expected order".

"Usually there are still gaps between each of the groups - few or none of the speciation events are preserved."

Gaps exist between all the genera of the Giraffidae, and not a single one of the numerous postulated "speciation events" has been preserved (granted that they ever occurred).

"Sometimes the individual specimens are not thought to be *directly* ancestral to the next-youngest fossils (i.e., they may be "cousins" or "uncles" rather than "parents")."

This can be said of *all* fossil and living Giraffidae genera and species.

"However, they are assumed to be closely related to the actual ancestor, since they have intermediate morphology compared to the next-oldest and next-youngest "links"."

As a rule, not even the expected "intermediate morphology" is present. "...they are *assumed* to be closely related to the *actual ancestor*...": In both cases we are dealing with *assumptions*, for the "actual ancestor" as well as for the evolutionary "cousins or uncles". None of these assumptions is scientifically stringent.

"The major point of these general lineages is that animals with intermediate morphology existed at the appropriate times,..."

Both the "intermediate morphology" as well as evidence of links "at the appropriate times" are missing.

"...and thus that the transitions from the proposed ancestors are fully plausible."

This would not be the case, even if all the criteria were fulfilled, cf. <http://www.weloennig.de/mendel13.htm> and the following chapter, as well as: <http://www.weloennig.de/mendel14.htm> and also <http://www.weloennig.de/AesWesen.html> and the ensuing chapter.

In this connection, we should remember Kuhn's basic statement concerning the relationship between morphology and evolution:

"The similarity of forms was explained by evolution, and evolution in turn was proven by the grades of similarities. That here one has fallen victim to circular reasoning was hardly noticed; the very point that one set out to prove, namely that similarity was based on evolution, was simply assumed, and then the different degrees in the gradation of the (typical) similarities, were used as evidence for the truth of the idea of evolution. Albert Fleischmann has repeatedly pointed out the lack of logic in the above thought process. The same idea, according to him, was used interchangeably as assertion and as evidence.

However, similarity can also be the result of a plan, and ...morphologists such as Louis Agassiz, one of the greatest morphologists that ever lived, attributed the similarity of forms of organisms to a creation plan, not to evolution."

It would perhaps be "fully plausible" only if there were no alternative to the evolutionary interpretation by mutation, recombination and selection. That is however, not the case (see in Part 2 the exposition on ID).

Kathleen Hunt continues:

"General lineages are known for almost all modern groups of vertebrates, and make up the bulk of this FAQ."

In this case, the Giraffidae family would be an exception to this rule of "general lineages". According to my knowledge, however, the giraffes conform to a rule, which has first been established for the classification of the higher systematic categories, and which according to current knowledge also holds true for the origin of the genera of the giraffes (cf. <http://www.weloennig.de/AesIV5.SysDis.html>, thus the statement of Steinmann about the more or less closed series of evolutionary sequences within lower systematic categories should likewise be carefully examined for any concrete case).

If, however, the general lineages for almost all modern groups of vertebrates are as uncertain as in the case of the giraffes, then we are dealing only with suggestive evolutionary interpretations in most other groups as well, yet without solid scientific proof.

Notes

(1) The program was, according to the statement of a MPG employee, replayed several times the following morning. Upon my question, the TV management informed me that the science program *Nano* has an average of a half million viewers, and similarly for the reruns.

(1a) Upon further reflection I have come to the conviction that the term "Falschaussage" (false statement) used by U. Kutschera is completely out-of-place here. According to all dictionaries and encyclopaedias available to me, this is a precise *legal* term, which is defined as follows (Brockhaus, Band 7, 1988, p. 86, further points there): "**Falschaussage, uneidliche [not under oath] Falschaussage, falsche uneidliche Aussage**, the intentional false statement of a witness or expert, not under oath, in a courtroom or other place where examinations of witnesses or experts take place (for example, parliamentary investigation committees). "Falschaussage" will be punished by three months to five years imprisonment (§ 153 StGB)." What Kutschera here apparently intends is the criminalization of opinions deviating from his own view of things, as evidenced by the following citations and commentaries made by him:

On page 159 of his book *STREITPUNKT EVOLUTION* ("Controversies of Evolution") Kutschera cites an article by Professor Werner Gitt, agreeing with the comments of the Jenaer biologist W. Bergmann as follows (boldface again from me):

"It should be further mentioned that the exposition of this author on the topic of "Animal and Plant Life" is factually incorrect and conveys a completely out-dated picture of the physiology of organisms: The concept of "metabolic energy" seems to be fully unknown to the author. The biologist Prof. W. Bergmann (Jena) sent me this journal with the following comments on the article by the engineer W. Gitt: 'Such journals with pseudo-scientific assertions were distributed at the Bible exhibition in Jena. This is irresponsible "dumbing down" of the public, which must be **penalized and forbidden**. One can only say, adapting a quote by Prof. H. Küng about Pope John Paul II, that with such writings, Christianity remains a middle-age galley of minors." **There is nothing to add to these appropriate comments.**"

If – as U. Kutschera says – "there is nothing to add to these appropriate comments", that means that the article should be penalized and forbidden – rather than discussed and factually refuted. For a work to be penalized and forbidden, it must first be criminalized, and this he attempts to do with regard to the topic of giraffe evolution, with the legal idea of the "Falschaussage", – it only remains to be asked, who should be the judge in this trial, though one can well imagine.

I cannot tell whether Kutschera's judgement on the article by Gitt is justified or not, since I have not as yet seen Gitt's comments. Anyhow, Kutschera himself has not offered any factual refutation. If Kutschera's claims about Gitt's article are as unfounded as his statements on giraffe evolution, then extra skepticism is appropriate. In any case, according to my understanding, anyone who – instead of arguing publicly, factually and scientifically – wants to **penalize and forbid, has ventured outside the framework of the Constitution** not only of the FRG, but of all countries which are in agreement with the Universal Declaration of Human Rights.

(1a2; Note added 7 November 2008.) Thus, Darwin had provided the basic idea of continuous evolution some 150 years ago by postulating "*innumerable* slight variations", "*extremely* slight variations" and "*infinitesimally* small inherited variations" (he also spoke of "infinitesimally small changes", "infinitesimally slight variations" and "slow degrees") and hence, as likewise quoted in part above, imagined "steps not greater than those separating fine varieties", "insensibly fine steps" and "insensibly fine gradations", "for natural selection can act only by taking advantage of slight successive variations; **she can never take a leap**, but must advance by the shortest and slowest steps" or "the transition [between species] could, according to my theory, be effected only by **numberless small gradations**" (emphasis added, see <http://darwin-online.org.uk/>).

(1b) The suggestion by R. E. Simmons and L. Scheepers of sexual selection was, however, not offered as a supplement to Darwin's explanation (feeding competition), but rather as an *alternative*. In the abstract of their article "Winning by a neck: Sexual selection in the evolution of giraffe" (American Naturalist 148 : 771-786, 1996) they say, among other things:

"A classic example of extreme morphological adaptation to the environment is the neck of the giraffe (*Giraffa camelopardalis*), a trait that most biologists since Darwin have attributed to competition with other mammalian browsers. However, in searching for present-day evidence for the maintenance of the long neck, **we find that during the dry season (when feeding competition should be most intense) giraffes generally feed from low shrubs, not tall trees**; females spend over 50% of their time feeding with their necks horizontal; both sexes feed faster and most often with their necks bent; and other sympatric browsers show little foraging height partitioning. **Each result suggests that long necks did not evolve specifically for feeding at higher levels**. Isometric scaling of neck-to-leg ratios from the okapi *Okapia johnstoni* indicates that giraffe neck length has increased proportionately more than leg length – an unexpected and physiologically costly method of gaining height. **We thus find little critical support for the Darwinian feeding competition idea**. [Here follow their arguments for sexual selection, which I do not want to address until the second part.]

...We conclude that sexual selection has been overlooked as a possible explanation for the giraffe's long neck, and on present evidence it provides **a better explanation** than one of natural selection via feeding competition" (my boldface).

(1c) The TV-3SAT-remark should also be understood in connection with the presentation of giraffe evolution by Dr. Ragnar Kühne (Berlin Zoo) in Fritz Poppenberg's Film. There Kühne defends the gradual evolution in connection with the selection theory. Poppenberg follows with a technical criticism, and Kutschera is now more or less defending Kühne.

(1d) Supplement from 23 April 2006 and 1 May 2006: Since I want to keep my readers as correct and up-to-date as possible, I feel obliged to add the following points to the discussion on the origin of the long-necked giraffes: On 21 April 2006, Dr. X partially retracted his statement. However, the facts – if there are any – on which this retraction was based, and which would support a view partially in opposition to his clear and unequivocal previous statements as well as those of the other giraffe specialists quoted above, are not known to me. (Such fully new facts must therefore have been discovered in the last couple of weeks, yet I have heard nothing of this. His *hypothesis* is that the neck vertebrae were first lengthened stepwise, and then a quantum mutation produced the

duplication of a cervical vertebra.) Therefore I sent him the following questions (22 April 2006) concerning his statement "I have intermediates with partially elongated necks but they are unpublished":

"If you really have intermediates (How many? Really a continuous series leading to the long-necked giraffes? What does "partially elongated" exactly mean? Are the intermediates really "intermediate" in the strict sense of the term?), which are relevant for the origin of the long-necked giraffes and which are occurring in the expected, i.e. "correct" geological formations (taking also into account the sexual dimorphism of the species and excluding juvenile stages and the later pygmy giraffes etc.), bridging in a gradual/continuous fashion of small steps in Darwin's sense the enormous gap between the short-necked and long-necked giraffes, I can only advise you to publish these results as a *Nature* or *Science* paper as soon as possible. And if you have, in fact, unequivocal proofs, I can only add that I, for my part, will follow the evidence wherever it leads. So drop all secondary things and publish it as rapidly as you can."

He replied, but did not answer these questions, neither does he intend to publish his findings this year. So at present I have no reasons to doubt that his original clear statements as quoted in the main text of the article were essentially correct and that Gould's verdict quoted on page 1 of the present article in accord with the answers of the other giraffe specialists, is still up-to-date.

But let's assume for a moment that there once existed say 2 or 3 further mosaic forms with some intermediary features: Would that prove the synthetic theory to be the correct answer to the question of the origin of the long-necked giraffes? As the quotation of Kuhn shows (see p. 20 above) that would be circular reasoning as long as the problem of the causes of such similarities and differences have not been scientifically clarified (just *assuming* mutations and selection is not enough). In 1990 and 1991, I wrote:

Since roughly half of the extant genera of mammals have also been detected as fossils (details see <http://www.weloennig.de/NeoB.Ana4.html>), one might – as a realistic starting point to solve the question of how many genera have existed at all – double the number of the fossil forms found. Thus, there does not seem to exist a larger arithmetical problem to come to the conclusion that by also doubling the intermediate fossil genera so far found (which represent in reality most often mosaics) one cannot bridge the huge gaps between the extant and fossil plant and animal taxa.

However, from this calculation it seems also clear that in many plant and animal groups further mosaic forms (but not genuine intermediates) will most probably be found, which will nevertheless – on evolutionary presuppositions – be interpreted as connecting links. Since the quality of the fossil record is often different for different groups (practically perfect concerning the genera in many of the cases mentioned by Kuhn above, but in other groups imperfect), it is not easy to make definite extrapolations for the giraffes. My impression is, however, that with about 30 fossil genera already found (only *Giraffa* and *Okapia* still extant), the number still to be discovered might be rather low (generously calculated perhaps a dozen further genera may be detected by future research). As to the origin of the long-necked giraffes one may dare to make the following predictions on the basis that at least about half of the giraffe genera have been detected so far:

(a) **A gradual series of intermediates** in Darwin's sense (as quoted above on page 3) **has never existed and hence will never be found.**

(b) Considering *Samotherium* and *Palaeotragus*, which belong to those genera which appear to display (to use the words of Dr. X) "some differences in the short vertebrae", a few further such mosaics might be discovered. As mosaics they will **not** unequivocally be "connecting any of the fossil taxa [so far known] to *Giraffa*". Nevertheless gradualists would as triumphantly as ever proclaim them to be new proofs of their assumptions (thus indicating that hardly any had been detected before).

(c) The duplication of a cervical vertebra excludes by definition a gradual evolution of this step – by whatever method the giraffes were created.

Note of 9 October 2008 (last modified 16 November 2008): Ever since the present article appeared online, some evolutionists seem to have been eagerly looking for "missing links" or transitional forms and recently they claimed to have found one (see, for example, <http://www.conservapedia.com/Giraffe> and Note below*). ***If true, it would show how extraordinarily***

fruitful the present article has been for scientific research. However, there is strong reason to doubt that the neck of this so far **un**published fossil specimen "is a perfect intermediate between the short-neck ancestors and their long-neck descendants". For the time being, the main reason is that some of long-necked forms are most probably *older* than this fossil "link" (a candidate fossil link should come at least from the *Middle Miocene*, and not be described "from the late Miocene and early Pliocene"). Remember, please, that – as stated on page 13 – according to Carroll (1988/1993, p. 629) **the first fossil evidence for the genus *Giraffa* is from the Middle Miocene.** And this is corroborated by fossils of *Giraffa priscilla* from the *Middle Miocene of Ramnagar*, India (Basu 2004, see Note ^(2a1) in the second part of the paper). Thus, the fossil with its 'perfectly intermediate neck' cannot be in the assumed phylogenetic lineage leading to the long-necked giraffes.

Also, both long-necked giraffes and the species with its 'perfectly intermediate neck' lived contemporaneously for millions of years like many other presumed ancestors of the giraffe with some intermediary features (see the figure on page 10 in Part 2).

Another question could be: Does the fossil whose neck is thought to be a "perfect intermediate..." (see above) have 7 or 8 cervical vertebrae?*

Moreover, except for the assertion concerning the neck just quoted, a description of the other parts of the unpublished fossil animal is not known to me; yet a mosaic-like combination of the neck with uniquely derived (autapomorphic, 'new-featured') characters not fitting into the presumed giraffe line may exclude it from the long-necked giraffe's ancestry *per se* (as is usually the case with "missing links" or "transitional forms"). Hence, this question has to be carefully investigated too.

As for possibilities and predictions of 2006 concerning intermediate forms mentioned in the present paper ("2 or 3 further mosaic forms with some intermediary features" in the 'right' geological strata, but **no continuous series in Darwin's sense** and "as mosaics they will **not** unequivocally be "connecting any of the fossil taxa to *Giraffa*"), see here pp. 22 and 23, and Part 2 (2007), pp. 6-11, 24-25, 28, 33-48. Considering the facts and arguments presented on these pages, there is, in principle, *nothing new* with another relatively small adult giraffe-like animal, which is, geologically speaking, *younger* than the long-necked giraffes (see, for instance, the pygmy-giraffes mentioned above and in Part 2 of the paper, pp. 7, 24, 34, 54 and, perhaps in part, also the zoo giraffes referred to in Part 2 as well (p. 84), not to speak of the females and young ones). However, if the fossil find with the intermediate neck *were older* than the long-necked giraffes, than it could be a good candidate for my prediction of "2 or 3 further mosaic forms with some intermediary features" – here especially the (7 or 8) shorter neck vertebrae – in the 'right' geological strata, granted that it would be an adult male animal, or at least the sexual dimorphism could be taken into account, and that the factor 'modification' could be neglected.

And, of course, an absolutely ingenious and prolific mind having generated and sustaining the laws of physics (as, for example, also many nobel laureates of science have inferred for the origin of the universe: <http://www.weloennig.de/Nobelpreistraeger.pdf>), has the potential to create as many mosaic forms with some intermediary characters as are imaginable within functional limits, front-loaded or otherwise, but hardly so by "infinitesimally small inherited variations", "steps not greater than those separating fine varieties" and "insensibly fine steps", "for natural selection can act only by taking advantage of slight successive variations; she can never take a leap, but must advance by the shortest and slowest steps" – see Darwin as quoted on p. 3 above in agreement with the basic assumptions of modern neo-Darwinism ("Macroevolution ... is composed of numerous small microevolutionary steps (additive typogenesis)" or of "uncountable successive small microevolutionary steps...." – see the details above).

So this is what the synthetic theory really needs to prove its case for the giraffidae: many continuous series in Darwin's sense, not isolated genera with some intermediary features appearing as late as or later than the long-necked giraffes and living contemporaneously with them for millions of years.

The reason or basis for the absence of such continuous series may consist in the functional limits due to the law of correlation (Cuvier) on almost all biological levels, and to the related law of

recurrent variation concerning mutagenesis (<http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf>) corroborating Cuvier's insights. He defined the law of correlation as follows:

"Every organized being constitutes a whole, a single and complete system, whose parts mutually correspond and concur by their reciprocal reaction to the same definitive end. None of these parts can be changed without affecting the others; and consequently each taken separately indicates and gives all the rest."

<http://aleph0.clarku.edu/huxley/comm/ScPr/Falc.html> (See the French original text below.***)

Living beings are, in fact, highly integrated, functional systems (all parts being correlated with limited space or tolerance concerning functional variation), which permits microevolution generating intermediate forms to a certain extent, but precludes infinite transformations. The law of correlation can be illustrated by Pierre Paul Grassé's remark on the eye as follows:

"In 1860 Darwin considered only the eye, but today he would have to take into consideration all the cerebral connections of the organ. The retina is indirectly connected to the striated zone of the occipital lobe of the cerebral hemispheres: Specialized neurons correspond to each one of its parts – perhaps even to each one of its photoreceptor cells. The connection between the fibers of the optic nerve and the neurons of the occipital lobe in the geniculite body is absolutely perfect."

As to the eye, see please <http://www.weloennig.de/AuIn.html>. We have seen on pp. 9 and 10 above, how the law of correlation is also relevant for the long-necked giraffes as coadaptation/synorganization.

Every **intermediate macroevolutionary step** would thus necessitate the coordinated change of many genes and physiological and anatomical functions. How much faith is required to believe that random ('micro'-)mutations could really afford this task? What about intelligent design to implement such or similar steps?

Another point: Prof. W. R. Thompson made the following instructive comment on intermediates in his introduction to Darwin's *Origin of Species* on the geographic level, properly applying this insight also to paleontology (1967, p. xix):

"As the range of our collections extends, so we invariably enrich our representation of various groups, and this **necessarily and inevitably entails the appearance of intermediates between the forms in the collection** from the restricted area in which we started. The recognition of this fact, with respect to the collections of organisms existing here and now, **does not necessarily commit us to any particular view of the origin of species**; and the same thing is true of the collection of fossil material."

Morphologic space within families like the giraffidae is not infinite and thus unavoidably entails the existence of at least some 'intermediates' (more exactly, 'mosaic forms') in any family with a plethora of genera and species, whatever their cause of origin. To a certain extent this appears to be true also for some higher taxonomic entities. Yet, as Thompson aptly stated on p. xvi of his introduction:

"On the Darwinian theory, evolution is essentially undirected, being the result of natural selection, acting on small fortuitous variations. The argument specifically implies that **nothing is exempt from this evolutionary process**. Therefore, **the last thing we would expect on Darwinian principles is the persistence of a few common fundamental structural plans** [the phyla and within them the many equally well defined subordinate groups]. Yet, this is what we find."^o

Hence, a general assertion of a "perfect intermediate"^v for the neck of the giraffe to prove Darwin's idea of evolution by "insensibly fine steps" etc. without the indispensable scientific discussion of the details and objections mentioned above, may be quite useful for propagandistic purposes on the false premise that only a mindless process could be responsible for its origin^x, but is *definitely insufficient and unqualified on the scientific level*. Let us hope that an unbiased, profound and critical scientific report on the fossil find will follow soon.

*Donald Prothero: *What missing link?* New Scientist, 27 February/1 March 2008, pp. 35-41. On page 35 we read: "Darwin's 1859 prediction that transitional forms would be found was quickly confirmed." Yet, Prothero qualifies the term "transitional form" as follows: "A transitional form need not to be a perfect halfway house directly linking one group of organisms to another. It merely needs to record aspects of evolutionary change that occurred as one lineage split from another".

However, according to the same author, the situation seems to be somewhat different in the case of the giraffe, for he answers the question "**How did the giraffe get its long neck?**" with the ensuing sentences (p. 40): "This question has puzzled biologists as far back as the early 18th century naturalist Jean-Baptiste Lamarck, who famously – and wrongly – speculated that the giraffe's ancestors had stretched their necks in search of food and passed this "acquired characteristic" onto their offspring."

Here Prothero omits to mention that Darwin speculated in a similar way as follows (*Origin of Species*, 1872/1967, pp. 24/25):

"**Changed habits produce an inherited effect** as in the period of the flowering of plants when transported from one climate to another. **With animals the increased use or disuse of parts has had a more marked influence.** The great and inherited development of the udders in cows and goats in countries where they are habitually milked, in comparison with these organs in other countries, is probably another instance of the effect of use. Not one of our domestic animals can be named which has not in some country drooping ears; and the view which has been suggested that **the drooping is due to the disuse of the muscles of the ear**, from animals being seldom alarmed, **seems probable.**"

And concerning the origin of the giraffe, Darwin combined natural selection with "the inherited effects of the increased use of parts" (p. 202):

"...natural selection will preserve and thus separate all the superior individuals, allowing them to intercross, and will destroy all the inferior individuals. By this process long continued, which exactly corresponds with what I have called unconscious selection by man, *combined no doubt in a most important manner with the inherited effects of the increased use of parts*, it seems to me almost certain that an ordinary hoofed quadruped might be **converted into a giraffe.**"

Prothero continues: "The giraffe fossil record is fairly good, with a wide variety of species known from the Miocene. These sported a range of weirdly shaped horns, but all had short necks rather like that of the only other living species of giraffid, the okapi. Only in the late Miocene do we see the fossils of long-necked giraffes. Like modern giraffes, they have an extra vertebra in the neck - recruited from the back - and lengthened neck vertebrae.

Until recently, there was no fossil evidence **linking the long-necked giraffes to their short-necked relatives.** But as my book went to press, news emerged that Nikos Solounias of the New York Institute of Technology had described [but not yet published] a fossil giraffe from the late Miocene and early Pliocene. **Its neck is a perfect intermediate between the short-neck ancestors and their long-neck descendants**" (emphasis added).

Thus, Prothero's message clearly is: Now we have, indeed, fossil evidence (although unpublished so far) **linking** the long-necked giraffes to their short-necked relatives. If the neck were a "perfect intermediate" ("a perfect halfway house", which may be doubted for the reasons given above) – what about all the other features of the animal? (See the facts and arguments concerning coadaptation/synorganization listed on pp. 4, 9, and 10.)

Also, Prothero's assertion that "A transitional form ... merely needs to record aspects of evolutionary change that occurred as one lineage split from another" presupposes much of the neo-Darwinian worldview of continuous evolution and is at odds with, for example, T. H. Huxley's drawing of a hypothetical intermediate link between dinosaurs and birds, displaying an entire range of intermediate characters.

**If, however, V8 (see Part 2, p. 15) displayed further intermediate features, Lankester's hypothesis that this neck vertebra was only a "cervicalized" thoracic would be reinforced.

***"Tout être organisé forme un ensemble, un système unique et clos, dont les parties se correspondent mutuellement, et concourent à la même action définitive par une réaction réciproque. Aucune de ces parties ne peut changer sans que les autres changent aussi; et par conséquent chacune d'elles, prise séparément, indique et donne toutes les autres" (Cuvier 1825): <http://records.viu.ca/~johnstoi/cuvier/cuvier-f12.htm>. There are several English translations. This one is also fine: "Every organized being forms a whole, a unique and closed system, in which all the parts correspond mutually, and contribute to the same definitive action by a reciprocal reaction. None of its parts can change without the others changing too; and consequently each of them, taken separately, indicates and gives all the others." http://www.ansp.org/museum/jefferson/otherPages/cuvier_revolutions.php

Similarly the botanist Antoine-Laurent de Jussieu stated (1789): "C'est dans cette dépendance mutuelle des fonctions, et ce secours qu'elles se prêtent réciproquement, que sont fondées les lois qui déterminent les rapports de leurs organes, et qui sont d'une nécessité égale à celle des lois métaphysiques ou mathématiques: car il est évident que l'harmonie convenable entre les organes qui agissent les uns sur les autres, est une condition nécessaire de l'existence de l'être auquel ils appartiennent, et que si une de ses fonctions étoit modifiée d'une manière incompatible avec les modifications des autres, cet être ne pourroit pas exister" (quoted according to evolutionist Jean-Pierre Gasca (2006): Cent ans après Marey: Aspects de la morphologie fonctionnelle aujourd'hui, *Comptes Rendus Palevol* 5, 489-498). **Any scientist who has ever systematically worked with mutants will immediately be able to give a range of examples corroborating this verdict.**

^o See also <http://www.weloennig.de/AesVIII2.html> and the following chapter, and this paper, Part 2, p. 57.

^v As implied by the text above, this would also be true for a general assertion concerning **several** of such "intermediate" genera. What Darwinism needs to prove its case for the giraffidae and other families are 'unmistakable species-to-species transitions' etc. (see above pp. 11, 15/16, 19).

^x For example, in his book *The Great Chain of Being* Arthur Lovejoy (1936/1964) has carefully documented the fact that for about 2,000 years any newly discovered intermediate link (real or imagined) was viewed to be another powerful proof for the truth of the entirely static Platonic world view ("the immutable essences of things", Lovejoy p. 34) for many philosophers and naturalists alike. And "the safest general characterization of the European philosophical tradition is that it consist in a series of footnotes to Plato" – Whitehead according to Lovejoy, p. 24.

Lovejoy pp. 50/51 on Plato's myths, whose implications were taken seriously even by high-ranking intellectuals like Gottfried Wilhelm Leibniz: "To the ... question – **How many kinds of temporal and imperfect beings must this world contain?** – the answer follows the same dialectic: **all possible kinds**. The "best soul" could begrudge existence to nothing that could conceivably possess it, and "desired that all things should be as like himself as they could be." "All things" here could consistently mean for Plato nothing less than the sensible counterparts of every one of the Ideas; and, as Parmenides in the dialogue bearing his name (I3oc, e) reminds the young Socrates, there are in the World of Ideas the essences of all manner of things, even things paltry or ridiculous or disgusting. In the *Timaeus*, it is true, Plato speaks chiefly of "living things" or "animals"; but with respect to these, at least, he insists upon the necessarily complete translation of all the ideal possibilities into actuality. It must not, he says, "be thought that the world was made in the likeness of any Idea that is merely partial; for nothing incomplete is beautiful. We must suppose rather that it is the perfect image of the whole of which all animals – both individuals and species – are parts. For the pattern of the universe contains within itself the intelligible forms of all beings just as this world comprehends us and all other visible creatures. For the Deity, wishing to make this world like the fairest and most perfect of intelligible beings, **framed one visible living being containing within itself all other living beings of like nature**," that is temporal and sensible. ... It is because the created universe is an exhaustive replica of the World of Ideas that Plato argues that there can be only one creation; it includes the copies "of all other intelligible creatures," and therefore there is, so to say, nothing left over in the model after which a second world might be fashioned. So, in the form of a myth, the story of the successive creation of things is told. After all the grades of immortal beings have been generated, the Demiurgus notes that mortals still remain uncreated. This will not do; if it lack even these the universe will be faulty, **"since it will not contain all sorts of living creatures, as it must do if it is to be complete."** In order, then, that "the Whole may be really All," the Creator [in distinct contrast to Genesis 1 und 2, note also the offer for everlasting life to the first human pair; – for further differences see <http://en.wikipedia.org/wiki/Timaios>] deputed to the lesser divinities who had already been brought into being the task of producing mortal creatures after their kinds. And thus "the universe was filled completely with living beings, mortal and immortal," and thereby became "a sensible God, which is the image of the intelligible – the greatest, the best, the fairest, the most perfect." In short, Plato's Demiurgus acted literally upon the principle in which common speech is wont to express the temper not only of universal tolerance but of comprehensive approbation of diversity that **it takes all kinds to make a world.**"

The following exposition of Lovejoy (pp. 231-233) on the application of Plato's ideas in science reads to a large extent like the program of modern evolutionary biology:

"Even for those biologists [of the eighteenth century] who did not explicitly reject the belief in natural species, the principle of continuity was not barren of significant consequences. It set naturalists to **looking for forms which would fill up the apparently "missing links" in the chain**. Critics of the biological form of this assumption attacked it largely on the ground that many links which the hypothesis required *were* missing. But **the more accepted view was that these gaps are only apparent**; they were due, as Leibniz had declared, "only to the incompleteness of the knowledge of nature then attained, or to the minute size of many of the — presumably lower — members of the series. The metaphysical assumption thus furnished a program for scientific research. It was therefore highly stimulating to the work of the zoologist and the botanist, and especially to that of the microscopist, in the eighteenth century. Every discovery of a new form could be regarded, not as the disclosure of an additional unrelated fact in nature, but as a step towards the completion of a systematic structure of which the general plan was known in advance, an additional bit of empirical evidence of the truth of the generally accepted and cherished scheme of things. Thus the theory of the Chain of Being, purely speculative and traditional though it was, had upon natural history in this period an effect somewhat similar to that which the table of the elements and their atomic weights has had upon chemical research in the past half-century. The general program of the Royal Society, wrote its first historian (1667), in an interesting passage in which Platonistic and Baconian motives are conjoined, was **to discover unknown facts of nature in order to range them properly in their places in the Chain of Being**, and at the same time to make this knowledge useful to man.

Such is the dependence amongst all the orders of creatures; the animate, the sensitive, the rational, the natural, the artificial; that the apprehension of one of them, is a good step towards the understanding of the rest. And this is the highest pitch of humane reason: **to follow all the links of this chain**, till all their secrets are open to our minds; and their works advanc'd or imitated by our hands. This is truly to

command the world; to rank all the varieties and degrees of things so orderly upon one another; that standing on the top of them, we may perfectly behold all that are below, and make them all serviceable to the quiet and peace and plenty of Man's life. And to this happiness there can be nothing else added: but that we make a second advantage of this rising ground, thereby to look the nearer into heaven...¹²

The *Encyclopedie* in the middle of the eighteenth century also, though in a less devout tone, dwelt upon this as the program of the advancement of knowledge: Since **"everything in nature is linked together,"** since "beings are connected with one another by a chain of which we perceive some parts as continuous, though in the greater number of points the continuity escapes us," the "art of the philosopher consists in adding new links to the separated parts, in order to reduce the distance between them as much as possible. But we must not flatter ourselves that gaps will not still remain in many places." It was, in the eyes of the eighteenth century, a great moment in the history of science when Trembley in 1739 rediscovered the fresh-water polyp *Hydra* (it had already been observed by Leeuwenhoek), this creature being at once hailed as the **long-sought missing link between plants and animals** – for which Aristotle's vague zoophytes were no longer considered quite sufficient. This and similar discoveries in turn served to strengthen the faith in plenitude and continuity as *a priori* rational laws of nature; and the greater credit, it was some-times remarked, was due to those who, not having seen, yet had believed in these principles. The chief glory, said a German popularizer of science, *à propos* of Trembley's work, is that "of the German Plato [Leibniz], who did not live to know of the actual observation" of this organism, "yet through his just confidence in the fundamental principles which he had learned from nature herself, had predicted it before his death."

The quest of organisms not yet actually observed which would fill these lacunae was prosecuted with especial zeal at two points in the scale: near the bottom of it, and in the interval between man and the higher apes. "Nature," remarked Bonnet, "seems to make a great leap in passing from the vegetable to the fossil [i. e., rock]; there are no bonds, no links known to us, which unite the vegetable and the mineral kingdoms. But shall we judge of the chain of beings by our present knowledge? **Because we discover some interruptions, some gaps in it here and there, shall we conclude that these gaps are real?** ...The gap that we find between the vegetable and the mineral will apparently some day be filled up. There was a similar gap between the animal and the vegetable; the polyp has come to fill it and to demonstrate the **admirable gradation there is between all beings.**"

But the program of discovering the hitherto unobserved links in the chain played a part of especial importance in the beginnings of the science of anthropology."

Now, the creationist assumption that there are no mosaic forms with some intermediate characters is as false as the evolutionary and Platonic views of the (living) world that there are only intermediates. The gaps at least between the higher systematic categories are real, but in many cases the distances are definitely not as large as once assumed by many creation scientists and on the genetic level also by almost all evolutionists (see the topic "genetic conservation" in <http://www.weloennig.de/DynamicGenomes.html>). Evidently, there was (and is) much more elegant simplicity, unity and order in complexity as well as an unfathomable abundance of thoughts in the ingenious and prolific mind of the Designer than humans have imagined or can ever envisage (Psalm 139: 17-18).

[End of note of 9 October 2008 \(last modified 16 November 2008\).](#)

(2) "However, bird flu actually exists. Concerning evolution, on the other hand, one is looking for a black cat in a dark room, where, in reality, there is no cat at all, yet one continually yells: I have found it." – Remarks of Dr. Werner Gieffers.

(2a) Dietrich Starck 1995, p. 206: "...in giraffes the blood pressure in arteries near the heart is very high (systolic 260-350 mm Hg), in the brain arteries however it is more or less the same level as in short-necked hoofed animals (130 mm Hg). The high pressure in the carotid (heart) arteries is necessary in order to overcome the large hydrostatic differences in the standing animal (3 m neck length). The drop of pressure in the brain blood vessels is achieved by the *rete mirabile* in the carotid arteries, which serves as a protection mechanism for the brain."

(2b) Wesson 1991, p. 226: "...an important part of the adaptation of the giraffe would have been protogiraffes' copying one another in stretching toward higher leaves, and this would promote the selective process favoring longer-necked mutants. This still leaves a lot for natural selection to explain. The protogiraffe had not only to lengthen neck vertebrae (fixed at seven in mammals [but with some exceptions, including the giraffe with its 8 neck vertebrae; my note]) but to make many concurrent modifications: the head, difficult to sustain atop the long neck, became relatively

smaller; the circulatory system had to develop pressure to send blood higher; valves were needed to prevent overpressure when the animal lowered its head to drink; big lungs were necessary to compensate for breathing through a tube 10 feet long; many muscles, tendons, and bones had to be modified harmoniously; the forelegs were lengthened with corresponding restructuring of the frame; and many reflexes had to be reshaped. All these things had to be accomplished in step, and they must have been done rapidly because no record has been found of most of the transition. That it could all have come about by synchronized random mutations strains the definition of random. The most critical question, however, is how the original impetus to giraffeness – and a million other adaptations – got started and acquired sufficient utility to have selective value (John and Miklos 1988, 236)."

For additional examples clarifying Wessons "most critical question" see Markus Rammerstorfer <http://members.aon.at/evolution/gererk.html>

As to further remarkable features of the long-necked giraffe, R. Peachey quotes Lynn Hofland as follows:

"Equally marvellous is the fact the blood does not pool in the legs, and a giraffe does not bleed profusely if cut on the leg. The secret lies in an extremely tough skin and an inner fascia [fibrous connective tissue] that prevents blood pooling. This skin combination has been studied extensively by NASA scientists in their development of gravity-suits for astronauts. Equally helpful to prevent profuse bleeding is that all arteries and veins in the giraffe's legs are very internal. The capillaries that reach the surface are extremely small, and the red blood cells are about one-third the size of their human counterparts, making capillary passage possible. It quickly becomes apparent that these unique facets of the giraffe are all interactive and interdependent with its long neck. But there's more. The smaller red blood cells allow for more surface area and a higher and faster absorption of oxygen into the blood. This helps to retain adequate oxygen to all extremities, including the head."

(2c) The Bible: according to Hebrews 11:1, modified by Lunn. The King James Version of 1611 translates: "Now faith is the substance of things hoped for, the evidence of things unseen." Modern translations give the original text more accurately, for example: "Faith is the assured expectation of things hoped for, the evident demonstration of realities though not beheld" (NW).

(2c1) und (2c2): For unknown reasons these Spanish internet sites or links cannot be opened any more. This is also true for the Spanish researcher quoted on page 5 of the present paper, for which I intended to set a link in the list of references in the second part on the evolution of the long-necked giraffe (the original quotation read: "Probablemente la familia de los girafídeos evolucionó de los *Climacoceras*;...").

(2d) Boundaries for the Middle Miocene according to Hardland et al. (1990) und Kearey (ed.) (1993). Kearey differs slightly from these data setting the limits at 16,2 and also 10,4 million years respectively (p. 401, Fig. M14 Miocene). However, Robert A. Rohde's numbers for the Middle Miocene are 15,97 and 11,608 million years (see <http://www.stratigraphy.org/geowhen/stages/Miocene.html>, last update 2005). Yet, these numbers may again not be the last word in this matter. Nevertheless this recent redating may also raise the maximum age for *Bohlinia* – a question which needs further investigation. If the dates presented by Rohde for the boundaries of the Middle Miocene were correct as well as the maximum age given so far for *Bohlinia*, this genus would approach the Middle Miocene but not be represented there.

(3) Regarding *Bohlinia*, see the citation on page 5 of the present article (2006) as well as Hamilton (1978, p. 212): "...Post-cranial material of *B. attica* is figured by Gaudry (1862-7) and the synonymy between Gaudry's species *Camelopardalis attica* and *B. attica* is indicated by Bohlin (1926, p. 123). This species has limb bones that are as long and slender as those of *Giraffa*. *Bohlinia* is more advanced than *Honanotherium* in features of the ossicones and is therefore identified as the sister-genus of *Giraffa*." Denis Geraads writes (1986, p. 474): "*Giraffa* (y compris les espèces fossiles) et *Bohlinia* possèdent quelques caractères crâniens communs (Bohlin 1926); l'allongement et les proportions des membres sont très semblable (Geraads 1979). Les deux genre sont manifestement très voisins et leur appendices crâniens selon toute vraisemblance homologues (ossicônes)."

The recurrent laryngeal nerve (Supplement 26 August 2010 and 29 September 2010): Much ado has been made in recent years by evolutionists like Richard Dawkins, Jerry Coyne, Neil Shubin, Matt Ridley and many others about the *Nervus laryngeus recurrens* as a "proof" or at least indisputable evidence of the giraffe's evolution from fish (in a gradualist scenario over millions of links, of course): Markus Rammerstorfer has written a (scientifically detailed and convincing) synoptic critique on this old and, in fact, already long disproved evolutionary interpretation of the course of this nerve in 2004 (see Rammerstorfer <http://members.liwest.at/rammerstorfer/NLrecurrens.pdf>). There are several main points which I would like to mention here:

1. As to the evolutionary scientists just mentioned: A totally nonsensical and relictual misdesign would be a severe contradiction in their own neo-Darwinian (or synthetic evolutionary) world view. Biologist and Nobel laureate Francois Jacob described this view on the genetic level as follows: "The genetic message, the programme of the present-day organism ... resembles a text without an author, that a proof-reader has been correcting for more than two billion years, *continually improving, refining and completing it, gradually eliminating all imperfections.*" The result in the Giraffe? Jerry Coyne: "One of nature's *worst designs* is shown by the recurrent laryngeal nerve of mammals. Running *from the brain to the larynx*, this nerve helps us to speak and swallow. The curious thing is that *it is much longer than it needs to be*" (quoted according to Paul Nelson 2009). And: "...it *extends down the neck to the chest...* and then runs back up the neck to the larynx. In a giraffe, that means a 20-foot length of nerve where 1 foot would have done" (Jim Holt in the *New York Times*, 20 February 2005: <http://www.nytimes.com/2005/02/20/magazine/20WWLN.html>). "Obviously a ridiculous detour! No engineer would ever make a mistake like that!" – Dawkins 2010 (see below) (All italics above mine.)

Apart from the facts that the nerve *neither runs from the brain to the larynx nor extends down from the neck to the chest* ("On the *right* side it arises from the vagus nerve in front of the first part of the subclavian artery;..." "On the *left* side, it arises from the vagus nerve on the left of the arch of the aorta..." – Gray's Anatomy 1980, p. 1080; further details (also) in the editions of 2005, pp. 448, 644, and of 2008, pp. 459, 588/589), the question arises: *why did natural selection not get rid of this "worst design" and improve it during the millions of generations and mutations from fish to the giraffe onwards?* Would such mutations really be impossible?

2. The fact is that even in humans in 0.3 to 1% of the population the *right* recurrent laryngeal nerve is indeed shortened and the route abbreviated in connection with a retromorphosis of the fourth aortic arch. ("An unusual anomaly ... is the so-called 'non-recurrent' laryngeal nerve. In this condition, which has a frequency of between 0.3 – 1%, only the right side is affected and it is always associated with an abnormal growth of the right subclavian artery from the aortic arch on the left side" – Gray's Anatomy 2005, p. 644.; see also Uludag et al. 2009 <http://casereports.bmj.com/content/2009/bcr.10.2008.11107.full>; the extremely rare cases (0.004% to 0.04%) on the left side appear to be always associated with *situs inversus*, thus still "the right side"). Nevertheless, even in this condition its branches still innervate the upper esophagus and trachea (but to a limited extent?). Although this variation generally seems to be without severe health problems, it *can* have catastrophic consequences for the persons so affected: problems in deglutition (difficulties in swallowing) and respiratory difficulties (troubles in breathing) (see Rammerstorfer 2004; moreover "*dysphagia* (if the *pharyngeal and oesophageal branches* of nonrecurrent or recurrent inferior laryngeal nerve are injured)" – Yang et al, 2009: <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=5868576>).

If mutations for such a short cut are possible and regularly appearing even in humans (not to mention some other non-shorter-route variations), – according to the law of recurrent variation (see Lönnig 2005: <http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf>, 2006: http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf), they must have occurred already millions of times in all mammal species and other vertebrates taken together from the Silurian (or Jurassic respectively) onwards. *And this must also be true for any other* (at least residually) *functionally possible shorter variations of the right as well as of the left recurrent laryngeal nerve.* Inference: All these 'short-cut mutations' were regularly counter-selected due to at least some disadvantageous and unfavourable effects on the phenotype of the so affected individuals (including any such mutants in the giraffes). Hence, they never had a chance to permeate and dominate a population except for the above mentioned very small minority of the (right) 'non-recurrent' laryngeal nerve, which is perhaps already accounted for by the genetic load ("The embryological nature of such a nervous anatomical variation results originally from a vascular disorder, named *arteria lusoria* in which the fourth right aortic arch is abnormally absorbed, being therefore unable to drag the right recurrent laryngeal nerve down when the heart descends and the neck elongates during embryonic development." Defechereux et al. 2000: <http://www.ncbi.nlm.nih.gov/pubmed/10925715>). Thus, even from a neo-Darwinian point of view, important additional functions of the *Nervus laryngeus recurrens* should be postulated and looked for, not to mention the topic of embryological functions and constraints.

3. However, just to refer to one possible substantial function of the *Nervus laryngeus recurrens* sinister during embryogenesis: "The vagus nerve in the stage 16 embryo is very large in relation to the aortic arch system. The recurrent laryngeal nerve has a greater proportion of connective tissue than other nerves, making it more resistant to stretch. It has been suggested that *tension applied by the left recurrent laryngeal nerve as it wraps around the ductus arteriosus could provide a means of support that would permit the ductus to develop as a muscular artery*, rather than an elastic artery" – Gray's Anatomy, 39th edition 2005, p. 1053.

4. Yet, implicit in the ideas and often also in the outright statements of many modern evolutionists like the ones mentioned above is the assumption that the only function of the *Nervus laryngeus recurrens sinister* (and *dexter*) is innervating the larynx and nothing else. Well, is it asked too much to state that they should really know better? In my copy of the 36th edition of Gray's Anatomy we read (1980, p. 1081, similarly also in the 40th edition of 2008, pp. 459, 588/589):

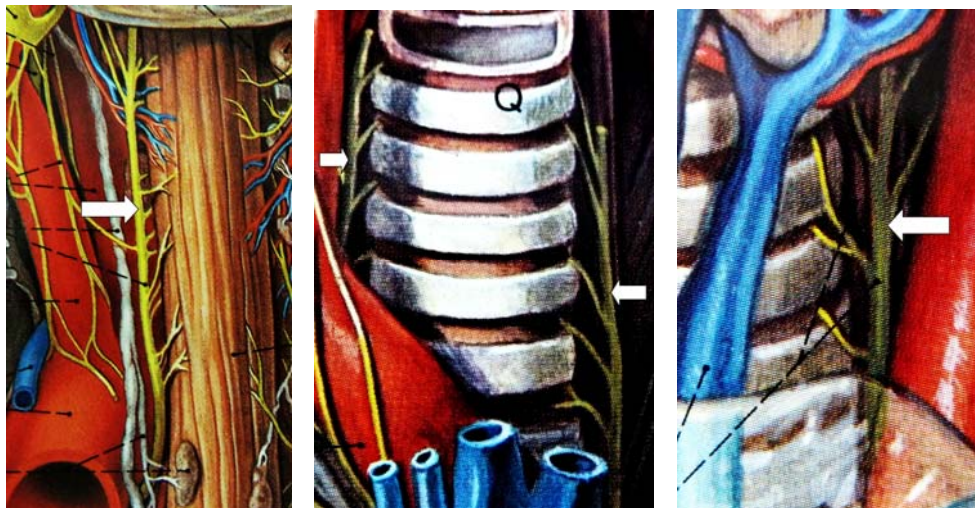
"As the recurrent laryngeal nerve curves around the subclavian artery or the arch of aorta, it gives *several cardiac filaments to the deep part of the cardiac plexus*. As it ascends in the neck *it gives off branches, more numerous on the left than on the right side, to the mucous membrane and muscular coat of the oesophagus; branches to the mucous membrane and muscular fibers of the trachea* and some filaments to the inferior constrictor [Constrictor pharyngis inferior]."

Likewise Rauber/Kopsch 1988, Vol. 4, p. 179, *Anatomie des Menschen*: "Äste des N. laryngeus recurrens ziehen zum *Plexus cardiacus* und zu *Nachbarorganen* [adjacent organs]." On p. 178 the authors of this *Anatomy* also mention in Fig. 2.88: "*Rr.* [Rami, branches] *tracheales und oesophagei des* [of the] *N. laryngeus recurrens*." – The mean value of the number of the branches of Nervus laryngeus recurrens sinister **innervating the trachea und esophagus** is **17,7** and for the Nervus laryngeus recurrens dexter is **10,5** ("Zweige des N. recurrens ziehen als Rr. cardiaci aus dem Recurrensbogen abwärts zum Plexus cardiacus – als *Rr. tracheales und oesophagei* zu oberen Abschnitten von Luft- und Speiseröhre, als N. laryngeus inferior durch den Unterrand des M. constrictor pharyngis inferior in den Pharynx. An der linken Seite gehen 17,7 (4-29) Rr. tracheales et oesophagei ab, an der rechten 10,5 (3-16)" – Lang 1985, p. 503; italics by the author(s)).

I have also checked several other detailed textbooks on human anatomy like *Sobotta –Atlas der Anatomie des Menschen*: they are all in agreement. Some also show clear figures on the topic.

To innervate the *esophagus and trachea* of the giraffe **and also reach its heart, the recurrent laryngeal nerve needs to be, indeed, very long**. So, today's evolutionary explanations (as is also true for many other so-called rudimentary routes and organs) are not only often in contradiction to their own premises but also tend to stop looking for (and thus hinder scientific research concerning) further important morphological and physiological functions yet to be discovered. In contrast, the theory of intelligent design regularly predicts further functions (also) in these cases and thus is scientifically much more fruitful and fertile than the neo-Darwinian exegesis (i.e. the interpretations by the synthetic theory).

To sum up: The *Nervus laryngeus recurrens* innervates not only the larynx, but also the esophagus and the trachea and moreover "gives several cardiac filaments to the deep part of the cardiac plexus" etc. (the latter not shown below, but see quotations above). It need not be stressed here that all mammals – in spite of substantial synorganized genera-specific differences – basically share the same *Bauplan* ("this infinite diversity in unity" – Agassiz) proving the same ingenious mind behind it all.



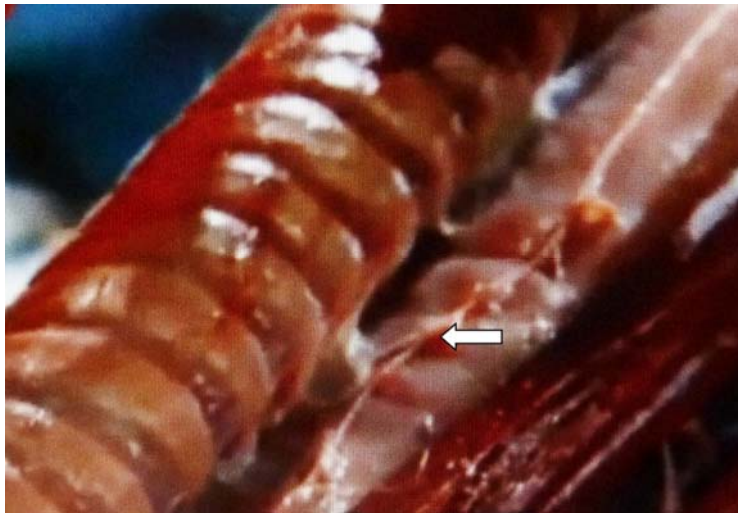
Left: Detail from a figure ed. by W. Platzer (enlarged, contrast reinforced, arrow added): In yellow beside the esophagus (see arrow): *Nervus laryngeus recurrens sinister* running parallel to the esophagus on left hand side with many branches innervating it (dorsal view).⁽¹⁾

Middle: Detail from a figure ed. by W. Platzer (enlarged, contrast reinforced, arrows added): Now on the right because of front view: *Nervus laryngeus recurrens sinister* and on the left *Nervus laryngeus recurrens dexter* (arrows) sending branches to the trachea.⁽²⁾

Right: Detail from a figure ed. by W. Platzer (enlarged, contrast reinforced, arrow added): Again on the right (arrow) because of front view: *Nervus laryngeus recurrens sinister* (as in the middle Figure, but more strongly enlarged), sending branches to the trachea.⁽³⁾

Fig. (1), (2) and (3): All three figures (details) from Werner Platzer (editor) (1987): *Pernkopf Anatomie, Atlas der topographischen und angewandten Anatomie des Menschen*. Herausgegeben von W. Platzer. 3., neubearbeitete und erweiterte Auflage. Copyright Urban & Schwarzenberg, München – Wien – Baltimore. Fig. (1): Detail from *Das Mediastinum von dorsal*, 2. Band. Brust, Bauch und Extremitäten, p. 83, Abb. 79. – Fig. 2: Detail from *Die prae- und paravertebralen Gebilde nach Entfernung des Eingeweidtraktes in der Ansicht von vorne*, 1. Band. Kopf und Hals, p. 344, Abb. 396, drawn by K. Endtresser 1951. – Fig. (3): Detail from *Topic der Pleuralkuppeln und des Halseingeweidtraktes in der Ansicht von vorne*, 1. Band. Kopf und Hals, p. 333, Abb. 388, drawn by F. Batke 1951.

As to the giraffe, direct evidence for more functions of the laryngeal nerve than just innervating the larynx and nothing else, was quite unintentionally provided by R. Dawkins and J. S. Reidenberg on YouTube (17 March 2010, but first shown on British TV in 2009, Channel 4) in their contribution *Laryngeal Nerve of the Giraffe Proves Evolution* (<http://www.youtube.com/watch?v=0cH2bkZfHw4>) showing directly some of the branches of the N. laryngeus recurrens innervating the esophagus and the trachea (see 2:09):



The Nervus laryngeus recurrens obviously displaying some of the branches innervating the esophagus and trachea in *Giraffa camelopardalis*. Photo of detail from the YouTube video of Dawkins (2010) *Laryngeal Nerve of the Giraffe Proves Evolution*: <http://www.youtube.com/watch?v=0cH2bkZfHw4>: 2:07/2:09 (arrow added; study, please, especially carefully the sequence of the pictures from 2:07 to 2:11).

Note, please, how Dawkins at 0:28 and later the anatomist Joy S. Reidenberg are unwarrantedly *equating the vagus nerve with the laryngeal nerve* in the video. Dr. Reidenberg in her explanations starting at 1:17 first says correctly about the N. laryngeus recurrens: "...It actually **starts out not as a separate nerve, but as a branch coming off of a bigger nerve called the vagus nerve** and this [*the vagus*] is going to keep running all the way down the body, so you can see it again over here all the way down the neck, on both sides. ... And this [*the vagus*] is going to wrap around the great vessels coming out of the heart. ... **So here is the vagus going down and here is the vagus continuing. And right over here, there is a branch, right there** [namely *the N. laryngeus recurrens* very near the great vessels coming out of the heart]. So it's looping and coming back, doing a U-turn all the way down here [at that point she seems to start equating the laryngeal with the vagus nerve]. So it [actually the *vagus*, not the laryngeal nerve] has travelled that entire distance to make a U-turn [and now concerning its *new branch, the laryngeal nerve*:] to go all the way back again.* And so we can follow it back up again. So we follow this branch. And if we look we see it again over here. Here it is. Like that [2:07; see above]. And here you see it going up, this is the voice box, the larynx. ...also coordinating breathing and swallowing in this area [yet, not only in this area!]. So this is a very important nerve. Interestingly, where it [*the laryngeal nerve*] ends is pretty close to where it started" [wrong; it really started *near the vessels coming out of the heart* – see above]. Reidenberg continues: "It started here coming out of the brain [totally wrong; this is where the *vagus nerve* started]. It really needs to go about two inches. But it [*the vagus nerve really*] went all the way down and it [*the laryngeal nerve*] came all the way back." Dawkins: "It is a beautiful example of historical legacy as opposed to design." And then Joy Reidenberg again: "This is not an intelligent design. An intelligent design would be to go from here to here."

Following that, an intelligent point was raised by Mark Evans, the veterinary surgeon and presenter of the film *Inside Nature's Giants: The Giraffe*, which was first shown at full length (48Mins) on Monday 9pm, 20 July 2009, on Channel 4 (a UK public-service television broadcaster): "It does kind of beg the question, even in an animal that might have been many millions of years ago with its head down here: why the route 'round the blood vessels, **unless there's a reason they were there to enervate something else**." This implicit question ("to enervate something else") was unjustifiably denied by Dawkins answering: "Well that was in earlier ancestors, then it was the most direct route. In fish." Etc. – followed by the typically inconsistent neo-Darwinian explanation (evolution 'continually improving, refining and completing the genetic message, eliminating all imperfections' (see above), yet stretching the laryngeal nerve for absolutely no functional reasons almost endlessly instead of ever finding a short cut etc.).

*To repeat: the vagus and not the laryngeal nerve has travelled all the distance and it is **its entirely new branch, the laryngeal nerve** (not the vagus) that goes all "the way back" innervating with many branches the heart, the larynx and the esophagus on its way. [Comments in brackets and footnote added by W-EL].

So is the recurrent laryngeal nerve really an “Obviously a ridiculous detour” etc. as Dawkins stated in the TV show 2009 and YouTube video 2010?

Wilhelm Ellenberger and Herrmann Baum sum up the multiple functions of that nerve in their *Handbook of Comparative Anatomy of Domestic Animals* as follows (only in German 1974/1991, p. 954, italics by the authors):

“Der N. recurrens führt die Hauptmasse der Vagusfasern für das Herz (HIRT 1934) und gibt sie vor Austritt aus der Brusthöhle an den *Plexus cardiacus* (s. unten und Abb. 1409). Er gibt außerdem Zweige an den in der präkardialen Mittelfellspalte zwischen Trachea und den großen Blutgefäßen gelegenen *Plexus trachealis caud.* Und steht mit dem Ggl. cervicale caud. des N. sympathicus in Verbindung. Nach seinem Austritt aus der Brusthöhle gibt der N. recurrens im Halsbereiche jederseits Zweige ab, die einen *Plexus trachealis cran.* bilden und *Rami oesophagici* und *Rami tracheales* an Muskulatur und Schleimhaut von Speise- und Luftröhre schicken. Im Kehlkopfbereich verbinden sich dünne Zweige von ihm mit solchen des N. laryngicus cran. (siehe dort).“

For me, personally, it is really impressive, how evolutionists like Dawkins, Coyne, Reidenberg and other 'intellectually fulfilled atheists' inform the public on such scientific questions in contrast to the facts cited above.

May I suggest that an unbiased scientific anatomical examination of the laryngeal nerve of the giraffe would have – as far as possible – included attention to and dissection of all the branches of the nerve, including the queries for the “several cardiac filaments to the deep part of the cardiac plexus”, the many “branches, more numerous on the left than on the right side, to the mucous membrane and muscular coat of the oesophagus” as well as the “branches to the mucous membrane and muscular fibers of the trachea” and perhaps even the “Rr. bronchiales” (Pschyrembel). So, when the opportunity arises, let’s do such a more comprehensive dissection of that nerve all over again – and add, perhaps, the research question on an irreducibly complex core system concerning the route and function of that nerve.

This seems to be all the more important since some of the observations by Sir Richard Owen made on the dissection of three young giraffes – two of them 3 years old and one about 4 years of age (one had died in the gardens of Regent’s Park and two at the Surrey Zoological Gardens) – seem to deviate from those of Dr. Reidenberg. Although the great anatomist Owen also made some mistakes in his work on other organisms (mistakes, which especially Thomas H. Huxley liked to stress), Owen’s findings on the giraffe should not be dismissed too easily. He writes (1841, pp. 231/232, italics his, bold in blue added as also the comment in brackets):

“From the remarkable length of the neck of the *Giraffe* the condition of the recurrent nerves became naturally a subject of interest: these nerves are readily distinguishable at the superior third of the *trachea*, but when sought for at their origin **it is not easy to detect them or to obtain satisfactory proof of their existence** [this comment seems to be in disagreement with what Dr. Reidenberg demonstrated by her dissection – she had no problems to detect it/them from the very beginning; also Owen’s following observations seem to disagree with those of Reidenberg’s to a certain extent]. Each nerve is not due, as in the short-necked *Mammalia*, to a single branch given off from the *nervus vagus*, which winds round the great vessels, and is continued of uniform diameter throughout their recurrent course, but it is formed by the reunion of **several small filaments derived from the *nervus vagus* at different parts of its course.**

The following is **the result of a careful dissection of the left recurrent nerve.** The *nervus vagus* as it passes down in front of the arch of the *aorta* sends off **four small branches**, which bend round the arch of the *aorta* on the left side of the *ductus arteriosus*; the **two small branches** on the left side pass to the *oesophagus* and are lost in the oesophageal *plexus*; **the remaining two branches** continue their recurrent course, and ascend upon the side of the *trachea*, **giving off filaments which communicate with branches from the neighbouring oesophageal nerves**: these recurrent filaments also receive twigs from the oesophageal nerves, and thus increase in size, and **ultimately coalesce into a single nerve of a flattened form**, which enters the *larynx* above the cricoid cartilage and behind the margin of the thyroid cartilage.” – (Similarly Owen 1868, p. 160.)

Nevertheless, Owen’s observations of filaments, which are given off by the recurrent nerve(s) are obviously in agreement with what Joy S. Reidenberg found, yet failed to mention and draw attention to explicitly (see above).

I have to admit that – the more deeply I am delving into the harmonious complexity of biological systems – the more elegant and functionally relevant the entire systems appear to me, even down to 'pernickety detail' (to use one of Dawkins' expressions), including the *Nervus laryngeus recurrens sinister* and the *Nervus laryngeus recurrens dexter* with their many branches and functions also in the giraffe and their correspondingly appropriate lengths.

Incidentally, Graham Mitchell's slip of the tongue or perhaps better his formulation from his innermost feelings in connection with his investigations of the giraffe's lungs and mechanism of respiration appears to be rather revealing (even if meant only figuratively): "It couldn't have been more beautifully designed ... [after a little pause] ... evolved" [laughter]. See this captivating dissection and investigation of the giraffe's lung here: http://channel.nationalgeographic.com/episode/inside-the-giraffe-4308/Photos#tab-Videos/07902_00

"Design should not be overlooked simply because it's so obvious" – Michael J. Behe 2005. May I repeat in this context that even from a neo-Darwinian perspective it would be very strange to assume that only the laryngeal nerve(s) could be "more beautifully designed" in contrast to all the rest which already is (see Francois Jacob above).

As to further discussions, including the quotation above of Jerry Coyne according to Nelson, see Paul Nelson (2009): Jerry, PZ, Ron, faithism, Templeton, Bloggingheads, and all that — some follow-up comments.

Notes added in proof

(29 September 2010 and 19 October 2010)

- a) The recurrent laryngeal nerves and most probably also some of their many branches usually missed/overlooked by leading neo-Darwinian biologists today, have been known *for more than 1800 years* now. See, for instance, E. L. Kaplan, G. I. Salti, M. Roncella, N. Fulton, and M. Kadowaki (2009): *History of the Recurrent Laryngeal Nerve: From Galen to Lahey* <http://www.springerlink.com/content/13340521q5723532/fulltext.pdf>.

"...it was Galen [ca. 129 to about 217 A. D.] who first described the recurrent laryngeal nerves in detail in the second century A. D." "He dissected these nerves in many animals – even swans, cranes, and ostriches because of their long necks..." "Because of Galen's fame and the spread of his teachings, the recurrent laryngeal nerve was discussed by many surgeons and anatomists thereafter." – Kaplan et al. 2009, pp. 387, 389, 390.

The keen observer Claudius Galenus [Galen] – having discovered, concentrating on and meticulously dissecting the recurrent laryngeal nerves of many different species of mammals and birds¹ – must necessarily also have seen at least some of the their branches leading to other organs as well. Yet, in agreement with Lord Acton's verdict that "The worst use of theory is to make men insensible to fact", not only many of today's neo-Darwinians but also Galen himself missed the altogether some thirty branches of the RLNs due to his own peculiar 'pulley-theory' (see again <http://www.springerlink.com/content/13340521q5723532/fulltext.pdf>). Margaret Tallmadge May comments in her translation of *Galen on the Usefulness of Parts of the Body* (1968, p. 371, footnote 62) on his assertion that "both [recurrent] nerves pass upward to the head of the rough artery [the trachea] without giving off even the smallest branch to any muscle...": "As Daremberg (in Galen [1854], I, 508]) intimates, *Galen is being ridden by his own theory here. The recurrent nerve does, of course, give off various branches as it ascends.*"

However, accepting the fact of the many branches given off by the recurrent laryngeal nerves innervating several other organs as well would have completely disproved Galen's own 'pulley-theory'² as it currently refutes the "ridiculous detour"-hypothesis of Dawkins and many other neo-Darwinians.

1 See some points written by Galen in the English translation of *On Anatomical Procedures, The later Books*, Translated by Duckworth (1962) under <http://books.google.de/books?hl=de&lr=&id=P508AAAAIAAJ&oi>, pp. 81-87 and especially pp. 203 ff.

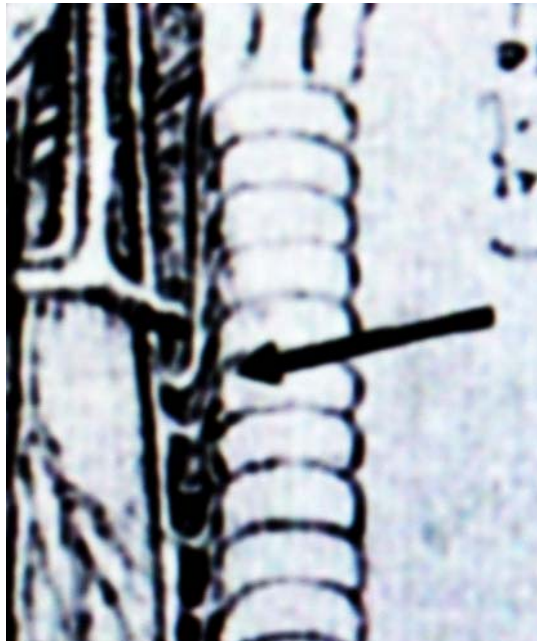
2 There are, however, several hints that he saw more than his theory allowed: "And when it [the Nervus laryngeus recurrens dexter] is extending upward after the turn, Nature stretches out to it from the sixth pair **the handlike outgrowth** which binds it to the large nerve and makes both its turn and its ascend safe. The portions of the nerve on the two sides of the turn are supported on both the right and left **by the outgrowths** [rami cardiaci inferiores? Comment by M. T. May] of the sixth pair which it makes to the parts of that region" (May: *Galen on the Usefulness of Parts of the Body* 1968, II, p. 694). "When immediately the after the turn these [recurrent] nerves are mounting straight upward, **the large nerve extends to them an outgrowth**, as if reaching out a hand, and by means of this it draws and pulls them up" (May I, pp. 370/371). Margaret T. May comments in her footnote 61 to *The Seventh Book of Galen* (I, pp. 370/371):

"The large nerve mentioned here is certainly the vagus itself; for in chapter 4 of Book XVI he mentions this helping hand extending to the recurrent nerve again and says that it comes from the "sixth" pair. Since no mention is made of it in *De nervorum dissectione* and no further light is ever shed on it either here or in *De anat. admin.*, XIV (Galen [1906, II, 189; 1962, 207]), where it is described once more, I have been unable to determine what may have misled Galen. Neither Daremberg (in Galen [1854, I, 507]) nor Simon (in Galen [1906, II, 344]) has a satisfactory explanation. The former suggests "the superior cardiac nerves, or perhaps the anastomotic branch"; the latter says that it may be "**certain connecting twigs** which Galen had seen at the point of reflection, going from the recurrent to the vagus." I cannot find these connecting twigs described elsewhere. Dr. Charles GOSS, however, tells me that "the vagus in the neck of a pig in a recent atlas is labelled vagosympathetic trunk. This gives ample opportunity for communicating fibers." Cf. Ellenberger and Baum (1926, 874)."

So, whatever Galen meant in detail by the "the handlike outgrowth which binds it to the large nerve" etc. – he must have seen "**certain connecting twigs**" going out from and to the recurrent nerves. But perhaps also a word of caution: Of the extant codices of the work of Galen, the *codex Urbinas* "dating from the tenth or eleventh century, is the oldest and also the best of the lot" – May 1968, I, p. 8. Nevertheless on p. 362 she argues as follows:

"The following description of the discovery of the recurrent laryngeal nerves and their function is a classic. In his splendid article, "Galen's Discovery and Promulgation of the Function of the Recurrent Laryngeal Nerve," Walsh (1926, 183) says that he has no doubt that it embodies the actual lecture given by Galen and taken down stenographically on the occasion when he demonstrated publicly the structure of the larynx, the muscles moving it, and their innervation. As for the importance of the discovery, Walsh (*ibid.*, 7751) says, "This discovery established for all time that the brain is the organ of thought, and represented one of the most important additions to anatomy and physiology, being probably as great as the discovery of the circulation of the blood.""

Interestingly, additional branches of the right recurrent laryngeal nerve to the trachea were indeed noted and drawn by **Leonardo Da Vinci in 1503**, see the following detail from Fig. 3 of Kaplan et al. 2009, p. 388:



- b) According to Dietrich Starck – one of the leading German evolutionary anatomists of the 20th century – the recurrent laryngeal nerves are missing in the suborder Tylopoda (family Camelidae with camels, lamas and vicuñas), see Starck 1978, p. 237. However, Hans Joachim Müller, who published the results of his careful dissections on *Camelus bactrianus* and *Lama huanacus* [*guanicoe*] in 1962³, found that – although in fact, the innervation of the larynx by the Nervus laryngeus inferior is exceptional⁴ in these animals – there still is a **ramus recurrens sinister**, which arises from the vagus nerve near the heart and ‘curves around the arch of aorta’ in order **to ascend** at the latero-dorsal (and during further development at the more dorsal) part of the trachea, but does *not* innervate the larynx. Müller writes (p. 161):

“Beim Überkreuzen der Aorta verlassen mehrere Äste den Nervus vagus und ziehen zum Herzen und zum Lungenhilus. Einer der Äste („**Ramus recurrens sinister**“) umschlingt den Aortenbogen und **steigt rückläufig am latero-dorsalen Rand der Trachea auf**. Im weiteren Verlauf liegt er mehr auf der Dorsalseite der Trachea, verbindet sich **mit entsprechend rückläufigen Ästen des rechten Nervus vagus** zu einem Nervenkomplex und anastomosiert schließlich mit dem absteigenden Ramus descendens n. vagi.“

The fact that the *ramus recurrens sinister* does *not* innervate the larynx in the Camelidae, but still takes the ascendent course of the normal recurrent laryngeal nerve of all the other mammal families (so much so that J. J. Willemse thought he had even found a *normal* Nervus recurrens in a young camel⁵), yet to eventually anastomose with corresponding recurrent branches of the right vagus to take part in the formation of a special network of nerves, *also implies important and indispensable functions of that route*. As for similar observations on the *ramus recurrens dexter*, see footnote below⁶. To discover

³ *Beobachtungen an Nerven und Muskeln des Halses der Tylopoden*; Zeitschrift für Anatomie und Entwicklungsgeschichte **123**: 155-173

⁴ „Seit etwa 60 Jahren [in the interim more than 100 years] ist bekannt, daß der Nervus laryngeus inferior [the part of the recurrent laryngeal nerve near the larynx] beim Lama (v. Schumacher 1902) und beim Kamel (Lesbre 1903) einen eigentümlichen Verlauf nimmt. Seine Fasern gelangen auf direktem Wege über einen absteigenden Ast des Nervus vagus zu den inneren Kehlkopfmuskeln.“ Außerdem fehlt bei dem Tylopoden der periphere Nervus accessorius.

⁵ „Die Feststellung von Willemse (1958), daß bei einem jungen Kamel ein normaler Nervus recurrens vorhanden war, dürfte wohl nur im Hinblick auf die topographischen Beziehungen dieses Nerven getroffen worden sein.“ – Müller, p. 167.

⁶ As to the *Ramus recurrens dexter*, Müller notes p. 162: „Der rechte Nervus vagus gelangt nach Trennung vom Truncus sympathicus ventral der Arteria subclavia in den Thorax, wo er die Trachea zum Lungenhilus begleitet (Abb. 7). Noch vor Passieren der Arteria subclavia verläßt ihn ein kleiner Ast, der, neben ihm verlaufend, ventral die Arteria subclavia kreuzt, um dann auf der Rückseite **rückläufig zum Truncus sympathicus aufzusteigen**. Caudal der Arteria subclavia gehen mehrere Nervenäste vom Nervus vagus ab und beteiligen sich an der Bildung des beschriebenen Nervenplexus auf der Dorsalseite der Trachea. Es läßt sich ein etwas stärkerer Strang durch das Geflecht verfolgen, der sich in den Ramus descendens n. vagi der rechten Seite fortsetzt (= **Ramus recurrens dexter**) (Abb. 7).“

or deepen our understanding of these necessary and probably further vital functions will be a task of future research.⁷

- c) I have now checked two additional (and again several further) research papers, which clearly imply that the last dissections of the giraffe **did not take place in 1838** (as stated by Mark Evans on public TV in England; see the link above), but were performed shortly before 1916, 1932, and 1958 and also between at least 1981 and 2001. (It could, perhaps, be a special task for historians of biology to find out whether further dissections and anatomical studies of the giraffe have taken place between 1838 and 2009, and especially to what extent such studies were relevant for the routes and functions of the RLNs.)

H. A. Vermeulen (1916): *The vagus area in camelopardalis giraffe*. Proc. Kon. Ned. Akad. Wet. **18**: 647-670. (Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen.)

He introduces his work on the giraffe as follows (1916, p. 647): “I [...] found several remarkable relations, particularly of vagus and accessorius nuclei of Camelidae which roused in me the desire to examine what the circumstances might be in the giraffe. I was able to to examine one part only of the central nervous system of this class of animal, and was enabled to do so by the courtesy of Dr. C. U. ARIENS KAPPERS, Director of the Central Institute of Brain Research, at Amsterdam, who kindly placed **part of the material at my disposal. This consisted of the brain stem and a piece of the first cervical segment of one specimen, and the first and second segment of another specimen.** In the latter preparation the nervi accessorii Willisii could be seen perfectly intact in their usual course between the roots of the two first cervical nerves, so that in this respect the giraffe differs here at least, from the Camelida.” However, Vermeulen could not dissect and investigate the laryngeal nerve itself of the giraffe. He only writes on p. 665: “...one might conclude, judging from the strong development of the nucleus at this place [the nucleus ambiguus spinally from the calamus] in the giraffe, that **the nervus recurrens, even in this animal in spite of its long neck, well deserves its name,** in which case the highly exceptional conditions of this nerve in Camelidae have wrongly been connected by LESBRE with the unusually long neck of these animals.”

J. J. Willemsse (1958): *The innervation of the muscles of the trapezius-complex in Giraffe, Okapi, Camel and Llama*. Arch. Néerl. Zool. **12**: 532-536. (Archives Néerlandaises de Zoologie.)

Willemsse 1958, p. 533 and p. 535: “ZUCKERMAN and KISS (1932) made an attempt to obtain certainty about the spinal accessory nerve of the giraffe. [...] **The dissection of two giraffes, carried out by Zuckerman and Kiss themselves,** indicate that the muscles of the trapezius-complex were supplied, as in other Ungulates, by branches from the spinal accessory and from cervical nerves.

The dissection of a giraffe at out own laboratory gave results which resembled those of ZUCKERMAN and KISS very much. [...] Some twenty years ago anatomists showed that in the giraffe a n. accessorius is present, but the nerve is lacking in camels and llamas. Recent investigations are in accordance with these facts.” – However, unfortunately no new information on the laryngeal nerves of the giraffe is given in this paper.

For some further dissections and anatomical studies of the giraffe, see the papers by Kimani and his co-workers (1981, 1983, 1987, 1991), Solounias 1999,

⁷ I earnestly hope without doing harm or being cruel to the respective animals. There are now many alternatives to animal experiments: http://www.vivisectioninfo.org/humane_research.html (I do not, of course, subscribe to everything these people say or do). We must, nevertheless, for many scientific and further reasons assign different values to humans and animals, but definitely without being incompassionate to either of them.

Concerning dissections: If an animal – like a mammal or bird – has died, but was not killed for studying its anatomy, it appears to be fully okay to me. On the other hand, I remember well the *Zoologische Praktika*, where we, i. e. the students, had the task to dissect fish, frogs and rats and that we were admonished to do our best especially because the animals had to die for these studies. My impression was that the lecturers (understandably) were not all too happy about killing these creatures. Although being fascinated by anatomical studies (I even taught [theoretical] human anatomy for nurses for a while), I later focussed on plant genetics for my further research to avoid killing or doing harm to sensitive animals myself (but there were also additional reasons for this choice). For a more differentiated comment on animal pain, including insects, see <http://www.weloennig.de/JoachimVetter.pdf>.

A word on Galen’s vivisections: I am of the opinion that they were cruel. In this context one may also ask: What about Darwin and vivisection? Rod Preece has stated (2003): “In the first major ethical issue that arose after the publication of Darwin’s *The Descent of Man* – legislation to restrict vivisection – Darwin and Huxley stood on the side of more or less unrestricted vivisection while many major explicitly Christian voices from Cardinal Manning to Lord Chief Justice Coleridge to the Earl of Shaftesbury – demanded the most severe restrictions, in many cases abolition.” http://muse.jhu.edu/login?uri=/journals/journal_of_the_history_of_ideas/v064/64.3preece.pdf. See also: http://darwin-online.org.uk/EditorialIntroductions/Freeman_LetteronVivisection.html and http://darwin-online.org.uk/pdf/1881_Vivisection_F1793_001.pdf (as to the latter link: It seems that Darwin could also be very compassionate to animals as shown by the quotation of T. W. Moffett). However, in the second edition (1874 and 1882), Darwin added “...unless the operation was fully justified by an increase of our knowledge, ...”

and Sasaki et al. (2001) in the references in Part 2 for the present paper

<http://www.weloennig.de/GiraffaSecondPartEnglish.pdf>.

- d) The verdict of Nobel laureate Francois Jacob quoted above that natural selection has been correcting the genetic message "for more than two billion years, *continually improving, refining and completing it, gradually eliminating all imperfections*" is not an isolated case but describes, in principle, an important and constitutive part of the general state of mind of neo-Darwinian biologists, which can be traced back to Darwin himself. The latter states – just to quote a few examples:

“As natural selection acts solely by the preservation of profitable modifications, each new form will tend in a fully-stocked country to take the place of, and finally to *exterminate, its own less improved parent-form and other less-favoured forms with which it comes into competition*. Thus extinction and natural selection go hand in hand.”

Or: "...old forms will be supplanted by new and improved forms." And on the evolution of the eye that natural selection is:

"intently watching each slight alteration" ... "carefully preserving each which...in any way or in any degree tends to produce a distincter image." And "We must suppose each new state of the instrument to be multiplied by the million; each to be preserved until a better one is produced, and then the old ones to be all destroyed." And: "In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and **natural selection will pick out with unerring skill each improvement.**"

In the same manner and context of eye-evolution (including necessarily the entire innervation and corresponding parts of the brain in complex animals), Salvini-Plawen and Mayr regularly speak of "evolutive improvement" (p. 247), "eye perfection", "gradually improved types of eyes", "grades in eye perfection", "the principle of gradual perfecting from very simple beginnings", "regular series of ever more perfect eyes" (1977, pp. 248 – 255; see please <http://www.weloennig.de/AullNeAb.html>).

Applying this kind of reasoning to the recurrent laryngeal nerve leads us directly into the contradiction in the neo-Darwinian world view pointed out above, to wit, that the “**unerring skill**” of natural selection – that exterminates every “less improved parent-form and other less-favoured forms”, which picks out and preserves “each improvement...”, which should also produce ‘regular series of ever more perfect nerves’ and which is, above all, “gradually eliminating all imperfections” – results in “one of nature’s worst designs”, the “ridiculous detour” etc., of the recurrent laryngeal nerve.

If I understand anything at all, the testable scientific theory of an intelligent origin of life in all its basic and often also irreducibly specialized forms is the superior explanation.

For further aspects on the laryngeal nerves, see Casey Luskins’ post (15 Oct. 2010) *Direct Innervation of the Larynx Demanded by Intelligent Design Critics Does exist* (http://www.evolutionnews.org/2010/10/direct_innervation_of_the_lary039211.html#more), explicating the role of the superior laryngeal nerves (SLNs) innervating the larynx directly from the brain, especially their co-operation with and complementation of the recurrent laryngeal nerves (RLNs). In his post of October 16, 2010 on the topic of *Medical Considerations for the Intelligent Design of the Recurrent Laryngeal Nerve* (http://www.evolutionnews.org/2010/10/medical_considerations_for_the039221.html#more), he sums the former point up as follows:

“There is dual-innervation of the larynx from the SLN and RLN, and in fact *the SLN innervates the larynx directly from the brain*. The direct innervation of the larynx via the superior laryngeal SLN shows the laryngeal innervations in fact follows the very design demanded by ID critics like Jerry Coyne and Richard Dawkins. Various medical conditions encountered when either the SLN or RLN are damaged point to special functions for each nerve, indicating that the RLN has a specific laryngeal function when everything is functioning properly. This segregation may be necessary to achieve this function, and the redundancy seems to preserve some level of functionality if one nerve gets damaged. This dual-innervation seems like rational design principle.”

For a separate version of the text on the laryngeal nerve of the giraffe, see please <http://www.weloennig.de/LaryngealNerve.pdf>

The following topics and questions should be addressed in Part 2. Due to many other time-consuming tasks, however, I will probably come back to this topic only in a few months:

- 1) Many Giraffidae species and genera appear in the fossil record practically simultaneously and the assumed ancestors co-exist millions of years with their "more evolved" offspring (illustration)
- 2) Using evolutionary assumptions, one can almost always postulate a line of descent out of a large variety of forms.
- 3) Neck vertebrae: Why is it so difficult to count to eight, in the giraffe neck?
- 4) The question of causes (1): Macromutations – Possibilities and limitations
- 5) The question of causes (2): Further hypotheses on the origins of the long-necked giraffe.
- 6) The question of causes (3): Is Intelligent Design verifiable and falsifiable?
- 7) Species concepts and basic types
- 8) With regard to a duplication of a neck vertebra: could there ever be a continuous transitional series of fossils?
- 9) The question of chance
- 10) "Old" and entirely new research topics by the ID-theory.
- 11) Mitchell and Skinner
- 12) Conclusions
- 13) Acknowledgement
- 14) References

The German article was translated into English mainly by Granville Sewell, Professor of Mathematics, the University of Texas at El Paso, yet the responsibility for any mistakes in words and grammar and especially of the contents of the text rests entirely with W.-E.L..

As for Part 2 of the article of 2007/2010 (also translated by Granville Sewell) see <http://www.weloennig.de/GiraffaSecondPartEnglish.pdf>