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Elephant Evolution:

Elephant Family[1]

What Do We Really Know?

Another Test for Gradualism, Punctuated Equilibrium, and Intelligent Design

"In the evolution of the elephant from its shortnosed ancestors, there must have been ***a smooth, gradual succession of steadily longer noses***, ***a sliding gradient*** of thickening muscles and more intricately dissected nerves. It must have been the case that, as each extra inch was added to the length of the average trunk, the trunk became better at its job." "On our route…[w]e shall reconstruct the ***slow, gradual evolution*** of wings and ***of elephant trunks***."

Zoologist **Richard Dawkins** (1996, 2006; implicitly 2016/2017)[2]

On Mammoth, African and Indian Elephant: "All three advanced genera descended from the ancestral genus *Primelephas*[3], and ***all three appear abruptly and almost simultaneously in the fossil record***. The subsequent history of each spans about four and one-half million years […] no lineage of any elephant genus changed enough to represent a new genus. The genera, once formed, retained their basic body plans through something like half a million generations."[4] "This example is especially compelling because elephants are famous for having left an excellent fossil record…" "…Maglio showed ***none of the three Plio-Pleistocene genera as having arisen by phyletic transition***."[5]

Paleontologist **Steven M. Stanley** (1981, 1979)[6]

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[1] Photograph of elephant family above by http://www.talenttalks.net/wp-content/uploads/2018/02/elephant-family.jpg

[2] Dawkins R (1996, p. 82 and paperback 2006): 20th Anniversary Edition): Climbing Mount Improbable. Viking. Same author (2004) and second edition with Yan Wong (2016/2017): The Ancestor's Tale: A Pilgrimage to the Dawn of Life. Weidenfeld &Nicolson. London.

[3] However, concerning an ancestral genus, Nowak suggests (2018, p. 470): "*Stegotetrabedolon* may be the ancestor of the most advanced elephants – *Loxodonta*, *Elephas*, *Palaeoloxodon*, and *Mammuthus* – though a contemporary African genus, *Primelephas*, has sometimes been assigned that role." See exact reference below. So, also in this case there is no real knowledge that either *Primelephas* or *Stegotetrabedolon* or another genus would be the ancestor of the "most advanced elephants", this inference being reinforced by the absence of phyletic gradualism.

[4] Stanley S M (1981, p. 100): The New Evolutionary Timetable. Basic Books. New York

[5] Stanley S M (1979, p. 84): Macroevolution. Pattern and Process. W H Freeman & Company. San Francisco.

[6] About Stanley: "Stanley received his Ph.D. from Yale University in 1968. For most of his career he taught geology at Johns Hopkins University (1969-2005). In 1977 Stanley was awarded the Paleontological Society's Charles Schuchert Award which is presented "to a person under 40 whose work reflects excellence and promise in the science of paleontology." In 2007 he was awarded the Society's Paleontological Society Medal, which is "awarded to a person whose eminence is based on advancement of knowledge in paleontology." In 2006 Stanley was awarded the Mary Clark Thompson Medal by the National Academy of Sciences, and in 2008 the William H. Twenhofel Medal by the Society for Sedimentary Geology." https://en.wikipedia.org/wiki/Steven_M._Stanley (retrieved 15.11.2018)

“Already over 175 species and subspecies Proboscidea are known to have become extinct,
some likely through human agency. **The order has *one of the most extensive and studied paleontological records* of any group of mammals**.”

Zoologist **Ronald M. Nowak** (2018)[7]

“The fossil record is pretty complete and the reason why we know this is something that is called the collector’s curve. And the collector’s curve you can imagine you have a kind of graph and in this graph you have a horizontal axis, which is the effort you have to invest you have to find something new in terms of man hours or grant money or energy and in the vertical axis you have the discovered new stuff in the fossil record. At the beginning you have a steep curve and you find a lot of new stuff with little invested energy or little invested money but later the curve flattens and then you know that you have sampled sufficiently what is out there to know the stuff that is still lacking. ***It is not lacking because you have a gap of knowledge but because it is not out there***. And this has been statistically tested over a lot of groups of different organisms and we know meanwhile that ***we have a pretty good complete fossil record about the history of life***. And if we compare the fossil record to the predictions of the theory of Darwinian evolution, then we find still a big difference, so Darwinian evolution would predict that new body plans originated in a stepwise process with small changes adding up to big differences. But ***what we find in the fossil record is abrupt appearance in a kind of top-down pattern. New body plans appear abruptly in the fossil record***. We also do not find the required gradual species-to-species transitions. So, the fossil record really poses a problem to Darwinian evolution. […] So, ***the fossil record is very complete and it doesn’t agree with the predictions of the Darwinian theory***.”

Paleontologist **Günter Bechly** (Interview 2018)[8]

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[7] Nowak R M (2018): Walker’s Mammals of the World. John Hopkins University Press. (Order Proboscidea: pp. 463-536; quotation above from p. 466.) https://jhupbooks.press.jhu.edu/content/walkers-mammals-world-0

[8] Interview: https://evolutionnews.org/?s=Bechly (2018) About Bechly, see https://de.wikipedia.org/wiki/G%C3%BCnter_Bechly

Introduction

After checking the data concerning gradualism, punctuated equilibrium, and intelligent design for the origin of the Giraffidae, especially the long-necked giraffe (*Giraffa camelopardalis*)[9] and the Canidae (dog family)[10], this is now my third investigation of a well-known animal family with an extensive fossil record on the question of what not only the paleontological, but also the relevant anatomical, physiological and genetic data really show.

As far as I could find out, the present paper is the first endeavor to write a scientifically in-depth analysis rigorously testing the different theories *en vogue* today yet including intelligent design on the origin of the elephants[11] in contrast to what is generally advanced in textbooks as well as for the public (on TV and elsewhere), along with a large number of internet contributions.

The thorough inspection and study of the Giraffidae and Canidae just mentioned – apart from the meticulous analysis of several plant families, particularly in the context of the origin of different carnivorous plant groups[12] and especially the in depth discussion of *Paleontology and the Explosive Origins of Plant and Animal Life: A Dialogue with an Evolutionary Geologist on Gradualism and Intelligent Design*[13] – has consistently shown that gradualism is the exception and the explosive origin of new plant and animal groups is the overwhelming rule. The necessary cause for the source of the enormous amount of specified and irreducible complexity, i.e. the development of information being at least in the giga to terabyte range (perhaps even in the petabyte ($10^{15}/2^{50}$) to yottabyte

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A formal note: All links to internet documents in the present paper have been retrieved between 10 November 2018 and 3 February 2019. Also, if not otherwise stated, all emphasis in the quotations (***italics*, bold, blue**) by W-E L to assist the reader who cannot invest much time here to quickly get the key points. ***Summary*** at the end of the paper.

Moreover: Repetitions are intended.

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[9] http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf

[10] http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf

[11] In comparison to the elephants, there are some scientifically valuable critiques on the evolutionary trees of the horses. See, for example, Junker R und Scherer S (Eds.) (2013): Evolution – Ein kritisches Lehrbuch. Weyel Lehrmittelverlag. Gießen (pp. 263-267). Already Nilsson H (1953) Synthetische Artbildung. Verlag CWK Gleerup. Lund (pp. 541-552).

[12] not to mention orchids, plant galls, mutation genetics, natural selection, Mendel, etc. (see http://www.weloennig.de/internetlibrary.html)

[13] http://www.weloennig.de/ExplosiveOrigins.pdf

($20^{24}/2^{80}$) area)[14] for entirely new forms of life – as for example in the Cambrian explosion – in a relatively short period of time is pointing unambiguously, unequivocally, explicitly to ingenious intelligent design.

Now, anyone – even if only superficially informed about the present state of the evolutionary art say on TV – knows that these factual results are in stark conflict, in utmost contrast, in total contradiction to the currently prevailing view, the dominant opinion of evolutionary science: *Neo-Darwinism*[15], also known as the *Synthetic Theory of Evolution* or the *Modern Synthesis*.

I have so often documented and repeated the central arguments of this view that I'm going to present here nothing more than the most basic tenets of this (what may perhaps better be called) contemporary *state of mind* in biology, as described by two of its founders, Mayr and Dobzhansky:

> "In essence it is a **two-factor theory**, considering the diversity and harmonious adaptation of the organic world as the result of a steady production of variation and the selective effects of the environment" (Mayr). "It must not be forgotten that ***mutation*** is the ultimate source of all genetic variation found in natural populations and the only new material available for ***natural selection*** to work on" (Mayr). "The process of mutation is the only known source of the new materials of genetic variability, and hence of evolution" (Dobzhansky).

For similar statements up to the present, see, please, the more than one hundred authors (including several Nobel laureates like Eigen, Lorenz, Monod, and Muller) documented, for example, in the links of the footnote below[16].

Another key point to be briefly repeated here for understanding the ***present main evolutionary view*** is the concept of ***gradualism*** also documented *ad nauseam* in the links just given and already summed up in the following words of Darwin himself (being all the more *en vogue* in the *Modern Synthesis* today) according to which evolution has proceeded by:

> "…*innumerable* slight variations", "*extremely* slight variations" and "*infinitesimally* small inherited variations" (Darwin also spoke of "infinitesimally small changes", "infinitesimally slight variations" and "slow degrees") and hence 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/).

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[14] *Cf.* http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf p. 246 and extensive footnote no. 465.

[15] http://www.weloennig.de/BegriffNeodarwinismus.html (2004)

[16] http://www.weloennig.de/AesV3.html (2004)
http://www.weloennig.de/ExplosiveOrigins.pdf (2018) http://www.weloennig.de/evolution/PhysalisOriginalPaper.pdf (2010)
http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf (especially pp. 44ff., 51ff.)
http://www.weloennig.de/Utricularia2011Buch.pdf (2011), pp.6 footnote no.10, 45ff.
http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf (2001)
http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf
http://www.weloennig.de/Gesetz_Rekurrente_Variation.html
And especially on the topic of natural selection:
http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf (2018)
http://www.weloennig.de/NaturalSelection.html (2001)
http://www.weloennig.de/jfterrorchipmunks.pdf (2016)
http://www.weloennig.de/PlantGalls.pdf (2017)
http://www.weloennig.de/BeautifulFactsPartI.pdf (2018)
http://www.weloennig.de/BeautifulFactsPartII.pdf (2018)
http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf (2011)
Concerning a series of fourteen *PODCASTS* (2012-2016), see please:
http://www.weloennig.de/internetlibrary.html
And TV-Interview (2018):
https://mediathek-hessen.de/medienview_18233_Hans-R.-Portner-OK-Kassel-Portners-Presseshow--Pal%C3%A4ontologie-und-Evolution.html
With English subtitles:
https://www.youtube.com/watch?v=9HxcaXDWELE
('For the English subtitles, make sure CC (closed captions, at the bottom of the screen) is turned on.')

But has not the theory of punctuated equilibrium provided a real alternative?

Stephen C. Meyer (2013/2014, pp. 136-152) has carefully and convincingly provided an in-depth analysis showing that punctuated equilibrium ("*punk eek*") with its main components of *allopatric speciation* and *species selection* have – after much ado in the 1970s and 1980s (I have intensely and often enthusiastically studied the relevant publications of that time and also in the following decades) – eventually ended up in "good, old-fashioned natural selection acting on random mutations and variations – that is, [...] the neo-Darwinian mechanism acting over long periods of time on large, relatively stable, populations". After Meyer had pointed out that *punk eek* already had come to naught by the Cambrian explosion (p. 142: "First, the top-down pattern of appearance of Cambrian animal forms […] contradicts punctuated equilibrium's depiction of the history of life almost as much as it does the Darwinian picture"), Meyer goes on to say (pp. 146-148)[17]:

> "Neither allopatric speciation nor species selection can generate the new genetic and anatomical traits necessary to produce animal forms, let alone in the relatively brief time of the Cambrian explosion. As conceived by Gould and the other advocates of punctuated equilibrium, allopatric speciation just allows for the possibility of the *rapid fixation* of preexisting traits, not the *generation* of new traits. When a parent population splits into two or more daughter populations, each of the daughter populations retains a part, but usually not the whole, of the gene pool of the original population. No new genetic traits are generated by the geographical isolation of one part of a population from another.
>
> It could be argued, of course, that mutations might occur during the process of speciation, thus generating new genetic traits. But as Gould and Eldredge conceived of it, allopatric speciation occurs much too rapidly to have a reasonable chance of mutations generating anything fundamentally new. Darwin recognized in *On the Origin of Species* that evolution is a numbers game: larger population sizes and more generations offer more opportunities for favorable new variations to arise. As he explained: "Forms existing in larger numbers will always have a better chance … of presenting further favourable variations for natural selection to seize on, than will the rarer forms which exist in lesser numbers." ***Yet for the mechanism of allopatric speciation to generate new traits, it would need to generate significant changes in form in small "peripherally isolated" populations over relatively few generations***. Because of these constraints, many biologists have concluded that ***allopatric speciation requires too much change too quickly to provide the theory of punctuated equilibrium with a biologically plausible mechanism for producing new traits or forms of animal life***.
>
> And that is why Gould and Eldredge, especially in their later formulations of the theory, envisioned new traits arising during long period of stasis in larger populations rather than during short bursts of speciation. ***But a process in which traits arise "during long periods of stasis" does not constitute a "mechanism of unusual speed and flexibility***," though that is precisely what, according to Gould and Foote, punctuated equilibrium requires in order to explain the abrupt appearance of new animal forms."

But what about species selection?

> "If allopatric speciation does not produce a fast-acting trait-generating mechanism, does **species selection**? Again, the answer is no. ***Species selection does not account for the origin of the different anatomical traits that distinguish one species from another***. Species selection, as conceived by the proponents of punctuated equilibrium, acts on species and traits that *already* exist. Indeed, when Stanley, Gould, and Eldredge envisioned natural selection acting to favor the most fit species over another in a competition for survival, they presupposed the existence of a pool of different species and, therefore, also the existence of some mechanism for producing the traits that characterize those different species. That mechanism, however, would necessarily need to generate those differentiating traits before species could enter into competition with each other. Species selection *eliminates* less fit species in a competition for survival; it does not *generate* the traits that distinguish species and establish the basis for interspecies competition.
>
> So where do these traits come from? When pressed, Gould eventually acknowledged that the origin of anatomical traits themselves result from good, old-fashioned natural selection acting on random mutations and variations—that is, from the neo-Darwinian mechanism acting overlong periods of time on large relatively stable populations. ***But that meant that punctuated equilibrium, to the extent it relies on mutation and natural selection, is subject to the same evidential and theoretical problems as neo-Darwinism***. And one of those problems is that the neo-Darwinian mechanism does not act quickly enough to account for the explosive appearance of new fossil forms in the Cambrian period [or other periods]. Like allopatric speciation, species selection does not qualify as the kind of rapid and flexible mechanism that Gould elsewhere insisted his theory must have in order to explain the abrupt appearance of animal forms in the fossil record."

I myself have pointed out similar problems of *punk eek* in 1986/1993/2011[18]. We are going to come back to special formulations of this theory in the discussion of the problems the elephant fossil record provides for classical neo-Darwinism and *punk eek* as well.

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[17] To repeat: All emphasis (***blue, bold, italics*** – here in the following quotations, if not otherwise stated) by W-E L

[18] www.weloennig.de/AesV3.Konti.html, www.weloennig.de/AesIV5.SysDis.html, see also the revealing very important details in http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf pp. 128-130.

So, let us please keep in mind that applying the basic ideas of neo-Darwinism to our present topic of elephant evolution, also this most impressive animal family would have originated – in accordance with Dawkins and all the neo-Darwinians referred to in the links and quotes above (including updated *punk eek*) – mainly by "extremely slight variations" "infinitesimally small inherited variations" etc. due to (in today's genetical language) random mutations with "slight or even invisible effects on the phenotype" (Mayr) driven by "omnipotent natural selection" (from Weismann to contemporary authors[19]), in the final analysis resulting in a process of a creepingly slow, evenly gradual, continuous, progressive evolution over millions of years.

Correlation and Synorganization

However, by extrapolating Dawkins' words referred to at the beginning of this paper focusing on the isolated elephant's trunk, now to the entire animal, i.e. considering not only its trunk (for an isolated, stark elongation of a nose alone does not by any means necessarily result in something like an elephant, as the elephant shrew[20], the elephant seal[21], tapir[22], the grant anteater[23], the proboscis monkey[24], and several other long-nosed animals[25] altogether clearly illustrate), we could now postulate that – according to the *neo-Darwinian Synthesis*:

> 'In the evolution of the elephant from its short nosed ancestors, there must have been a smooth, gradual succession ***not only of steadily longer noses***, but also a ***sliding gradient*** of thickening muscles and more intricately dissected nerves of the entire system of all synorganized body parts and also its behaviour: from the ***entire skeleton of some 326 to 351 bones, the tusks, teeth, the approximately 394 skeletal muscles, brain, hair, ears, feet, skin, senses and communication***. It must have been the case that, apart from each extra inch that was added to the length of the average trunk, also, all these further necessary organs became better at their job.'

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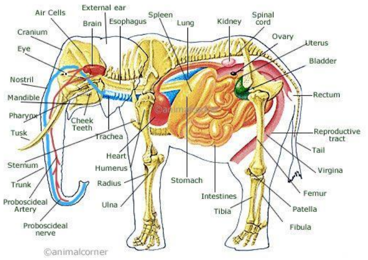
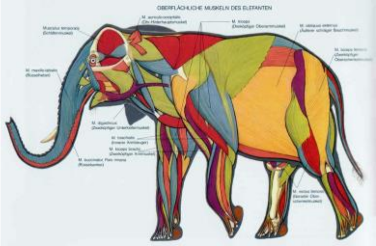


27



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Such an enormously complex system of correlations and intricate synorganizations, so far only hinted at by the fine figures shown above, may immediately remind us of Georges Cuvier's *Law of Correlation* stating that:

> "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."[29]

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[19] http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf

[20] https://en.wikipedia.org/wiki/Elephant_shrew

[21] https://en.wikipedia.org/wiki/Elephant_seal

[22] https://en.wikipedia.org/wiki/Tapir

[23] https://en.wikipedia.org/wiki/Anteater

[24] https://en.wikipedia.org/wiki/Proboscis_monkey

[25] Google, please, long nosed animals.

Sources of the figures (there many further figures):

[26] https://dictionary.cambridge.org/dictionary/english/elephant

[27] Female Elephant Anatomy: https://animalcorner.co.uk/elephant-anatomy/

[28] https://en.upali.ch/anatomy-of-the-elephants/

[29] To repeat a relevant footnote for the French orginal text as well as a further English translation as taken from my book on *The Evolution of the Long-Necked Giraffe* (2011, p. 26) "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,

In my book on the giraffe I commented that 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, for example, 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."[30]

Now, the law of correlation appears to be, due to the coadaptations and synorganizations of virtually all the elephant's body parts on all their levels – anatomical, physiological, genetical – also highly relevant for our topic, the origin of the elephant family (not to speak of organisms in general).

Since any continuous evolution resulting in intermediate macroevolutionary steps would thus necessitate the coordinated change of many genes and physiological and anatomical functions, one may raise the question whether "innumerable slight variations", "extremely slight variations" and "infinitesimally small inherited variations" etc. due to random ('micro'-mutations) have actually realized this enormous task in the gradual process envisioned by Darwin and Dawkins as well as most other contemporary evolutionary biologists. So, let's first have a look at the elephant's "very complete"[31] fossil record, for such a record should reflect the postulated gradual evolution of the elephant family.

Gradualism and (updated) Punk Eek are in Utmost Contradiction to "What the Fossils Say and Why It Matters"[32]

When the postulated gradual evolution of a group of animals and/or of plants cannot be proved by the fossil record, proponents of the synthetic theory of evolution regularly object that the fossil material would still be much too fragmentary. However, *the sudden appearance of new forms is also confirmed in the best-preserved animal groups*. 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, 1998/2003 and 2012, Bechly 2018, see especially the discussion of an Italian geologist with Lönnig 2018) – (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

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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 fontionnelle 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.

[30] Grasse P P (1973): L'Evolution du Vivant; Paris 1973 (pp. 177/178). See also: http://www.weloennig.de/AuIAbI.html

[31] To apply Bechly's overall assessment of the fossil record also to the rich fossil record of the elephants.

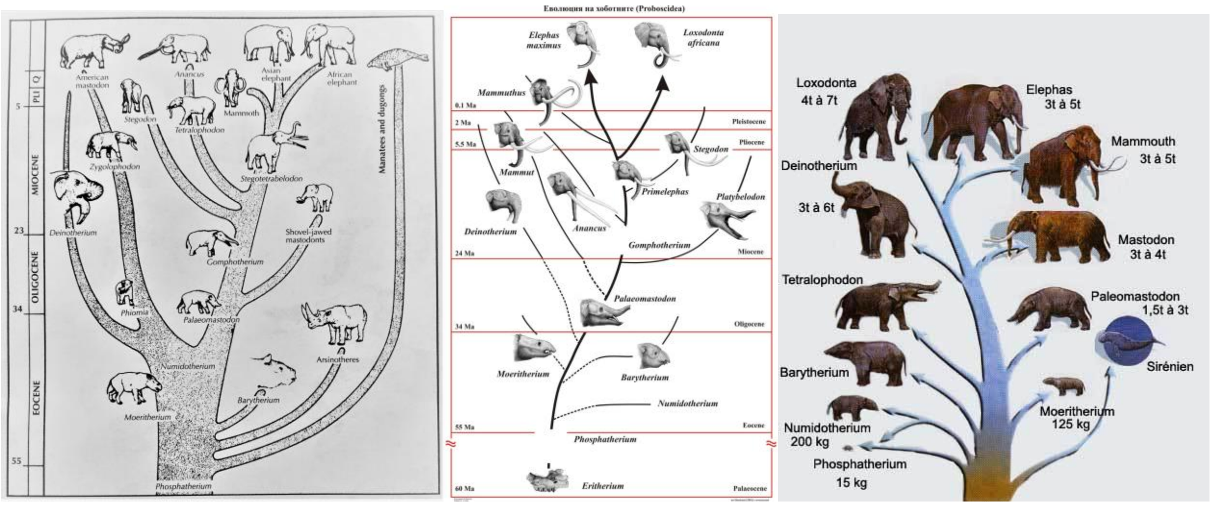
[32] Prothero's Book (2007): https://www.amazon.de/Evolution-What-Fossils-Say-Matters/dp/0231180640 Second edition 2017. Columbia University Press. New York.

> [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 Beurlen, Dacqué and Schindewolf 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 noticed that in the case of the elephant the paleontological material is especially abundant – as all competent paleontologists commenting on this topic have unanimously emphasized (see examples above).

Family Elephantidae: Total: **1164 collections including 1346 occurrences**.[33]

These genera and their putative relatives are usually depicted in the biological literature as positive proof and conclusive evidence for the completely naturalistic, i.e. materialistic, evolution of the elephants by "innumerable slight variations" due to random mutations and natural selection, among many other charts (see later), as follows:



Left: "Evolutionary history of the elephants" according to Donald R. Prothero 2017, p. 349[34]. Middle: "Evolution of Proboscidea" drawn by Vladimir Nicolov for the Geology and Paleontology Department of Sofia University (2010/2018)[35]. Right: "The Royal British Columbia Museum's Exhibit on Mammoths and Ancient Proboscideans" (2016)[36]. Despite the general message behind all these figures ("we know how it happened, and it occurred definitely without any trace of intelligent design"), upon a closer investigation one detects several essential differences between these charts: On the left are *Moeritherium*, *Numidotherium*, *Stegotetrabedolon* direct ancestors of the present elephants, but on the middle figure *Moeritherium*, *Numidotherium* are on side branches and, instead of *Stegotetrabedolon*, *Primelephas* is the direct ancestor of the latter (discussion below). However, on the right, i.e. in the Museum's exhibit, none of any of the known genera is presented as a direct ancestor but all are on side branches, including *Moeritherium*, *Numidotherium* and even *Palaeomastodon*. Note also this important time sequence difference: *Moeritherium* before *Numidotherium* in Prothero's figure, but *Numidotherium* first in the others here and below.

Prothero (2017, p. 349) comments his Figure 14.19 shown left above: "Evolutionary history of the elephants and their kin (Proboscidea), starting with pygmy hippo-like forms like *Moeritherium* with no trunk or tusks, through mastodonts with short trunks and tusks, and concluding with the huge mammoths and the two living species. Early in their history, the other tethytheres branched off from the Proboscidea. These include the manatees, order Sirenia, the extinct desmostylians, and the extinct horned arsinotheres." (The same Figure appears in the first edition (2007) and almost the same (2009) in his paper on Evolutionary Transitions.[37]

After mentioning several "transitional forms" as *Palaeomastodon*, *Phiomia* and *Moeritherium* back to *Phosphaterium* from "the very beginning of proboscidean evolution", Prothero emphasized (2017, p. 348) that "Thus we now have fossils to trace modern elephants ***continuously*** back through many different transitional forms to forms that are almost 60 million years old…" (italics, blue and bold as ever by W-E L).

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[33] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43263 (retrieved 28 November 2018)

[34] Prothero D R (2017): Evolution What the Fossils Say and Why It Matters. Second Edition. Columbia University Press. New York. Same Figure in the first edition 2007, p. 324 – so he emphasized his doubtful story twice. https://www.amazon.de/Evolution-What-Fossils-Say-Matters/dp/0231180640

[35] https://www.deviantart.com/t-pekc/art/Evolution-of-Proboscidea-164823079

[36] From Chicago's Field Museum of Natural History. http://motleymoose.net/2016/10/31/4403/the-royal-british-columbia-museums-exhibit-on-mammoths-and-ancient-proboscideans/

[37] Prothero D (2009): Evolutionary transitions in the fossil record of terrestrial hoofed mammals. *Evolution: Education and Outreach* **2**: 289-302. https://link.springer.com/content/pdf/10.1007%2Fs12052-009-0136-1.pdf. There, however, he derives ***Stegodon from Zygolophodon*** and not from a side branch of the line some time after *Gomphoterium* leading to the modern elephants as he did again in 2017. An enormous jumb to and to and fro! How sure are these derivations?

So, let's start to analyze in depth this example of the "Evolutionary history of the elephants" as suggested in two recent editions of the evolution book of the widely known proponent and tireless defender of the putative truth of materialistic evolution, Donald R. Prothero, starting with the present Asian and African elephants, checking the history of its assumed evolution to/from *Phosphatherium* and *Eritherium*. Concerning the supposed descent also of all the ***Proboscidea from shrew-like ancestors*** cf. please Lönnig 2014[38]. So, what is the scientifically testable evidence?

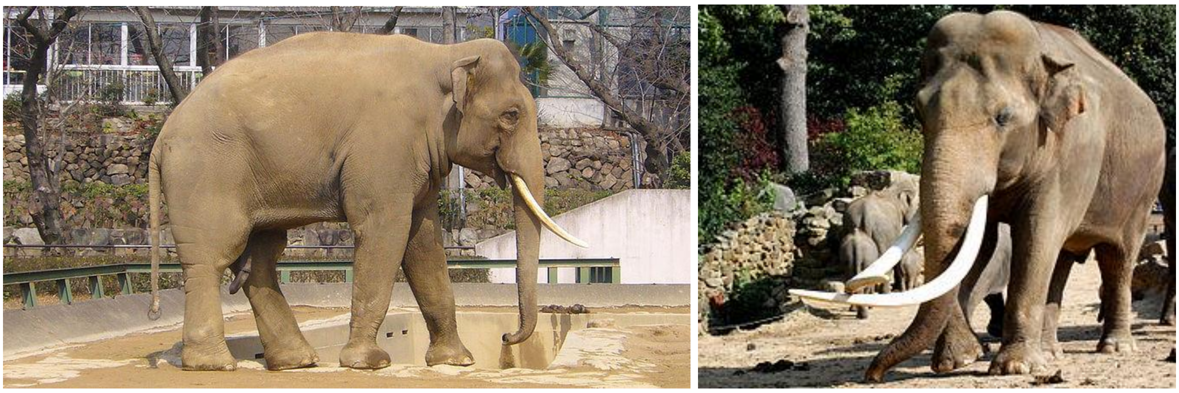
Age Range and Origin of the Genera of the "Evolutionary History" by Prothero 2017 and further authors on:

(a) *Elephas*, (b) *Loxodonta*, (c) *Mammuthus*, (d) *Primelephas*, and (e) *Stegotetrabelodon*

Family: Elephantidae Gray 1821

(a) *Elephas* Linnaeus1758 (Asian Elephant: 9 species) Total: 70 collections including 75 occurrences

Oldest: Up to **11.6-5.3 Ma** (Upper Miocene of Thailand)[39]. However there seems to be also one reference of an excellent source to the Eocene of Myanmar: Bartonian (**41.3-38.0 Ma**)[40] So, in that case, the age range could be up to the present >**41 Ma.** However, so far, I could not establish the Eocene occurrence from the primary literature. Anyway, the genus shows an enormous constancy: Living fossil.



Elephas maximus (Asian Elephant)[41]

An age range of up to 11.6 Ma is already impressive enough to convince us of the enormous constancy of this species.

However, if it could be established that *Elephas* fossils have really been detected at the Bartonian level of Eocene formations, then it would be older than most of its presumed phylogenetic ancestors of Prothero's figure as shown above and also of all the other phylogenetic schemes produced so far. Yet, neither Pilgrim and Cotter (1916) nor Colbert (1938)[42] mentions *Elephas hysudricus* for the Eocene of Myanmar. The alternative would be that the entrance in PBDB is an error.

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[38] http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf pp. 2, 357 ff.

[39] https://paleobiodb.org/classic/displayCollResults?taxon_no=43264&max_interval=Miocene&country=Thailand&is_real_user=1&basic=yes&type=view&match_subgenera=1 (checked several times, last 24 January 2019) See also the PBDB: https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43264: Klick: Miocene of Thailand

[40] https://paleobiodb.org/classic/displayCollResults?taxon_no=43263&max_interval=Eocene&country=Myanmar&is_real_user=1&basic=yes&type=view&match_subgenera=1
Quote: "Than-u-daw, Pondaung Sandstone (Eocene of Myanmar). Also known as Than-udaw AMNH A8. Where: Myanmar (21.7° N, 94.8° E: paleocoordinates 13.1° N, 93.3° E). Coordinate based on nearby landmark outcrop-level geographic resolution.
When: Pondaung Formation, Bartonian (**41.3 - 38.0 Ma**)
The whole sequence of units was originally defined as the 'Pondaung Sandstones' by Cotter (1914), but the horizon yielding Eocene vertebrate fossils is now known as the 'Upper Member' of the Pondaung Formation (see Maung et al. 2005). The most recent age for this unit is ~**39–38** Ma and so so it can be regarded as middle Bartonian (see Tsubamoto et al. 2011
Seventh line from below of the reverence just given: Proboscidea - Elephantidae "Hypselephas hysudricus" = Elephas
(Retrieved 10 December 2018 and checked also several times in the weeks before that date. Checked again 7 January 2019.)

[41] Foto links: https://de.wikipedia.org/wiki/Datei:Elephas_maximus_bengalensis01_960.jpg
Foto rechts von Dick Mudde: https://de.wikipedia.org/wiki/Elephas

[42] Colbert E H (1938): Fossil Mammals from Burma in The American Museum of Natural History. Bulletin of The American Museum of Natual History. Vol LXXIV, Art. VI, pp. 255-438.

Origin: According to Prothero, *Elephas* originated from *Stegotetrabedolon*. I have already mentioned above that also Nowak suggests (2018, p. 470) that "Stegotetrabedolon may be the ancestor of the most advanced elephants – *Loxodonta*, *Elephas*, *Palaeoloxodon*, and *Mammuthus*" but he adds "– though a contemporary African genus, *Primelephas*, has sometimes been assigned that role." Well, not only "sometimes", but almost generally. The Geology and Paleontology Department of Sofia University[43] and many others (see below) still seem to favour *Primelephas*[44].

Also, to quote from some present elephant internet sites: "The mastodon … gave rise to *Primelephas* which is a common ancestor to the mammoths of the genus *Mammuthus*, with 11 species, *Loxodonta* and *Elephas*"[45]. "…*Primelephas*, [is] the oldest ancestor of Elephantidae […] The branches of the modern elephant's evolutionary tree seem to move along two distinct segments from *Primelephas*"[46].

And still another version has been suggested by Nancy E. Todd (2010) in her scientific paper on the *New Phylogenetic Analysis of the Family Elephantidae*… stating that "New insight into the origin of the three lineages is also proposed, with *Stegotetrabelodon* leading to the *Mammuthus* lineage, and *Primelephas* as the ancestor of *Loxodonta* and *Elephas*".[47]

Now Wikipedia (2018) informs the general public:

> The name of the genus [*Primelephas*] suggests 'first elephant'. These primitive elephantids are hypothesised to be the common ancestor of *Mammuthus*, the mammoths, and the closely allied genera *Elephas* and *Loxodonta*, the African and Eurasian elephants, […].[48]

So, is there real, scientifically established knowledge that either *Primelephas* or *Stegotetrabedolon* or both or any other genus would be the ancestor of the "most advanced elephants"?

Fact is that there is neither a continuous series of transitional links by "infinitesimally small inherited variations" etc. in the sense of Darwin and the ruling neo-Darwinians (see above), nor any species series in the sense of the proponents of punctuated equilibrium, favoured by Prothero (2017, p. 86, according to which "…most of speciation should happen too rapidly[49] to be seen in the fossil record"). However, even in the latter versions – old and updated ones – ***a line of links consisting of many transitional species*** is postulated to have existed even between related genera. So, if the fossil record is "very complete", it is neither in agreement with the *Synthetic Theory* nor with punctuated equilibrium.

Moreover, also very importantly to be considered – but often totally neglected by evolutionary speculations – are the ***age ranges*** of the genera involved: All the genera (*Elephas*, *Loxodonta*, *Palaeoloxodon*, *Mammuthus*, *Primelephas*) first appear at nearly the same Miocene stage and thus existed ***simultaneously***, site by site as it were, for even millions of years (see further points below).

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[43] https://www.deviantart.com/t-pekc/art/Evolution-of-Proboscidea-164823079 Evolution of Proboscidea. Pencil artworks and digital editing, 2010. Made for Geology and Paleontology department, Sofia University "St. Climent Ohridski".

[44] https://biologiepagina.nl/Toetsen/evolutie/evolutie.htm, https://www.youtube.com/watch?v=ZNO-MM8ugFw, elephant.elehost.com/About_Elephants/Stories/Evolution/evolution.html

[45] wildliferanching.com/content/african-elephant-loxodonta-africana

[46] https://animalsake.com/evolution-of-elephants . See also https://elephantcountry.org/article/50-million-years-elephant-evolution

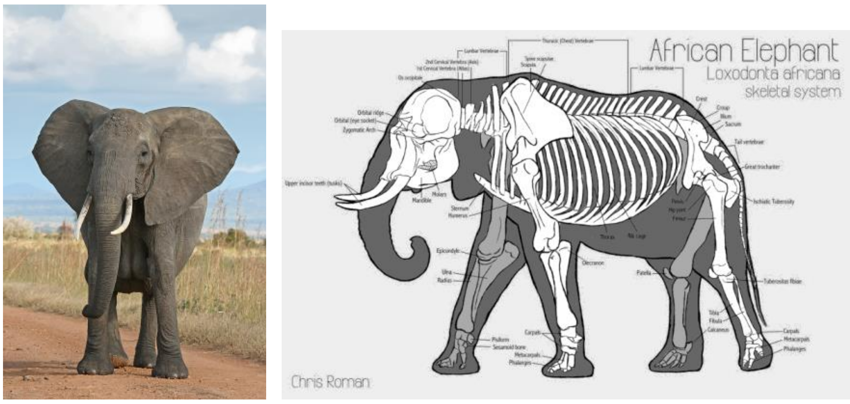
[47] Todd N E (2019): New Phylogenetic Analysis of the Family Elephantidae Based on Cranial-Dental Morphology. Anatomical Record 293: 74-90: https://onlinelibrary.wiley.com/doi/pdf/10.1002/ar.21010

[48] https://en.wikipedia.org/wiki/Primelephas (retrieved 15 December 2018)

[49] Although – as far as I could find out – never saying exactly how rapidly!

(b) *Loxodonta* Cuvier 1825 (African Elephant: 4 species) Total: 131 collections including 137 occurrences

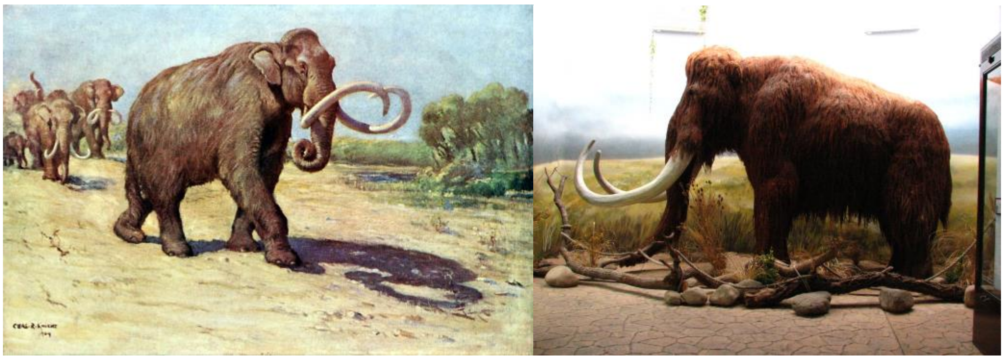
Oldest: Swartlintjies 2 (Miocene of South Africa) Late/Upper Miocene (**11.6 - 5.3 Ma**) to present.
Late/Upper Miocene (11.6 - 5.3 Ma), bed-level stratigraphic resolution. **11 Ma** (living fossil)



Left: African bush elephant *Loxodonta*[50]. Right: Skeletal system of *Loxodonta africana*[51]

(c) *Mammuthus* Brookes 1828 (8 species) Total: 549 collections including 567 occurrences

Oldest: Miocene to Pliocene of Ethiopia (3), South Africa (3), Uganda (1)
Miocene to Pleistocene of Ethiopia (1), the Netherlands (1), South Africa (1) (**11.6-5.3 Ma**)[52]
(Until 0.0037 Ma ago)



Left: "Reconstrucción de un mamut colombino de Charles R. Knight."[53]
Right: Another reconstruction of *Mammuthus* ("Reconstitution d'un mammouth, Dvůr Králové Zoo (en)."[54])

I chose these pictures of mammoths as having lived *not* in ice and snow – as they often are depicted (but where they could not have survived for long) – but in milder climates. For all the details to prove that this version is the best one, see please, the very punctilious, excellent work (17 books[55]) by Hans Krause on the mammoth: Full texts: http://www.hanskrause.de/indexEnglish.htm[57].

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[50] https://en.wikipedia.org/wiki/African_elephant

[51] According to https://animaltalk5.wordpress.com/2017/01/15/the-african-bush-elephant/ (All the above references retrieved 10 December 2018)

[52] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43265 Klick there: Miocene of South Africa. Last checked 24 January 2019.

[53] https://es.wikipedia.org/wiki/Mammuthus

[54] https://fr.wikipedia.org/wiki/Mammouth#/media/File:Mammoth-ZOO.Dvur.Kralove.jpg

[55] The book on the C14-Dates not included.

[56] Hans Krause (1931 - 2006) – Although he was one of the best analysts and keenest investigators on the Mammoth topic, he was something like an underdog in the Mammoth research community and was, for example, "deplatformed" (as Dawkins would have said [see, for example, https://evolutionnews.org/2017/07/dawkins-banned-in-berkeley/] for 3 talks at the congress "*The Worlds of Elephants*" in Rome on 17 and 19 October 2001 for perhaps the following simple reason, as Krause put it: "It might be, because some persons find it hard, to admit their mistakes, especially, if they have to do this openly, at an international conference. Some of them might find it hard to admit, that their assumed adaptation of the mammoth to an arctic climate is not science, only science fiction." See http://www.hanskrause.de/HKHPE/index_HKHPE_23_00.htm. But the deeper reason might have been that he saw a connection between the extinction of the mammoth and catastrophism, especially the biblical flood.

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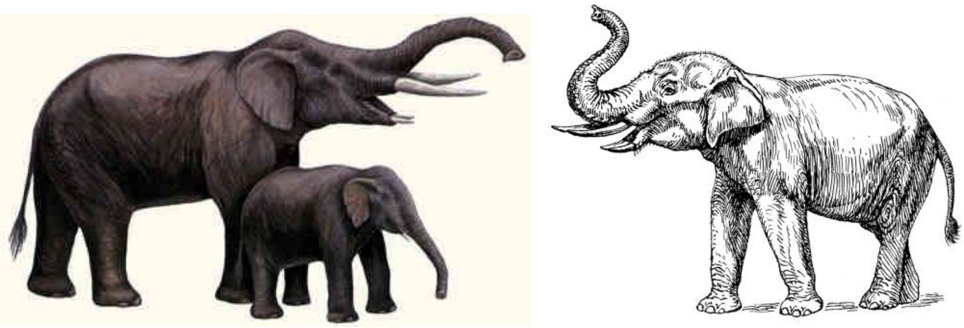
(d) *Primelephas* Maglio 1970 (1 species) Total: 28 collections including 29 occurrences (not the ancestor according to Prothero, but to many other authors – compare the evolutionary trees above & below).

Oldest: Lothagam-Lower Nawata Mb. (= ETE Locality 1064, Lothagam 1B, Lothagam 1A, Lothagam 1, Lothagam, Lothagam-Lower Nawata mbr) Tortonian[58] (**11.63-7.246 Ma**) – Cenozoic 6 – Kenya. Dated up to Zanclean of Pliocene (**3.6 Ma**). Several other sources speak of an age range of only 7.246-3.6 Ma. – In that case *Primelephas* would appear ***later***, not only than *Elephas*, but even than *Loxodonta* and *Mammuthus*.

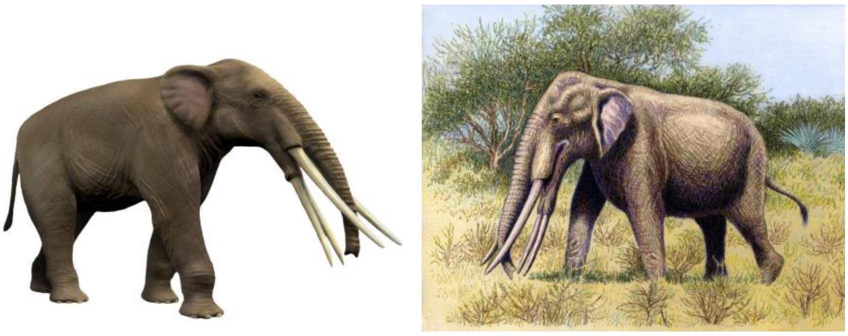


Left[59] and right[60]: Probably the most natural reconstructions of *Primelephas*

According to Prothero, Nowak and others, next in the line of the immediate ancestors of *Elephas*, *Loxodonta*, and *Mammuthus* is *Stegotetrabedolon* – in contrast to (as pointed out above) a considerable number of evolutionists who favour *Primelephas*. So, let's have a look at this animal:

(e) *Stegotetrabelodon* Petrocchi 1941 (3 species) Total: 22 collections including 23 occurrences.

Oldest: Edelény Formation, MN 9 **Age range: 11.1 - 9.7 Ma**[61]



Reconstructions of *Stegotetrabedolon*. Left: According to Nobu Tamura (2017)[62]
Right: Reconstruction according to Willem van der Merwe.[63] But on the left the trunk seems to be too short in comparison with the length of the tusks.

Age ranges of *Elephas, Loxodonta, Mammuthus, Primelephas,* and *Stegotetrabelodon* according to the best references and sources available to date: Paleobiology Data Base (PBDB) and Fossilworks (partially repeating the links in the

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[58] http://fossilworks.org/bridge.pl?a=collectionSearch&taxon_no=43267&max_interval=Miocene&min_interval_no=Pleistocene&country=Kenya&is_real_user=1&basic=yes&type=view&match_subgenera=1 (retrieved 7 December 2018)

[59] Several sources: http://palaeos-blog.blogspot.com/2013/03/sabias-que-elefantes-2.html, https://www.elephant.se/primelephas.php, and even here: http://parody.wikia.com/wiki/Primelephas

[60] https://it.wikipedia.org/wiki/Primelephas. So far I could not find out the original author of this reconstruction.

[61] https://paleobiodb.org/classic/displayCollResults?taxon_no=43259&max_interval=Miocene&country=Hungary&is_real_user=1&basic=yes&type=view&match_subgenera=1 (retrieved 24v January 2019)

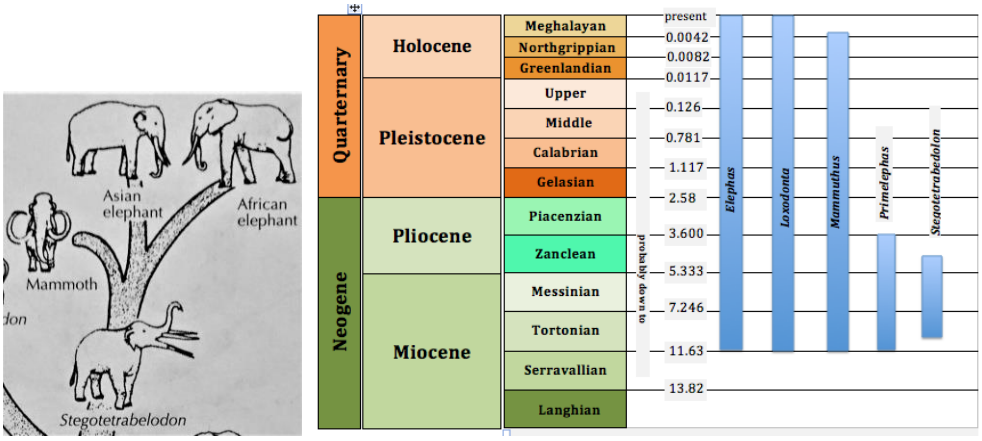
[62] https://de.wikipedia.org/wiki/Datei:Stegotetrabelodon_syrticus_life_restoration.jpg

[63] https://www.pinterest.de/pin/575968239823742409/

corresponding footnotes above for the reader to check directly the first appearances, especially because lower dates are wrongly given by many authors and sources for the following first three elephant genera [usually from 4.5 to 6.2 Ma]):

(a) *Elephas*	up to	11.6 Ma to present (First: Miocene of Kenia and Thailand)[64]
(b) *Loxodonta*	up to	11.6 Ma to present (First: Miocene, many places)[65]
(c) *Mammuthus*	up to	11.6 Ma to 4.000 years ago (First: Miocene, many places)[66]
(d) *Primelephas*	up to	11.6 Ma to 3.6 Ma (First: Miocene, many places)[67]
(e) *Stegotetrabedolon*	up to	11.1 Ma to 9.7 Ma ago (First: Miocene, many places)[68]

Thus, *Elephas*, *Loxodonta*, *Mammuthus*, and *Primelephas* appeared virtually simultaneously, and *Stegotetrabedolon* arrived half a million years later, but all five genera emerge abruptly in the fossil record. In the case of *Stegotetrabedolon* the parents seem to appear even *after* their children – everything seems to be possible in evolutionary theory (not to speak of ***accidents producing elephants***). Now, let's contrast the paleontological facts gained so far from Prothero's "Evolutionary history of the elephants" (being in mostly accord many other like-minded authors) by showing his phylogenetic scheme (left) side by side with the fossil data (right):



Left: Detail of Prothero's figure on the "Evolutionary history of the elephants". Right: Showing the contradiction of his scheme with the fossil record of the five elephant genera in question (Graph by Berthold Winterlich, Düren 2019.[69])

Since both, the Messinian and Tortonian belong to the Upper or Late Miocene and the differentiation between them is not always noted in the original papers, I follow Michael J. Benton's practice in his acclaimed FOSSIL RECORD 2[70] drawing the lines for Late Miocene down including the Tortonian (*cf.* example in the supplement)

So, what do we really know? Is *Stegotetrabedolon* the ancestor of the mammoths as well as the Asian and African elephants? Or is it *Primelephans*? Or is "*Stegotetrabelodon* leading to the *Mammuthus* lineage, and *Primelephas* […] the ancestor of *Loxodonta* and *Elephas*"? As already pointed out above: Fact is that there is neither a continuous series of transitional links by "infinitesimally small inherited variations" etc. in the sense of Darwin and the ruling neo-Darwinians as well as the updated *punk eek*, nor any species series in the sense of the proponents of the old, i. e.

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[64] See https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43264, https://paleobiodb.org/classic/displayCollResults?taxon_no=43264&max_interval=Miocene&country=Thailand&is_real_user=1&basic=yes&type=view&match_subgenera=1 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43264 but see http://fossilworks.org/bridge.pl?a=collectionSearch&taxon_no=43264&max_interval=Miocene&country=Thailand&is_real_user=1&basic=yes&type=view&match_subgenera=1 (most of the links retrieved in December 2018, this one checked again 24 January 2019)

[65] Ethiopia (1), Kenya (1), South Africa (1), Uganda (9) Chad (1), (1) https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43265 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43264 (When: Late/Upper Miocene (11.6 - 5.3 Ma) Swartlintjies 2 (Miocene of South Africa) https://paleobiodb.org/classic/displayCollResults?taxon_no=43265&max_interval=Miocene&min_interval_no=Pliocene&country=South%20Africa&is_real_user=1&basic=yes&type=view&match_subgenera=1 (checked again 24 January 2019)

[66] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43266 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43264

[67] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43267 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43264

[68] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43259 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43259

[69] Details according to http://www.stratigraphy.org/ICSchart/ChronostratChart2018-08.jpg right combined with the data from above.

[70] Benton M J (1994)/ Paperback (2016): Fossil Record 2. Springer. https://www.abebooks.co.uk/servlet/BookDetailsPL?bi=19667798720 (retrieved 26 Jan 2019). *Cf.* also by McKenna & Bell (1997/2000): Classification of Mammals. Columbia UP and R L Carroll (1993): Paläontologie und Evolution der Wirbeltiere. Thieme. Stuttgart.

the none-updated hypothesis of punctuated equilibrium (which still seems to be favoured by Prothero and several further authors), imagined to be leading from their contradictorily favoured different ancestors to their putative descendants.

Now, on the basis of the latest known fossil record, it is hardly possible anymore to derive *Elephas*, *Loxodonta*, and *Mammuthus* from either *Primelephas* or *Stegotetrabedolon* or both – the only alternative would be to derive them altogether from an entirely unknown common ancestor (at least if one does not want to derive the all five genera directly from *Gomphotherium* [see also below]).

For this obscure common ancestor, I'm going to apply the basic calculations for the origin of the giraffe by N. Ludo Badlangana et al. (2009)[71] and similarly Edgar Williams (2010, pp. 19-20)[72] as well as extrapolating from human fossil record to the putative evolution of the elephants by (1) phyletic gradualism and (2) punctuated equilibrium, now however for the updated version of *punk eek*:

> "Punctuated equilibrium accepts the conventional idea that species form over hundreds or thousands of generations and through a series of intermediate stages" (Gould)[73]. "I'd be happy to see speciation taking place over, say, 50,000 years . . . (Gould)"[74]. Or summary in Wikipedia (2018): "Although there exists some debate over how long the punctuations last, supporters of punctuated equilibrium generally place the figure between 50,000 and 100,000 years."[75]

Francisco Ayala commented on the punctuations in his review of Stephen Jay Gould's masterpiece, his *magnum opus* of 2002, *The Structure of Evolutionary Theory* (2005, pp. 104 and 102):

> "Gould reiterates in his new book, as he has repeated before, that the geological ''instants,'' during which ''sudden'' change occurs, typically encompass ***50,000 to 100,000 years***[76], and that these bursts of change result from the well-known processes studied by evolutionary geneticists, genetic mutation, and natural selection, yielding adaptive evolutionary change."
>
> "The discontinuities reflect periods during which sediments failed to accumulate that typically last 50,000 to 100,000 years or longer. Moreover, a time span of 100,000 years encompasses one million generations of insects such as *Drosophila*, or snails such as *Cerion* (Gould's subject of empirical research), and ***tens of thousands of generations of fish, birds, or mammals***. Speciation events and morphological changes deployed during thousands of generations ***may occur by the slow processes of gene substitution that are familiar to the population geneticist***."[77]

Application to the elephants: We are going to focus our attention on the latest paleontological data (see above) and not on the outdated information many authors still follow for the first appearances of *Elephas* (4.5 Ma to present), *Loxodonta* (6.2 Ma to present)[78], and *Mammuthus* (5.7 Ma – 4.000 years before present) in the fossil record, but accept dates for *Primelephas* (age range 7.2 to 3.6 Ma)[79] and *Stegotetrabedolon* (age range 7.5 – 4.5 Ma)[80].

But before we can do so, it seems to be necessary to clarify the ensuing point:

Also, in the discussion below, I am focusing on the elephant ***genera*** and not the species, extant and extinct. Main reason: The great majority of genera have been oversplitted into multiple morphological species, which forms, however, clearly and unambiguously ***genetically*** belong to just one species (as often tested and found for

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[71] Badlangana N U, Adams J W, Manger P R (2009): The giraffe (*Giraffa camelopardalis*) cervical vertebral column: a heuristic example in understanding evolutionary processes? Zoological Journal of the Linnean Society **155**: 736-757. See full text in https://academic.oup.com/zoolinnean/article/155/3/736/2627129

[72] https://books.google.de/books?redir_esc=y&hl=de&id=xi4jcqyLk6kC&q=punctuated#v=snippet&q=punctuated&f=false (***cf.*** **also details in Supplement, pt 3 below**)

[73] https://www.nap.edu/read/5787/chapter/6#56

[74] Full text of Roger Lewin (1980) Evolutionary theory under fire (*Science* **210**: 883-887): https://apologetyka.com/ptkr/groups/ptkrmember/spor/folder.2005-11-15.0080748368/Lewin

[75] https://en.wikipedia.org/wiki/Punctuated_equilibrium (retrieved 14 December 2018). I would classify Ian Alexander McFarland's 10,000 years for punk eek as its older, outdated version.

[76] Although Gould has used such numbers at other places of his work, I have to admit that I could not find these numbers in his *magnum opus* of 2002. Rather, there he uses the following analogy (p. 768): "As the gestation time of a human being represents 1-2 percent of an ordinary lifetime, perhaps we should permit the same general range for punctuational speciation relative to later duration in stasis. At an average species lifetime of 4 million years, **a 1-percent criterion allows 40,000 years for speciation**." He further emphasizes that "the punctuations of punctuated equilibrium do not represent de Vriesian saltations…" Also, very important is that **Gould defines punctuations "relative to the subsequent duration of the derived species in stasis**…" (same page).

[77] http://www.stephenjaygould.org/reviews/ayala_structure.pdf

[78] https://de.wikipedia.org/wiki/Afrikanische_Elefanten (retrieved 14 December 2018)

[79] https://de.wikipedia.org/wiki/Primelephas (retrieved 14 December 2018)

[80] https://de.wikipedia.org/wiki/Stegotetrabelodon (retrieved 14 December 2018)

extant genera)[81]. Oversplitting has been practiced by contemporary systematists and paleontologists alike. Thus, the authors have been able to put their names even behind **morpological variants** now ranked as a completely new species, which had recently been discovered in the field or the museum[82]. For a detailed analysis of the topic see Lönnig (1993/2003): *Artbegriff, Evolution und Schöpfung* (624 pp.). In contrast to Gould's following first sentence of such a "past taxonomic practice", I would like to emphasize that it is, in fact, still commonplace today. Nevertheless, I fully agree with the rest of Gould's statement as quoted below. Another key point is that the "*genus has traditionally been regarded as the lowest unit of rough comparability in paleontological data*". Gould states (2002, pp. 792/793 and 2007, pp. 72/73[83]):

> "I don't doubt, of course, that past taxonomic practice, ***often favoring the erection of a species name for every morphological variant*** (even for odd individuals rather than populations), has greatly inflated the roster of legitimate names in many cases, particularly for fossil groups last monographed several generations ago. (Our literature even recognizes the half-facetious term "monographic bursts" for ***peaks of diversity thus artificially created***. But this problem of past oversplitting cannot be construed as either uniquely or even especially paleontological, for neontological systematics then followed the same practices as well.) The ***grossly uneven, and often greatly oversplit, construction of species-level taxonomy*** in paleontology has acted as a strong impediment for the entire research program of the prominent school of "taxon-counting" (Raup, 1975, 1985). For this reason, **the genus has traditionally been regarded as the lowest unit of rough comparability in paleontological data** (see Newell, 1949). Sepkoski (1982) therefore compiled his two grat compendia – the basis for so much research in the history of life's fluctuating diversity – at the family, and then at the genus, level (***but explicitly not at the species level in recognition of frequent oversplitting*** and extreme imbalance in practice of research among specialists on various groups)."

Example: The great Haeckel, the leading biologist who established Darwinian evolutionary theory in the German speaking countries, justified his system of Human species (***twelve species in four genera*** of contemporary human beings), among other things, by pointing out:

> "that our progressive knowledge of animal forms always leads to an ever-increasing division of the groups. Related species united by Linné in one genus, by Cuvier in a family, now form an extensive order with several families and many genera" (1911, p. 754).

Fact is that today all informed biologists – I don't know of any exceptions so far – agree that "all humans who are living at present belong to one species: ***their matings have fertile offspring***" (Vogel and Motulsky) or Eldredge and Tattersall:

> "Today we are but a single species, Homo sapiens, and some [8] billion of us have encircled the globe. We are eurytopic: our adaptations are broad and general. Our cultures, diverse as they are, serve to fit us to the physical exigencies of the wide variety of environments in which we live. But we are a single species."[84]
>
> "The billions of human beings living today all belong to one species: *Homo sapiens*" (Smithonian Inst. 2018).[85]

So, at least in that case – almost a rare exception – oversplitting has been corrected.

Now, let's continue with the revised data for the time ranges of *Elephas*, *Loxodonta*, *Mammuthus*, *Primelephas*, and *Stegotetrabelodon*: All five genera lived *contemporaneously* for enormous periods of time. And based on this record the following numbers of generations would have been involved in their origin from an

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[81] Incidentally, Cuvier, who "possessed one of the finest minds in history", has been proven terribly right on global and local catastrophism, was also right in his groundbreaking paper on the anatomy and systematics of the elephants: See his famous paper of 1796 *Mémoire sur les espéces d'éléphans vivantes et fossilies* (published 1800): https://www.biodiversitylibrary.org/page/16303001#page/175/mode/1up https://www.geni.com/people/Georges-Cuvier/6000000029559543751

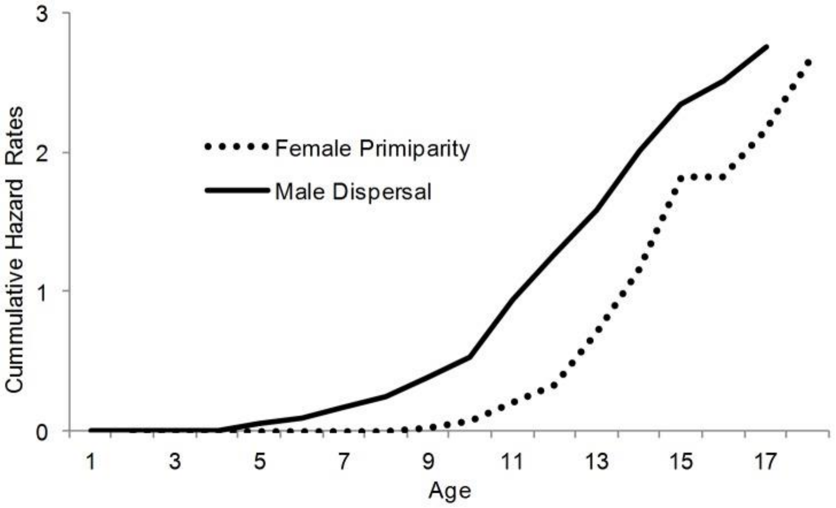
[82] Understandably human – for who cares and pays for just another morphological variant? – But an entirely new species: that's really something different.

[83] Gould (2002): Reference see above. (2007): Punctuated Equilibrium. Also: The Belknab Press of Harvard University Press. Cambridge, Mass. and London, England.

[84] See references http://www.weloennig.de/AesIIMe.html

[85] http://humanorigins.si.edu/evidence/genetics/one-species-living-worldwide (retrieved 19 December 2018). As for Human Evolution, see please, Bechly (28 November 2018): https://evolutionnews.org/2018/11/rewriting-of-human-origins-ongoing-in-east-asia/

unknown common ancestor according to (1) gradualism and (2) *punk eek* (calculating the time for an elephant generation as some 20 years – complaisantly for evolutionary theories; had I followed our evolutionary minded giraffe authors, defining a generation "as the time between birth and first birth of a calf", the generation numbers would be definitely higher, of course). [86]



Note, please, in the context of our discussion especially the onset female primiparity. After Wittemeyer et al. (2013): Comparative Demography of an At-Risk African Elephant Population: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0053726

Elephant genera: Time and numbers of generations for their putative evolutionary origins:

Gradualism: Minimal time for ***Elephas***, ***Loxodonta***, ***Mammuthus***, ***Primelephas*** and ***Stegotetrabedolon*** to evolve from an unknown common ancestor at least ~ 4 Ma[87] (so 200,000 transitional generations for each; detection of transitional forms expected ~ 2,800 for each; no series of transitional forms found)[88]. However, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~ 7 Ma or more with correspondingly higher numbers of generations and missing links.

Punk eek: Minimal time for ***Elephas Loxodonta***, ***Mammuthus***, ***Primelephas*** and ***Stegotetrabedolon*** to evolve from an unknown common ancestor (applying Gould's 1 percent criterium to the genera: see above): ~ 45,000 years (at least 2,250 transitional generations for each; detection of transitional forms expected ~ 31 for each putative line; no transitional forms found). Maximal time ~100,000 years (so 5,000 transitional generations for each line ~ detection of transitional forms expected ~ 70 for each hypothetical line; no transitional forms found).

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[86] https://www.iucnredlist.org/species/7140/12828813: "The life span of **Asian elephants** is 60 to 70 years, and males reach sexual maturity at between 10–15 years of age; ***females usually first give birth in years 15 or 16*** (Shoshani and Eisenberg, 1982)."
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3869725/: Asian E. "Reproduction was seasonal, such that most births occurred during the long inter-monsoon dry season and peaked in May. During the study, the average age at first reproduction was 13.4 years and the 50th percentile inter-birth interval was approximately 6 years."
http://wildpro.twycrosszoo.org/S/0MProboscidae/Elephantidae/Loxodonta/Loxodonta_africana/07LoxAfrLifePhys.htm: "**African elephant**: Sexual maturity: In optimum conditions, **elephants may become sexually mature at about 10 or 11 years old**. Both nutritional and social factors may affect sexual maturity, so that puberty may be delayed to about 16 - 18 years of age in drought conditions or in an overcrowded population. Males, although they may be producing sperm at as young as 10 - 13 years, are unlikely to be able to compete successfully with other males and actually mate a female under about 20 years of age. […] Female African elephants are most fertile at about 18 to 19 years old, with declining fertility after 40 years old, although they may remain reproductively active to 52 years." Both, Badlangana et al. (2009) with reference to Dagg & Foster (1976), and Edgar Williams (2010) (see references above), **defined a generation "as the time between birth and first birth of a calf"** (Williams p. 19) for their evolutionary calculations. Other authors, mostly in a non-evolutionary context, define the term generation often differently ("average time between two consecutive generations in the lineages of a population"). Herve Fritz (2017) on the elephant: "With an average generation time close to 25 years (Wittemyer et al. 2013), elephants are very long-lived mammals. They also show a rich and complex social life and potentially have massive short- and long-term effects on their environment." https://academic.oup.com/jmammal/article/98/3/603/3855617 See also Wttemyer et al. 2013: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3547063/ ("…mean generation time was 24.1 years."). So, by 20 years I chose something like a mean value between the different definitions.

[87] This appears to be a **conservative number**: The data for the gradual evolution of a new genus vary considerably. For the first appearance of *Australopithecus anamensis* over several additional *Australopithecus species* to *Homo sapiens* some 4 million years. The divergence time for humans and chimpanzees about 7 to 8 million years, for *Misopathes orontium* and its next relative *Antirrhinum majus* between 21 and 36 million years. See Lönnig et al. 2007, p. 15: http://www.weloennig.de/Dollo-1a.pdf Humans and *Australopithecus*: Shorter times according to Kimbel at al (2016): From *Australopithecus* to *Homo*: the transition that wasn't" https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4920303/ "Although the transition from *Australopithecus* to *Homo* is usually thought of as a momentous transformation, the fossil record bearing on the origin and earliest evolution of *Homo* is virtually undocumented." (This seems to be almost *punk eek*) …"By almost all accounts, the earliest populations of the *Homo* lineage emerged ***from a still unknown ancestral species in Africa*** at some point between approximately 3 and approximately 2 million years ago." However, into which direction ever one may vary that number – plus or minus – even in the latter case enormous numbers of transitional links would have to be postulated for gradualism: For instance: 2 million years 100,000 generations ~1,400 transitional links; or 21 million years: 1,050,000 generations ~ 14,700 transitional links.

[88] See further reasons below for the numbers given.

Intelligent design: ***Elephas Loxodonta***, ***Mammuthus***, ***Primelephas*** and ***Stegotetrabedolon Elephas*** did not evolve from a common ancestor, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes[89], for more see, please, point 10 in the summary at the end of the paper.)

The generally raised objection that numbers like 45,000 years with of 2,250 generations, or up to some 100,000 years with 5,000 generations, are much too low to leave any transitional fossils is invalid and usually appears to be nothing but a feeble excuse for the assertion: Macroevolution is an unassailable fact. Just let's contemplate human history ***according to evolutionary presuppositions***: how many fossils have been dated to be between 100,000 and 45,000 years and also younger![90]. Almost 70 "names" for often several fossil groups have been given for the last 100,000 years of human evolution[91] and more than 40 for the last 45,000 – 50,000 years[92]. And let's recall, please, that the elephants have an "excellent fossil record" (already in 1796 Cuvier had mentioned "the enormous quantity of fossil bones about which so many writers have spoken", which – starting with this author – were subsequently examined with scientific thoroughness and rigorosity; i.e. at a time and then for decades when nothing of human fossils was known)[93].

Corresponding numbers of expected transitional forms have been calculated above and for the further evolutionary scenarios on the basis of that (although largely hypothetical) human evolution, being aware of the fact that the investigations of the elephant fossil record *started more than ~100 years earlier* than that for humans – so the former record should be much less imperfect than the latter. Method: humans: 70 'transitional links' in 100,000 years with 4,000 generations (generation time 25 years) 70 : 4,000 = 0.0175 link per generation. However, 100,000 years for the elephants with a generation time of 20 years is 70 : 5,000 = 0.014 – accordingly the postulated numbers of transitional forms were given on the previous page for 4,000,000 years.

Although these are, of course, all relatively rough calculations, they help to convey the magnitude of the evolutionary transitional forms expected in the excellent elephant fossil record in strong contrast to the fossil facts really found.

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[89] Orphan genes have been found, often en masse, in virtually all organisms tested so far, even in single genera or species, so that we might extrapolate this discovery also to fossil species and genera:
https://evolutionnews.org/2018/11/about-orphan-genes-whats-the-big-problem-for-evolution/ https://evolutionnews.org/2018/04/a-pattern-problem-brochosome-proteins-encoded-by-orphan-genes/ https://evolutionnews.org/2018/03/adam-and-the-genome-and-the-origin-of-de-novo-genes/ https://www.youtube.com/watch?v=gH2Gu-07ps8
And perhaps a talk: https://www.youtube.com/watch?v=gH2Gu-07ps8

[90] *Cf.* for example https://en.wikipedia.org/wiki/Timeline_of_human_prehistory

[91] https://en.wikipedia.org/wiki/List_of_human_evolution_fossils (retrieved 19 December 2018) See also again Bechly (28 November 2018): https://evolutionnews.org/2018/11/rewriting-of-human-origins-ongoing-in-east-asia/ See, please, also John Sanford https://www.contestedbones.org/ /*Cf.* the YouTube series on "contested bones": https://www.youtube.com/watch?v=e6ZOKj-YaHA

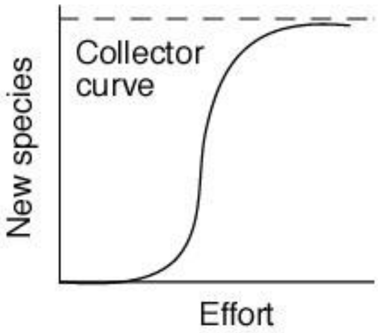
[92] Even the Galapagos Islands have a considerable fossil record. One of the the best summaries I could detect so far was given on a creationist site: "Fossils collected from the lava tubes include tens of thousands of bones and bone fragments of birds, reptiles, and mammals, as well as shells of land snails [2, 8, 9]. The vertebrate remains **include specimens of the most iconic Galápagos species, such as the giant tortoise, land iguana, finches** [*Geospiza nebulosi* (E), *G. fuliginosa, G. fortis, G. magnirostris* (E), *G. crassirostris, G. scandens, G. parvula* (?), *G. pauper, G. olivacea, Geospiza*, sp. Indet: Just from Isla Floreana, the smallest of the inhabitated Galápagos Islands – see Steadman (1986): https://pdfs.semanticscholar.org/2092/bae7e25dcbc19d0ac33de03210b0672e8d57.pdf] **and mockingbirds**, together with species of rodents, snakes, lizards, geckos, bats, and birds." R. Nalin (2016): https://www.grisda.org/fossils-of-the-galapagos-a-review-with-implications-for-creationist-models-1; see also evolutionists Steadman et al. (1991) "A Holocene fossil record **approaching 500,000 bones**, more than 90% of which predate the arrival of people, shows that most or all cases of extinction or extirpation in the Galápagos occurred after first human contact in AD 1535." [https://www.sciencedirect.com/science/article/pii/003358949190021V]: See also Michael Dvorac et al. (2017): https://onlinelibrary.wiley.com/doi/abs/10.1111/jofo.12197 And https://www.researchgate.net/publication/259354568_Microrefugia_and_species_persistence_in_the_Galapagos_highlands_A_26000-year_paleoecological_perspective concerning plants on 26,000 year paleoelogical perspective by Collins et al. (2013).

[93] https://www.geni.com/people/Georges-Cuvier/6000000029559543751 (Jean-Léopold Nicolas Fréderic dit Georges Cuvier) (Retrieved 26 December 2018)
This appears to be especially revealing becaues at his time many people thought that "L'homme fossil n'existe pas!" But:"Das oft Georges Cuvier zugeschriebene Zitat stammt in dieser dogmatischen Absolutheit wohl eher von seinen Schülern, er selbst sah die Sache etwas entspannter: „Je n'en veux pas coclure que l'homme fossile n'existait point de tout avant cette epoque. Il pouvait habiter quelques contrées peu étendu, d'où il la repeuplé la terre après ces événements terrible (Cuvier 1825, S. 138)."
Suhr D (2018, p 11): Das Mosaik der Menschwerdung. Springer-Verlag GmbH Deutschland. Berlin.

Incidentally, the basic problem of the missing links reminds me of a verdict of Donn Rosen of the American Museum of Natural History: "*Darwin said that evolution happened too slowly for us to see it. Gould and Eldredge said that it happened too quickly for us to see it. Either way, we don't see it.*"[94]

To emphasize: As for the doubtful objection that numbers like 45,000 years with of 2,250 generations, or 100,000 years with 5,000 generations, are much too low to leave any transitional fossils, let's recall how many fossils have been dated for human history to be between 100,000 and 45,000 years and also younger[95] and let's always keep in mind that the elephants have an "excellent fossil record".

Assuming that after almost 250 years of research, the collector's curve for the "excellent fossil record", for the "the enormous quantity of fossil bones" of the elephants is in the asymptotic phase, one can, of course, (and I do so) still predict that some further genera and especially several new "species" will be detected.



"A complete discovery curve (= collector curve) might plot as a logistic, or S-shaped, curve, with a slow rate of discovery at the start, then a rapid rate of discovery, followed by an asymptote as sampling has recovered nearly all taxa."[96]

However, the expectation that the postulated continuous series of the altogether thousands of transitional links between the presumed ancestors and their putative descendants will ever be found appears to unrealistically optimistic, not least because these links most probably have never have existed at all. Both, neo-Darwinism and the old as well as the updated *punk eek* hypotheses, have been falsified by the paleontological record.

To repeat: Georges Cuvier: "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."

Antoine-Laurent de Jussieu: "It is in this mutual dependence of functions, and this reciprocal assistance, that the laws which determine the relations of their organs are founded, and which are of a necessity equal to that of the metaphysical or mathematical laws: for it is evident that the proper harmony between the organs which act upon one another is a necessary condition of the existence of the being to which they belong, and that if one of its functions be modified in an incompatible manner with the modifications of others, this being could not exist."

W-E L: Any scientist who has ever systematically worked with mutants will immediately be able to give a range of examples corroborating this verdict. 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. For Cuvier and Antoine-Laurent de Jussieu *cf.* links above.

In spite of all autapomorphies, the following insert on intermediates (which on closer inspection regularly are not transitional) is perhaps especially relevant for our Darwinian friends:

> W R Thompson FRS (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**."[97]

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[94] Tom Bethell (2017, p. 135): Darwin's House of Cards. Rosen, "formerly chairman of the museum's Department" was interviewed by Bethell in the early 1980s.

[95] *Cf.* for example https://en.wikipedia.org/wiki/Timeline_of_human_prehistory

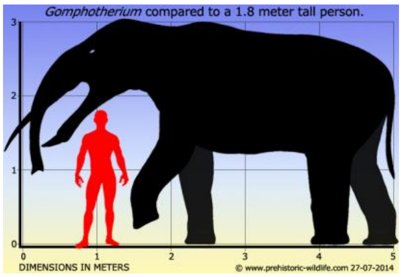
[96] http://palaeo.gly.bris.ac.uk/macro/naming/discoverycurve.html (retrieved 14 December 2018)

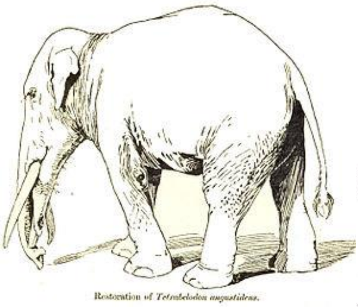
[97] Thompson W R (1967) Introduction to Darwin's Origin of Species. Everyman's Library No. 811, reprint of the sixth edition of Darwin's book of 1872

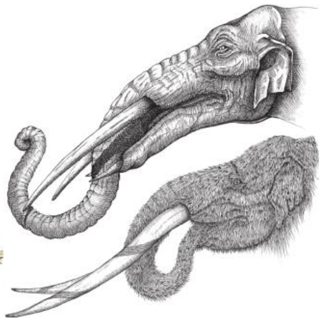
Gomphotherium

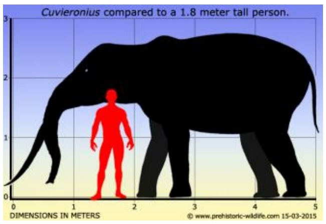
Family Gomphoteriidae Hay 1922

Next in Prothero's (and that of many other author's) line of ancestors leading to the modern elephants and *Mammuthus* is ***Gomphotherium*** (Oligocene) Total: 202 collections including 206 occurrences. Age range: 23.03 to 0.012 Ma[98].









Above left: Skeleton of *Gomphotherium* (photo by Ryan Somma)[99]
Above right: Reconstruction according to *Prehistoric Wildlife*[100]
Middle row: Reconstruction according to *paleophiles*[101]
As to such relatively short trunks, one may ask whether they were already "long enough to reach the plants scooped up on the bottom tusks and long enough to pick up water" (see quotation below) – wouldn't the tusks be in the way?
So, other authors reconstructed *Gomphotherium* with long trunks:
Below left: Reconstruction of *Gomphoterium angustidens* (Andrews 1908, p. 25, using the name *Tetrabelodon angustidens*).[102]
Middle: Reconstruction of *Gomphotherium* and below that of *Cuvieronius*[103] according to paleontologist Spencer G. Lucas (2014, p. 149).[104]
Right *Cuvieronius*: Interestingly, this is usually depicted with long trunks.[105]

Considering the age range of 23.03 to 0.012 Ma, the first point that may be noticed is that *Gomphotherium* lived ***contemporaneously with all the other genera of elephants***, extinct and extant *for almost the full time of their existence*: *Elephas* (Asian elephant), *Loxodonta* (African elephant), *Mammuthus* (at least 5.3 Ma – 0.0037 Ma),

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[98] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43268
[99] https://commons.wikimedia.org/wiki/File:Gomphotherium_productum.jpg (retrieved 23 December 2018)
[100] http://www.prehistoric-wildlife.com/species/g/gomphotherium.html (retrieved 23 December 2018)
[101] https://sites.google.com/site/paleofilescom/gomphotherium (retrieved 23 December 2018)
[102] https://archive.org/details/guidetoelephants00britrich/page/24 and https://de.wikipedia.org/wiki/Gomphotherien (retrieved 24 December 2018)
[103] "Cuvieronius is an extinct New World genus of gomphothere and is named after the French naturalist Georges Cuvier" https://en.wikipedia.org/wiki/Cuvieronius. Age range ~4.9–0.0134 Ma.
American paleontologist Spencer George Lucas is curator of paleontology at the New Mexico Museum of Natural History and Science. http://www.nmnaturalhistory.org/paleontology-curators/spencer-g-lucas-ph-d
For another reconstruction of a Gomphotherium with a long trust see http://www.ucmp.berkeley.edu/mammal/mesaxonia/gomphotheriidae.php
[104] https://www.researchgate.net/figure/Restoration-of-the-heads-of-two-Central-American-gomphotheres-Gomphotherium-above-and_fig6_285206729.
[105] See, for example, as shown in: http://www.prehistoric-wildlife.com/species/c/cuvieronius.html

Stegotetrabedolon, *Tetralophodon*, *Anancus*, *Stegodon*, *Zygolophodon*, American *Mastodon*, *Deinotherium*, showel-jawed *Mastodon*s – just to mention the forms depicted in Prothero's "Evolutionary history of the elephants" (see above), to be added from other figures by at least *Primelephas*. The continuous series of connecting links to be postulated by gradualism and *punk eek* alike are always missing.

To illustrate the significance, force and weight of this point, let's imagine for a moment that one or several of the putative ancestors of *Homo sapiens* – like *Sahelanthropus tchadensis*, *Orrorin tugenensis*, *Ardipithecus ramidus* and *Australopithecus anamensis*[106] – would have been still alive, flourishing and going well with millions of individuals of modern man and became extinct just recently, say a few hundred years ago (like the Dodo around 1690).

The probably long trunk, being one the most distinctive characters of the elephants, has unfortunately not been fossilized in *Gomphotherium* so that:

> "The ***length of the trunk can vary greatly in artistic renderings*** but palaeontologists believe that the trunk would have been on the shorter side because of the low profile of the elongated skull. Beyond this there is currently no way of knowing exactly how long the trunk was, but logic would dictate that it would need to be long enough to be of practical use. This would mean at least long enough to reach the plants scooped up on the bottom tusks and long enough to pick up water,…(Prehistoric Wildlife 2014)"[107]

"…but [evolutionary] palaeontologists believe that the trunk would have been on the shorter side because of the low profile of the elongated skull"? Why this "believe"? Possibly, because of their desperate need for "transitional links". On the other hand, one could argue that the low profile of the elongated skull already points to special functions necessitating also an extraordinarily long trunk say to reach into deeper waterholes or to help "dig up aquatic vegetation near lakes or swamps". So, evolutionary geologist and paleontologist Mohammed Hilal Al Kindi (2018) suggests that they probably had long trunks:

> "*Gomphotherium* … appeared about 14 million years ago during the Miocene [14 million years of Oman?] and became extinct after more than eleven million years during the Pliocene about 3.5 million years ago (Fig.15). […] *Gomphotheriums* **were very similar to modern-day elephants but had four tusks** – two on the upper jaw and two on the lower. The upper tusks pointed gently to the body, whereas the lower were upwardly shaped and were probably used shovels to dig up aquatic vegetation near lakes or swamps. […] They fed on trees and shrubs or mangroves living on the shores of lagoons or coastal inlets.
>
> *Gomphotheriums* also had elongated and and low skulls and ***probably long trunks*** to allow them to pick up their food (Fig. 5.15). However, in general, they were smaller in size than the giant proboscideans of the Miocene. The evolution history of the gomphotheriums is still not well understood" (Al Kindi 2018, pp. 156/158).[108]
>
> "*Gomphotherium* was **as large as a modern Asian elephant**" (Raman Sukumar 2003, p. 16).[109]
>
> "This animal attained the size of a **moderately large Indian elephant** […] traces of its [the trunk's] original elongated condition are retained in the occurence of deciduous lower incisors in some species of *Mastodon* and in the peculiar sharp process of the symphysis of the Elephants."[110]
>
> Two years later, same author: "This animal is **as large as a medium-sized elephant**…"[111] (Context African elephant.)

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[106] „Nach dem Fund des rund 6 Millionen Jahre alten Orrorin tugenensis im Jahr 2000 und des 7 bis 6 Millionen Jahre alten Sahelanthropus tchadensis im Jahr 2001 (in der Fundstelle TM 266) wurden beide Arten als bereits aufrecht gehende, älteste bisher bekannte Arten der Hominini ausgewiesen und somit als ***direkte Vorfahren des Menschen.*** Allerdings steht diese Deutung in Widerspruch zu den anhand der molekularen Uhr errechneten Befunden, denen zufolge die Trennung der zu Homo und zu den Schimpansen führenden Entwicklungslinien erst vor 5 bis 6 Millionen Jahren erfolgte."… „Bereits 1994 waren in Äthiopien Fossilien von *Ardipithecus ramidus* entdeckt worden. Sie sind 4,4 Millionen Jahre alt und werden von vielen Forschern ***ebenfalls zu den direkten Vorfahren des Menschen gestellt***."…"Zu den durch Fossilienfunde relativ gut bekannten, bereits aufrecht gehenden ***Vorfahren des Menschen*** gehören die Australopithecinen, speziell die Gattung Australopithecus."… "Anhand von genetischen Markern wurde berechnet, dass vor 1,2 Millionen Jahren nur rund 18.500 Individuen aus der direkten Vorfahrenlinie des *Homo sapiens* lebten." https://de.wikipedia.org/wiki/Stammesgeschichte_des_Menschen (retrieved 28 December 2018) "Lucy was classified as a new species, ***Australopithecus afarensis***, which is thought to be more closely related to the genus *Homo* as a ***direct ancestor***, ***or as a close relative*** of an unknown ancestor, than any other known hominid or hominin from this early time range;" … "…*Homo heidelbergensis* which may be the ***direct ancestor*** of both *Homo neanderthalensis* and *Homo sapiens*." https://en.wikipedia.org/wiki/Human_evolution (retrieved 28 December 2018). For scientific arguments against all these hypothesis see again Bechly (28 November 2018): https://evolutionnews.org/2018/11/rewriting-of-human-origins-ongoing-in-east-asia/ See, please, also John Sanford https://www.contestedbones.org/ /Cf. the YouTube series on "contested bones": https://www.youtube.com/watch?v=e6ZOKj-YaHA

[107] http://www.prehistoric-wildlife.com/species/g/gomphotherium.html (as above)

[108] Mohammed Hilal Al Kindi (Of the Earth Sciences Consultance Center Muskat, Oman and German University of Technology, Muskat, Oman.) (2018): Evolution of Land and Life in Oman: An 800 Million Year Story. Springer. Cham, Switzerland. (Springer International Publishing AG, part of Springer Nature 2018.

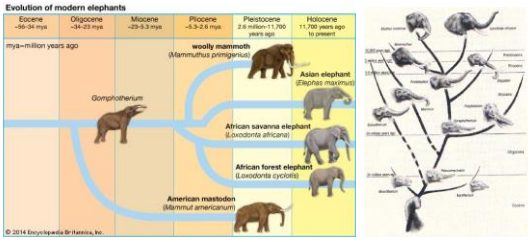
[109] Raman Sukumar (2003) The Living Elephants. Oxford University Press. New York.

[110] Andrews C W (1906, p. xix). https://www.biodiversitylibrary.org/item/115776#page/26/mode/1up

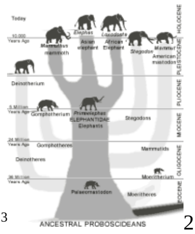
[111] Andrews C W (1908, p. 21 below): https://archive.org/details/guidetoelephants00britrich/page/20

The modern Asian or African elephant would probably be strongly handicapped with such relatively short trunks as depicted in several reconstructions of *Gomphotherium*. This may have been one of the reasons why the British vertebrate paleontologist Charles William Andrews (1866-1924; FRS)[112] who (in his *Guide to the elephants exhibited in the department of geology and paleontology in the British Museum*) reconstructed *Gomphotherium* with a definitely longer trunk (reaching to the ground) already in 1908 (see reconstruction above).

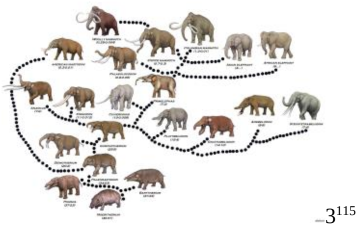
Now, was *Gomphotherium* actually the direct (or at least the potential) ancestor of the many elephant genera suggested by 2 of the phylogenetic trees above and 6 below?



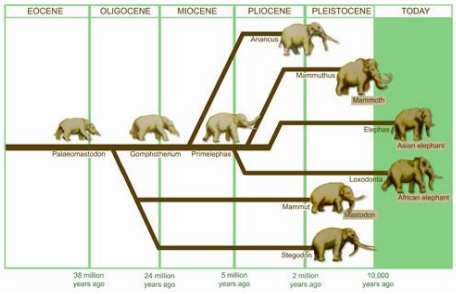
1[113]



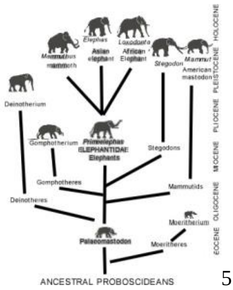
2[114]



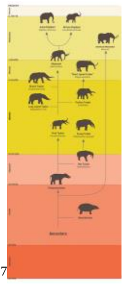
3[115]



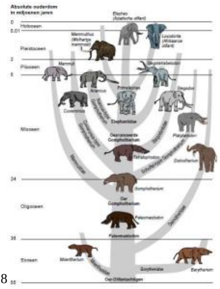
4[116]



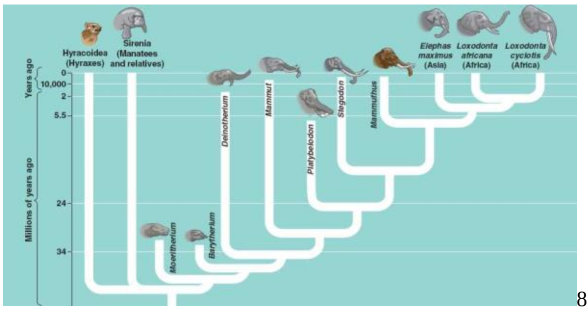
5[117]



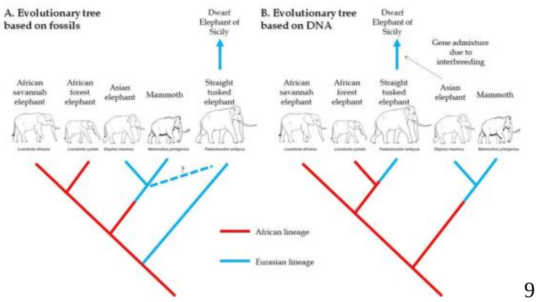
6[118]



7[119]



8[120]



9[121]

For the details of these evolutionary trees, enlarge/zoom, please, this PDF document to a correspondingly higher percentage.

Comments: In the first two pedigrees (they are from the same link) *Gomphotherium* is depicted as a ***direct ancestor*** of the modern elephants and the woolly mammoth. In the third figure (same row) created by famous elephant researcher J. Shoshani *Gomphotherium* is ***on a side branch*** without any descendants (and the branch starting long before the time of the appearance of *Primelephas*, which – instead of *Stegotetrabedolon* – is suggested by Shoshani to belong to the ancestor group of modern elephants). The next two genealogies (3 and 4) ***again depict Gomphotherium as 'missing link' and ancestor***, but on (5) the museum evidently follows Shoshani: ***Gomphotherium is again on a side branch***. Yet the next two (6 and 7) represent ***it anew as an ancestor for other elephants***. In the row below in number (8) ***all elephant genera are on side branches***. And on number (9) ***all evolutionary trees not based on DNA are false***: "Ancient DNA changes everything we know about the evolution of elephants". However, usually there is also a ***series of contradictions between such latter trees*** if several researchers publish their results independently: See for example S. C. Meyer in Darwin's Doubt (2013/2014). Or W-E L directly: http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf pp. 299-301.

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[112] https://en.wikipedia.org/wiki/Charles_William_Andrews (retrieved 24 December 2018). It is perhaps interesting in our context of elephant origins that after 1900 "he joined Beadnell of the Geological Survey of Egypt, inspecting fossils of freshwater fishes in the Fayoum, where Andrews noticed mammalian fauna not previously detected and published ***Moeritherium*** and an early elephant, ***Palaeomastodon***, followed by his Descriptive Catalogue." (Retrieved 24 December 2018)

[113] https://elephantcountry.org/article/evolution-elephants-0

[114] http://elephant.elehost.com/About_Elephants/Stories/Evolution/evolution.html

[115] http://yousense.info/656c657068616e74/elephant-evolution.html

[116] https://www.reed.edu/biology/professors/srenn/pages/teaching/web_2006/Georgia_Lacy_Elephants/phylogeny.html

[117] http://hoopermuseum.earthsci.carleton.ca/PleistoceneWebsite/mammoth04.htm

[118] http://paleosleuths.org/elephants.html

[119] https://biologiepagina.nl/Toetsen/evolutie/evolutie.htm

(all nine links retrieved 27/28 December 2018)

[120] http://bio1903.nicerweb.com/Locked/media/ch22/descent.html Text: https://www.google.de/search?biw=1337&bih=938&tbm=isch&sa=1&ei=ZmAlXLKRK9GZkwXL74_ADA&q=elephant+evolution+sirenia&oq=elephant+evolution+sirenia&gs_l=img.3...18183.23858..24511...0.0..0.41.694.20......0....1..gws-wiz-img.......0i19j0i30i19j0i5i30i19j0i8i30i19.kGA3tFA4GaA#imgrc=KwLEHFIsY7rfiM

[121] http://theconversation.com/ancient-dna-changes-everything-we-know-about-the-evolution-of-elephants-94426

I leave it to the intelligent reader to detect the many additional differences between the evolutionary trees as shown on the page before and further above.

So, what do we really know? Was *Gomphotherium* (1) a direct ancestor of the modern and other elephants or (2) a potential ancestor, or (3) was it a fossil group of *Gomphotherium* species, or (4) was *Gomphotherium* a side branch of the putative evolutionary tree absolutely without any further descendants? (5) Or is intelligent design involved due to autapomorhies, specified and irreducible complexity?

After about a century of careful analyses of the *pros* and *cons* for proofs of ancestor-relationships of fossil formes, the following conclusion of the matter has been generally accepted by virtually all well-informed paleontologists and neontologists alike, and this has already been so for ***for many decades***, so that even evolutionary hardliners like Prothero and others seem to have accepted it – at least paying lip service to it (see below).

As evolutionary biologist Gareth J. Nelson[122] has formulated in his renowned paper of 1969 (and further elaborated 2005[123] and 2014[124]) – with a strong impact and aftereffects to this very day (see, for example, Prothero 2017 as quoted below):

> (1969, p. 22) "***It is a mistake to believe even that one fossil species or fossil "group" can be demonstrated to have been ancestral to another***. The ancestor-descendant relationship may only be assumed to have existed in the absence of evidence indicating otherwise." (P. 23) "The history of comparative biology teaches us that the search for ancestors is doomed to ultimate failure; thus, with respect to its principal objective, this search is an exercise in futility. Increased knowledge of suggested "ancestors" usually shows them to be too specialized to have been direct ancestors of anything else."[125]

And on Nelson's *Presentation to the American Museum of Natural History*, also in same year, David Williams and Malte Ebach commented in 2010, p. 613:

> "***Nelson's talk caused an outrage***. Previously, fossil taxa that were similar to younger species were **labeled as ancestors** and a lineage was proposed based on the rates of similarity and the arrow of time dictated by the rock record. Biologists or "neontologists" were dismissed as possessing neither the faculty nor the data to find evolutionary relationships. Paleontology was thought to be superior, and, as a consequence, **many fossils were thought to be real ancestors**.[126]

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[122] https://fr.wikipedia.org/wiki/Gareth_Jon_Nelson (retrieved 1 January 2019; absent in other languages of Wikipedia).

[123] Nelson G V (2005): Cladistics: Its arrested development. In: Williams D.M., und P. L. Forey (Eds.) Milestones in Systematics. The Systematics Association Special Volume Series 67, pp. 127 -147. See a quotation in http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf p. 284, footnote 538.

[124] Nelson G V (2014): Cladistics at an earlier time. Pp. 139-149 in: Hamilton A (Editor) (2014): The Evolution of Phylogenetic Systematics. University of California Press. Berkeley.

[125] Nelson G V (1969): Origin and diversification of teleostian fishes. Annals of the New York Academy of Sciences. ***167***: 18-30. First published: October 1969 https://nyaspubs.onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.1969.tb20431.x (The quotation just given above has been reproduced with mistakes at least twenty times by, for example, the *Genesis Park*, members of Evangelical and other Christian denominations, Muslims, Hindus, and others nad even several evolutionists (as retrieved 2 January 2019). The errors to be mentioned here are: Instead of "It is a mistake ***to believe even*** that one fossil species…" they write: "It is a mistake ***to believe that even*** one fossil species…" Often instead of Gareth **J**. Nelson, they speak of Gareth **V**. Nelson, and instead of **1969** they often quote it from **1971**. Am I incorrect to suppose that they just copied the text from each other without checking the original article?

Context for pp. 22/23: The writer does not wish to underestimate the importance of paleontology, which, after all, can give us some idea of the absolute ages and past distributions of the Recent species and higher taxonomic groups, matters of great importance to evolutionary studies. In addition, paleontology often can give us some indication of the direction and magnitude of phyletic trends. But it is a mistake, all too often committed, to assume that an earlier known fossil species in structure or distribution necessarily is more primitive than, or ancestral to, a later know fossil or Recent species. It is a mistake to believe even that one fossil species or fossil "group" can be demonstrated to have been ancestral to another. The ancestor-descendant relationship may only be assumed to have existed in the absence of evidence indicating otherwise. This relationship logically has the status of a null hypothesis: that of no difference between some fossil species or group and a conception of an ancestor (e.g. the "morphotype" of Zangerl, 1948) defined on the basis of primitive characters, i.e., specializations which are absent. As such, the relationship is supportable only by negative (unavailable) evidence and is of questionable value as a scientific hypothesis. The history of comparative biology teaches us that the search for ancestors is doomed to ultimate failure; … In this connection, G. G. Simpson's (1953) remarks concerning the fossil record of horses, probably one of the most complete vertebrate records we have, are highly instructive: instructive: ". . . in some of the most recent works on evolutionary theory . . . , this phylogeny is presented as a single line of gradual transformation of *Hyracotherium* into *Equus*. It has been well known to the better informed for more than two generations that the phylogeny includes considerable branching and for the last ten or 15 years it has been increasingly evident that the really striking and characteristic part of the pattern is precisely its repeated and intricately radiating splitting. **Its botanical analogue would be more like a bush than a tree**, . . . the actually evolving units. . . , the lineages in a strict sense, . . . certainly [number] thousands and probably tens of thousands. . . , each one in some respect divergent from all others.""

[126] Ebach M C and Williams D M (2010): Systematics and Biogeography: Cladistics and Vicariance. Systematic Biology ***59***: 612-614. https://academic.oup.com/sysbio/article/59/5/612/1648251

– Which thoughts could not be proved. Now, in our context I’m going to reproduce just the key quotation of Nelson’s presentation of 1969 (the text was reproduced by Williams and Ebach (2004, pp. 702-712, quote p. 707):

> “[T]he idea that one can go to the fossil record and expect to empirically recover an ancestor-descendant sequence, ***be it of species, genera, families or whatever***, has been, and continues to be, a ***pernicious illusion***, responsible, in my opinion, for much of the current confusion within the field of comparative biology.”[127]

For a detailed justification of this conclusion, see please the original papers.

Gareth Nelson and Norman Platnick have emphasized in their book on *Systematics and Biogeography* (1981, p. 333; see comments on the importance, influence and relevance of this book by Ebach and Williams 2010[128]):

> “The notion that phylogeny can be read directly from the rocks ***is superstition and nothing more***.”[129]

Perhaps one important reason for this fact has been given by Steven M. Stanley already in 1981 stating (p. 95) in the context of the superb fossil data from the Bighorn Basin of Wyoming) that “*in fact, the fossil record does not convincingly document a single transition from one species to another*.” Can we extrapolate his inference on the basis of these findings to the elephants and other organisms?[130] Now, if this is true for such “superb fossil data”, and their “remarkable degree of completeness” even “unmatched by contemporary [Eocene] deposits” (at that time at least) – what can we conclude (1) for equally outstanding/magnificent/exquisite data? And (2) what for less perfect fossil data? As to (1): The elephants have already shown that the Bighorn Basin data do not represent an isolated case – thus we may also say that ***the distinguished elephant “fossil record does not convincingly document a single transition from one genus***[131] ***to another***” neither for *Gomphotherium* to *Primelephas* or *Stegotetrabedolon* or from either of the latter to *Elephas*, *Loxodonda*, *Mammuthus*, nor for any other of the genera mentioned above. Also, elephant “species that were once thought to have turned into others have been found to overlap in time with these alleged descendants”. And this appears to be true also for many further organisms (for missing transitions in general, *cf*. Kuhn above). (2) As for less perfect fossil data – is it necessary to say anything?

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[127] Ebach M C and Williams D M (2004): The reform of palaeontology and the rise of biogeography - 25 Years after 'ontogeny, phylogeny, paleontology and the biogenetic law' (Nelson, 1978). Journal of Biogeography ***31***: 685-712.

[128] https://www.researchgate.net/publication/234884150_Systematics_and_Biogeography_Cladistics_and_Vicariance_by_Gareth_Nelson_Norman_I_Platnick Book Review in *Systematic Biology* **59**, pp. 612-614.

[129] Nelson G and Platnick N (1981) Systematics and Biogeography. Cladistics and Vicariance. Columbia University Press. New York. *Context* p. 333: In its most general form, the paleontological argument holds that the fossil record shows the course of evolution because it shows actual ancestor-descendant sequences (actual phylogenies). This general form of the argument is simply fallacious; stratigraphic sequences alone cannot indicate that two fossils belong to the same lineage (if it cvould, we might have to conclude that a fossil mammoth found only in one stratum is ancestral to a fossil cockroach found only in the next). Fossils must be ordered on the basis of systematic hypotheses, and since those hypotheses may always be incorrect, fossils so ordered cannot be said to show the truth, or the true history, of evolution. The notion that phylogeny can be read directly from the rocks is superstition and nothing more.”

[130] Stanley S M (1981): The New Evolutionary Timetable. Basic Books, Inc., Publishers. New York. This is the context: “***Superb fossil data*** have recently been gathered from deposits of early Cenozoic Age in the Bighorn Basin of Wyoming. These deposits represent the first part of the Eocene Epoch, a critical interval when many types of modern mammals came into being. The Bighorn Basin, in the shadow of the Rocky Mountains, received large volumes of sediment from the Rockies when they were being uplifted, early in the Age of Mammals. In ***its remarkable degree of completeness***, the fossil record here for the Early Eocene is ***unmatched by contemporary deposits*** exposed elsewhere in the world. The deposits of the Bighorn Basin provide a nearly continuous local depositional record for this interval, which lasted some five million years. It used to be assumed that certain populations of the basin could be linked together in such a way as to illustrate continuous evolution. Careful collecting has now shown otherwise. **Species that were once thought to have turned into others have been found to overlap in time with these alleged descendants**. In fact, the fossil record does not convincingly document a single transition from one species to another. Furthermore, species lasted for astoundingly long periods of time. David M. Schankler has recently gathered data for about eighty mammal species that are known from more than two stratigraphic levels in the Bighorn Basin. Very few of these species existed for less than half a million years, and their average duration was greater than a million years.”

[131] The term “species“ is here substituted by “genus” – see, please – for the reasons given above.

Hence, because of these facts, and for many additional reasons, British vertebrate paleontologist Colin Patterson – who told Tom Bethell that "he was an atheist, and once referred to the belief-system underlying the Church of England as "a pack of lies"" and who believed in evolution[132] – stated in both editions of his book on *Evolution* (1978 und 1999): that:

> "Fossils may tell us many things, but one thing they can never disclose is whether they were ancestors of anything else" (1978, p. 133 and 1999, p. 109).

And Nelson again (in the first paper by him quoted above, now p. 27):

> "That a known fossil or recent species, or higher taxonomic group, however primitive it might appear, is an actual ancestor of some other species or group, is an assumption scientifically unjustifiable, for science never can simply assume that which it has the responsibility to demonstrate."
>
> "It is the burden of each of us to demonstrate the reasonableness of any hypothesis we might care to erect about ancestral conditions, keeping in mind that we have no ancestors alive today, that in all probability such ancestors have been dead for many tens of millions of years, and that even in the fossil record they are not accessible to us."[133]

Cornelius Hunter[134] comments on Nelson's verdict just quoted that "even a propagandist for evolutionary creation myths like *Prothero cites a refutation of assuming evidence of ancestry approvingly*" [see Prothero 2007, p. 133 and 2017, p. 143].

This can perhaps be the impression when you read statements of Prothero like the following ones (2017, p. 143):

> "Most paleontologists use the word ancestor (as I will throughout this book) very loosely to describe a fossil that has all the right anatomy and is older in time to potentially be ancestral to some later form. But we all recognize subconsciously that, ***in the strictest sense, telling whether a particular fossil is actually the ancestor of another is not a testable hypothesis***. Instead, we look to fossils to show us the transitional anatomical features of ancestors that illustrate the path that evolution took."[135]

On the page before he states (2017, p. 142):

> "The biggest sticking point is the concept of ancestry. We tend to use the term "ancestor" to describe certain fossils, but we must be careful when making that statement. If we want to be rigorous and stick to testable hypotheses, it is hard to support the statement that "this particular fossil is the ancestor of all late fossils of its group," because we usually can't test that hypothesis. Because the fossil record is so

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[132] Tom Bethell 2017, p. 140 in *context*: "Patterson's views had nothing to do with the Bible or religious faith. He told me that he was an atheist and and once referred to the belief-system underlying the Church of England as "a pack of lies"". P. 149: "When I asked him if he "believed in" evolution himself, he replied: "Well, isn't it strange that this is what it comes to, that you have to ask me whether I believe it, as if it mattered whether I believe it or not. Yes, I do believe it. But in saying that, it is obvious that it is faith." [However, in the preface to Patterson's second edition 1999, p. VII, he asserts that "evolution is certainty".]

The complex organisms that he studied certainly exist. And as an atheist he had little choice but to accept that they assembled themselves one small bit at a time. But the fossil record gives little or no support for this faith." – I would add that the fossil record gives not only little or no support but in general is ***in clear opposition to that faith***. See the details, for example, in Lönnig 2018: http://www.weloennig.de/ExplosiveOrigins.pdf

[133] *Context*: "But to attempt to derive the mormyrid brain from that of some other fish, such as any other osteoglossomorph, gar, bowfin, sturgeon, bichir, coelacanth, lungfish, elasmobranch or cyclostome, fossil or Recent, in the belief that these are more primitive animals and therefore must have more primitive brains, is to evade the real scientific problem. That a known fossil or Recent species, or higher taxonomic group, however primitive it might appear, is an actual ancestor of some other species, or group, is an assumption scientifically unjustifiable, for science never can simply assume that which it has the responsibility to demonstrate. Unfortunately, it is true that zoologists, even today, often begin a discussion of evolution with some presumed ancestor, fossil or Recent, and from it derive some presumed descendant. The presumed ostracoderm ancestry of vertebrates is one example among many.

It should be obvious that there is little justification for selecting a particular Recent fish, e.g., a minnow, herring or trout, and assuming that it is some primitive teleost from which another has evolved. There is a long evolutionary history behind all Recent organisms and no Recent species or higher taxonomic group ultimately can be said to have given rise to any other. It is probably true that in some ways a minnow is more primitive than a perch, but in others, it is more advanced. Such matters are worthy of investigation, but we don't progress much by making a teleostean morphotype out of a minnow, or for that matter a vertebrate morphotype out of a lamprey or any other single, Recent vertebrate or vertebrate group.

Indeed, there is no more justification for selecting even a particular fossil species or group, and assuming that it was some primitive animal from which another has evolved. How, after all, can we hope to demonstrate that ostracoderms ever gave rise to anything else but other ostracoderrns?

This particular point cannot be overemphasized in view of past practices of vertebrate zoologists, who all too often have been willing to make facile assumptions about what is or is not primitive, and to derive one species or group from another. It is the burden of each of us to demonstrate the reasonableness of any hypothesis we might care to erect about ancestral conditions, keeping in mind that we have no ancestors alive today, that in all probability such ancestors have been dead for many tens or hundreds of millions of years, and that even in the fossil record they are not accessible to us."

[134] http://darwins-god.blogspot.com/2010/03/why-evolutionists-say-evolution-is-fact.html

[135] By the way, he seems to presuppose "the path that evolution took" and then looks "to fossils to show us the transitional anatomical features of ancestors that illustrate" that path. And there appears to be also space for interpretation to define "transitional anatomical features of ancestors". Nelson's and Platnicks's analyses quote above may be applied here: "Fossils must be ordered on the basis of systematic hypotheses, and since those hypotheses may always be incorrect, fossils so ordered cannot be said to show the truth, or the true history, of evolution."

> incomplete, it is highly unlikely that any particular fossil in our collections is the remains of the actual ancestor of another taxon (Schaeffer et al. 1972; Engelmann and Wiley 1977)."

"Because the fossil record is so incomplete,…" – Still the old (long refuted) refuge of Darwin and his followers for more than 160 years now when the starkly desired proofs for evolutionary deductions are missing.

However, more than 220 pages further on, after many hypotheses and false allegations about the evolution of "the popular large hoofed mammals" – in which he includes (stangely enough) also the whales – he asserts in his book (2017, p. 348):

> "Now that we have seen that most of the popular large hoofed mammals — horses, rhinos, camels, giraffes, and whales – **have excellent fossil records** that document transitional forms going all the way back to the Cretaceous, we need to look at one more group: the elephants and their relatives. ***Elephants, too, have an excellent fossil record in the late Oligocene and more recent rocks***, because mastodonts left Africa about 18 million years ago and migrated among all the northern continents (fig. 14.18)."

If in an incomplete fossil record "it is highly unlikely that any particular fossil in our collections is the remains of the actual ancestor of another taxon" – reversely, wouldn't it be highly likely to detect **actual ancestors** in "***excellent fossil records***"? Now, this is exactly what he believes, saying on p. 143:

> "But there are circumstances ***where the fossil record is so complete that it is possible to say that "the fossils in this population represent the ancestors of this later population***." My friend and fellow former graduate student Dave Lazarus (now a curator at the Museum für Naturkunde in Berlin) and I (Prothero and Lazarus 1980) provided just such an example from the extraordinary fossil record of planktonic microfossils."

After pointing out for the planktonic microfossils that "with an extraordinarily dense and continuous record such as this, we really can say that we have sampled all the fossil populations that lived in the world's oceans and can establish which samples are ***most likely*** the ancestors of later populations."

Let us recall here, please, that *Gomphotherium* occurs in the "excellent fossil record" of the late Oligocene. So, does he believe that it is an actual ancestor of the other elephant genera he portrays in his figure reproduced above?

Following his "most likely" relativization of his former assertions, he goes on to say (2017, p. 143):

> "Since our paper, a number of studies have been done to establish how complete the fossil record needs to be to determine the probability that one population is ancestral to another (Fortey and Jefferies 1982; Lazarus and Prothero 1984; Paul 1992; Huelsenbeck 1994; Fisher 1994; Smith 1994; Clyde and Fisher 1997; Hitchin and Benton 1997; Huelsenbeck and Rannata 1997)."

Did these authors disprove the statements of Stanley, Nelson, Nelson & Platnick, Patterson as documented above and of many others[136]? If they had – would Prothero not have emphasized the putatively confirming results for his thesis by the authors he just enumerated? Would he not have cited additional examples where "the fossil record is so complete that it is possible to say that "the fossils in this population represent ***the ancestors*** of [a] later population"?

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[136] Like David R. Oldroyd (1986, p. 154): "…one cannot use the paleontological record with certainty to establish genealogical relationships." Quoted according to W R Bird (1989): The Origin of Species Revisited." Volume I, pp. 183; context of the quotation pp. 267/268. Similar statemenst by authors corroborating this conclusion already up to that time: Thompson, Rosen, Forey, Gardiner, Raup, Bradey, Good, Saiff & Macbeth (see Bird 1989, pp. 183-185 and 267-270.

Instead he continues with the further and clearly stronger relativization already quoted above (next but one sentence – full context in the footnote[137]):

> "Most paleontologists use the word ancestor (as I will throughout this book) very loosely to describe a fossil that has all the right anatomy and is older in time to potentially be ancestral to some later form. But we all recognize subconsciously that, ***in the strictest sense, telling whether a particular fossil is actually the ancestor of another is not a testable hypothesis***. Instead, we look to fossils to show us the transitional anatomical features of ancestors that illustrate the path that evolution took."

We have already heard by Stanley that it was not possible to establish ancestor-descendant relationships even in the context of the superb fossil data from the Bighorn Basin of Wyoming, and that "in fact, the fossil record does not convincingly document a single transition from one species to another."

So, whatever Prothero and others ***believe*** concerning *Gomphotherium*, and although they strongly convey the idea that this genus is a milestone demonstrating, confirming and establishing the evolution of the elephants from small beginnings, there is absolutely no proof that it is the ancestor of any later elephant genera. On the contrary:

(1) Stanley's comment "species that were once thought to have turned into others have been found to overlap in time with these alleged descendants" is also fully applicable to *Gomphotherium* (see details above).

(2) *Gomphotherium* was already a large elephant comparable to medium-sized Indian and possibly even African elephants.

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[137] *Context*: Discussion of the rise of Cladistics in Biosystematics. Prothero 2017, pp. 142/143:

Subtitle: **Ancestor Worship**

> That a known fossil or recent species, or higher taxonomic group, however primitive it might appear, is an actual ancestor of some other species or group, is an assumption scientifically unjustifiable, for science never can simply assume that which it has the responsibility to demonstrate. . . . It is the burden of each of us to demonstrate the reasonableness of any hypothesis we might care to erect about ancestral conditions, keeping in mind that we have no ancestors alive today, that in all probability such ancestors have been dead for many tens of millions of years, and that even in the fossil record they are not accessible to us.
>
> — Gary Nelson, "Origin and Diversivication of Teleostean Fishes"
>
> Fossils may tell us many things, but one thing they can never disclose is whether they were ancestors of anything else.
>
> —Colin Patterson, Evolution

[Text after these two quotations – all emphasis (bold, blue, italics) again by W-E L:]

"Some aspects of cladistic theory have proven more difficult for many scientists to accept. For example, a cladogram is simply a branching diagram of relationships among three or more taxa. It does not specify whether one taxon is ancestral to another; it only shows the topology of their relationships as established by shared derived characters. In its simplicity and lack of additional assumptions, it is beautifully testable and falsifiable, so it meets Popper's criterion for a valid scientific hypothesis. The nodes are simply branching points supported by shared derived characters, which presumably represent the most recent hypothetical common ancestor of the taxa that branch from that node. But strictly speaking, cladograms never put real taxa at any nodes, but only at the tips of the branches.

Many scientists, however, would like to say more than just "taxon A is more closely related to taxon B than it is to taxon C." Instead, they would draw relationships ***with one taxon being suggested as ancestral to another***. This is the more traditional family tree type of phylogeny, which not only suggests relationships, but **shows a pattern of ancestry and descent as well**. But as Tattersall and Eldredge (1977) point out, a family tree makes far more assumptions than does a cladogram. Some people are happy to make those assumptions, but the strict cladists are not so comfortable with them.

The biggest sticking point is the concept of ancestry. We tend to use the term "ancestor" to describe certain fossils, but we must be careful when making that statement. If we want to be rigorous and stick to testable hypotheses, it is hard to support the statement that "this particular fossil is the ancestor of all later fossils of its group," because we usually can't test that hypothesis. Because the fossil record is so incomplete, it is highly unlikely that any particular fossil in our collections is the remains of the actual ancestor of another taxon (Schaeffer et al. 1972; Engelmann and Wiley 1977).

But there's another reason why cladists avoid the concept of ancestry. To be a true ancestor, the fossil must have nothing but shared primitive characters compared to its descendants. ***If it has any derived feature not found in a descendant*** [W-E L: an autapomorphy]***, it cannot be an ancestor***. Consequently, for decades, traditional taxonomists looked only at shared primitive characters so they could construct ancestor-descendant trees, thereby missing all the derived characters that showed they were on the wrong track. One of the great advantages of cladistics is that it has solved many previously insoluble problems by getting away from paraphyletic wastebasket groups and "**ancestor worship**" and focusing on derived characters only. For these reasons, hard-core cladists like Gary Nelson (quoted earlier) refuse to recognize the concept of ancestor at all, except in the hypothetical sense of the taxa at the nodes of the cladogram. Instead of ancestor and descendant, cladists prefer to talk about two taxa at the tips of the branches as being ***sister groups***. ***Neither is ancestral to the other, but they are each other's closest relatives***.

But there are circumstances where the fossil record is so complete that it is possible to say that "the fossils in this population represent the ancestors of this later population." My friend and fellow former graduate student Dave Lazarus (now a curator at the Museum für Naturkunde in Berlin) and I (Prothero and Lazarus 1980) provided **just such an example from the extraordinary fossil record of planktonic microfossils**. In these unusual circumstances, we have deep-sea cores covering all of geologic time since the Jurassic for most of the world's oceans and every centimeter of sediment in most of those cores is filled with thousands of microfossils. With an extraordinarily dense and continuous record such as this, we really can say that ***we have sampled all the fossil populations that lived in the world's oceans and can establish which samples are most likely the ancestors of later populations***. Since our paper, a number of studies have been done to establish how complete the fossil record needs to be to determine the probability that one population is ancestral to another (Fortey and Jefferies 1982; Lazarus and Prothero 1984; Paul 1992; Huelsenbeck 1994; Fisher 1994; Smith 1994; Clyde and Fisher 1997; Hitchin and Benton 1997; Huelsenbeck and Rannata 1997). Nowadays, paleontologists are a lot more relaxed about the concept of ancestry than they were during the early, bitterly polarized debates over cladistics in the 1970s. Most paleontologists use the word ancestor (as I will throughout this book) very loosely to describe a fossil that has all the right anatomy and is older in time to potentially be ancestral to some later form. But we all recognize subconsciously that, in the strictest sense, telling whether a particular fossil is actually the ancestor of another is not a testable hypothesis. Instead, we look to fossils to show us the transitional anatomical features of ancestors that illustrate the path that evolution took"

(3) In contrast to the figure of the “Evolutionary history of elephants” by Prothero and others (drawing a short proboscis), its anatomy suggests a long proboscis – which correspondingly has been adequately considered in several of the best reconstructions by leading elephant experts.

(4) Yet, a shorter proboscis would be absolutely no problem for intelligent design, but a huge problem for the theory of random mutations and natural selection: With an age range of 23.03 to 0.012 Ma[138] *Gomphotherium* was the longest living genus of all the Proboscidea so far discovered (23.018 Ma). Questions:

So, why would it have been necessary for such a successful life form to evolve a longer proboscis if it has been so successful for 23 million years with a shorter one – apart from the fact that it efficiently lived ***contemporaneously*** – again for millions of years – together with the other longer-nosed genera (*Elephas*, *Loxodonta*, *Mammuthus*, *Primelephas*, *Stegotetrabedolon* and others)? And which accidental mutations (the “…*innumerable* slight variations”, “*extremely* slight variations” and “*infinitesimally* small inherited variations” etc. [see above]) should have transformed the short proboscis into a long one? And what could have been the selective advantages of each the thousands of tiny little steps of less then 1 mm deciding over life and death of an animal population?

(5) The anatomical and other specializations decidedly/indubitably/undeniably exclude *Gomphotherium* from an ancestral line to other elephant genera.

“The very term "heterobathmy” to be applied here, in German "Spezialisationskreuzungen", a translation of Dollo's "chevauchement [overlappings] de specialisation”, in English also "specialization-crossings” and "cross-specializations” – for the detailed history of the term see Nelson 2004, p. 131 – ***implies the irreversibility of complex special traits***[139] ***as a basic criterion to exclude species displaying them from being ancestors to others without these characters***.”[140] *Gomphotherium*: Four tusks, lower tusks parallel and formed like a shovel, upper tusks with layer of enamel (in contrast to modern elephants), skull elongated. Or in the words of Ursula B. Göhlich: “*Gomphotherium* is characterized by a longi-rostrine mandible (with an elongated symphysis) and by both a pair of upper and lower tusks, called tetrabelodont. The upper tusks feature an enamel band on the outside. The lower ones show a pyriform to rounded cross section. Certain characters of the bunodont cheek teeth, the course of the enamel band and the kind of cross section in the lower incisors allow the differentiation of some species.”[141]

Now, as we have noted above, according to many authors *Gomphotherium* has credulously been believed/assumed/supposed to be the evolutionary progenitor of *Stegotetrabedolon* and *Primelephas* – although *Gomphotherium* lived contemporary with them for entire the time of their earthly sojourn (with *Primelephas* 8 Ma, with *Stegotetrabedolon* 1.4 Ma). So, how many transitional links have to be postulated for (1) Gradualism and (2) Punk eek? Since there are no time gaps, let’s postulate some minimal times and number of links according to their presuppostions:

Gradualism: Minimal time for ***Stegotetrabedolon*** or ***Primelephas*** to evolve from ***Gomphotherium*** transgressing the family boundary at least ~ 5 Ma (so 250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~ 10 Ma or more (because of the putative evolution of a new family[142]) with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Stegotetrabedolon*** or ***Primelephas*** to evolve from ***Gomphotherium*** (applying Gould’s 1 percent criterium, see above): ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case the family boundaries have to be transgressed by probably not only one genus but several genera – let’s assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary genera.

Intelligent design: ***Gomphotherium*** did not evolve into ***Stegotetrabedolon*** or ***Primelephas***, so time/transitional form issue eliminated. (Keywords: autapomorhies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.)

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[138] See again http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43268

[139] Now, of course, one could argue that even Dollo's irreversibility law does not seem to be without exceptions – nevertheless, no one expects the reversibility of entire series of features back to phylogenetically postulated ancestors (example: to my knowledge, no evolutionist thinks seriously to recover something like the mosaic bird *Archaeopteryx* by back mutations from a chicken – at the very least not as live organism). The reasons for this have been discussed by Dollo more than 100 years ago.

[140] For a detailed discussion of heterobathmy see pp. 284/285 in http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf

[141] https://www.pfeil-verlag.de/wp-content/uploads/2015/05/2_50.pdf (1999 p. 6). https://pfeil-verlag.de/?product=the-miocene-land-mammals-of-europe

[142] Zoologist Douglas Dewar estimated for the origin of **a new family 30 million years** (The Transformist Illusion 1957, p. 151. Dehoff Publications). Context was the putative evolution of the horse, for which evolutionary biologist and paleontologist Dr William Elgin Swinton had estimated **100,000 generations to produce a new species**. Regarding Swinton *cf*. https://en.wikipedia.org/wiki/William_Elgin_Swinton (retrieved 29 January 2019). Since the boundaries between genus and family are often not clearly defined, I took a modest ~ 5 Ma. In contrast, molecular estimates are usually much higher. Upper limit for speciation according to M J Benton (2003): “The example of Darwin’s finches, mentioned above, indicated that the present 14 **species** must have diverged from their common ancestor **within the five million years** of the existence of the Galapagos islands. This observation simply places an upper limit on the time-scale of speciation: species splitting could indeed have taken a much shorter time.” http://palaeo.gly.bris.ac.uk/benton/reprints/2003eolss.html (retrieved 29 January 2019). Since "Intersterility is not known in Darwin's finches. Intrageneric hybrids among ground finches are certainly both viable and fertile (chapter 8), and probably the same is true for intergeneric hybrids between tree finches and warbler finches..." P R Grant (1986, p. 353). *Cf*. http://www.weloennig.de/AesIV3.html. So, these genera are hardly more than morphological species. See also P R Grant and B R Grant 1997 https://www.pnas.org/content/94/15/7768 “...some intergeneric crosses are known among the tree finches and warbler finch, and breeding hybrids have been produced.”

Palaeomastodon

Family: Palaeomastidontidae Andrews 1906

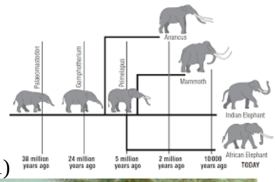
Next in Prothero's (and that of many other authors[143]) putative line of ancestors leading to *Gomphotherium* and from this genus to the *Stegotetrabedolon* and/or *Primelephas* to the modern elephants and *Mammuthus*, is:

> ***Palaeomastodon*** Andrews 1901 Total: 4 collections including 8 occurrences: Oligocene of Egypt (1 collection), Ethiopia (1), Libya (1), Saudi Arabia (1). 4 Species.
>
> Age range: 24.04 to 23.03 Ma according to Fossilworks[144]. According to PBDB: "When: Jebel Qatrani Formation, Rupelian (33.9 - 28.1 Ma)"[145].

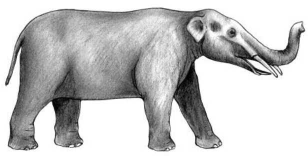
Now, for *Gomphotherium* an age range of 23.03 to 0.012 Ma was given (see above). So, according to fossil works *Palaeomastodon* could have known *Gomphotherium* (environment: fluvial), but as reported by PBDB there would be a time lapse of some 4 Ma.

What did *Palaeomastodon* possibly look like? Reconstructions differ again strongly from each other: Sometimes the trunk is long, sometimes it is short – seems to depend somewhat on the evolutionary aims of the author.


(1)



(2)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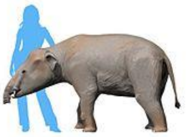
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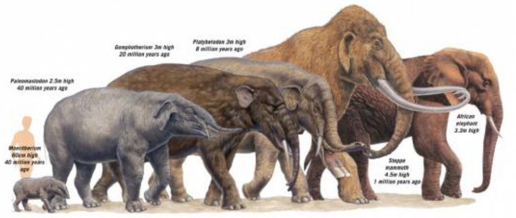
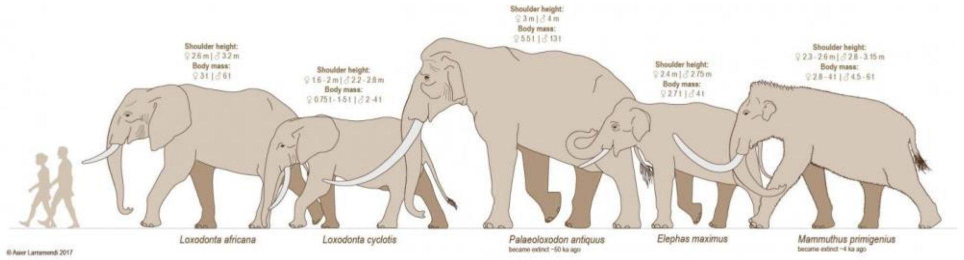


(6)



(7)

Above reproduced according to the links below (1)[146], (2)[147]: "Figure 1 shows how modern elephants evolved" (*Palaeomastodon* again as ancestor of *Gomphotherium* and other elephants), (3)[148], (4)[149]: in comparison to the woman, *Palaeomastodon* is larger, (5)[150], (6)[151]: retaltive heights of elephants, (7)[152]: Some further height comparisons; note please that *Paleoloxodon* was even larger than *Mammuthus primigenius*. The time specifications given in (6) do not consider the concurrency of the genera: *Gomphotherium* was living mostly contemporaneously with all those on the right of it.

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[143] – see please the figures above.

[144] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43251 (retrieved 7 January 2019). But see also the different time specifications there for Oligocene.

[145] https://paleobiodb.org/classic/basicCollectionSearch?collection_no=65960 (retrieved 7 January 2019)

[146] https://de.wikipedia.org/wiki/Palaeomastodon#/media/File:Palaeomastodon_beadnelli.jpg

[147] http://www.queenelizabeths.derbyshire.sch.uk/closure-work/20180319/11/11Y1%20Biology%20Worksheet%20to%20complete%2019th%20March%202018.pdf

[148] 1.bp.blogspot.com/-2whGtx9Fkdw/Ti2mA8bdaFI/AAAAAAAAAd4/-foACTlcnvk/s1600/Gomphotherium.jpg

[149] https://en.wikipedia.org/wiki/Palaeomastodon

[150] Same as before.

[151] https://tapoueh.org/blog/2018/03/object-relational-database-management-system/

[152] https://3c1703fe8d.site.internapcdn.net/newman/gfx/news/hires/2017/1-geneticstudy.jpg https://phys.org/news/2017-06-genetic-elephant-family-tree.html (All figures above retrieved 7 January 2019.)

"*Palaeomastodon* is widely regarded as being one of the ancestors to modern day elephants."[153] Yet, there are again strong differences of opinion among the specialists: "Some scientists, such as Heinz Tobien and Cary Madden, think that *Paleomastodon* is ancestral to the true mastodons, and *Phiomia* is ancestral to the rest of Proboscidea, including mammoths and elephants. They base their belief on the cross-crest arrangement of molar cusps in *Paleomastodon*, which is developed even more strongly in true mastodons. Pascal Tassy, on the other hand, considers the similarities in molars between these groups to be outweighed by the other anatomical features which argue that *Palaeomastodon* is not ancestral to the mastodons alone, but to all other proboscideans" (Prothero & Schoch 2002, p. 162)[154].

So, again some key questions. Comparing the phylogenetic trees shown above and considering the comment by Prothero and Schoch – what do we really know? Was (1) *Palaeomastodon* the direct ancestor of *Gomphotherium* and the modern and other elephants, or (2) a potential ancestor, or (3) was it a fossil group of *Palaeomastodon* species, or (4) was it only the ancestor of the "true mastodons", or (5) was *Palaeomastodon* a side branch of the putative evolutionary tree absolutely without any further descendants? (6) Or is intelligent design involved due to autapomorphies, specified and irreducible complexity?

As in the case of *Gomphotherium*, according to Dollo's law of irreversibility the anatomical and other specializations decidedly/indubitably/undeniably exclude *Palaeomastodon* from being ancestral to any other elephant genera.

Some special features of *Palaeomastodon*:

> "One clear difference between *Palaeomastodon* and modern elephants however are the incisors of the lower jaw which point forwards out from the mouth. These incisors effectively form a scoop-like structure which was likely a feeding aid. How this worked is uncertain because although the popular perception is that it was used to scoop up plants, especially aquatic varieties, some later elephants like the gomphotheres (those like *Platybelodon* and *Gomphotherium* etc.) seemed to use their forward facing lower incisors to scrape bark off of trees."[155]

So, again the question, but now for *Gomphotherium* to evolve from *Palaeomastodon*: how many transitional links have to be postulated for (1) Gradualism and (2) *Punk eek*?

Gradualism: Minimal time for ***Gomphotherium*** to evolve from ***Palaeomastodon*** again transgressing a family boundary at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Gomphotherium*** to evolve from ***Palaeomastodon*** (according to Gould's criteria): again ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case the family boundaries have to be transgressed by probably not only one genus but several genera – let's assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Palaeomastodon*** did not evolve into ***Gomphotherium***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.)

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[153] http://www.prehistoric-wildlife.com/species/p/palaeomastodon.html

[154] Prothero D R & R M Schoch (2002): Horns, Tusks, & Flippers. The Evolution of Hoofed Mammals. John Hopkins Univerity Press. Baltimore and London.

[155] http://www.prehistoric-wildlife.com/species/p/palaeomastodon.html. They go on to say (p.162): "In either case, there is no dispute that by the late Oligocene, the proboscidea had split into two major groups: the true mastodonts (Family Mastodontidae) and a group including the gomphothere and shovel-tusked mastodonts", the mammoths and the elephants (Fig. 8.1). Unfortunately, we have almost no middle or late Oligocene deposits in Africa to record this transition."

Phiomia

Family: Phiomiidae Kalandadze and Rautian 1992

In place of *Palaeomastodon* Prothero had put *Phiomia* in the putative line of ancestors in his paper of 2009 in *Evolution: Education and Outreach*[156], which "Promotes accurate understanding and comprehensive teaching of evolutionary theory for a wide audience", so that we are going to have a look at that genus, too:

Phiomia Andrews and Beadnell 1902 Total: 10 collections including 11 occurrences

Oligocene of Angola (1 collection), Egypt (2), Ethiopia (1), Kenya (2), Libya (1), Oman (1) Eocene of Libya (2)
Age range: 40.4 to 23.03 Ma[157]

As just hinted at above, contrary to his "Evolutionary history of the elephants" of 2007 and 2017, Prothero replaced *Palaeomastodon* with *Phiomia* in 2009 (Fig 13, p. 300)[158] so that the latter was now leading to *Gomphotherium* as well as the modern elephants etc. and *Palaeomastodon* was on *Phiomia*'s former place on a side-branch.

On *Palaeomastodon* and *Phiomia* (both derived from *Numidotherium*) Prothero comments (2017, p. 348)[159]:

> "Going back farther into the early Oligocene, the famous Fayûm beds of Egypt […] also produce very primitive[160], small mastodonts with short jaws and even shorter tusks, known as *Palaeomastodon* and *Phiomia*."

Jan van der Made briefly describes *Phiomia* together with *Palaeomastodon* (2010, p. 343)[161] as follows:

> "*Palaeomastodon* (Fig. 2; 3) and *Phiomia* (Fig. 2; 3) are later forms [in comparison with Moeritherium]. They are well known from ***very good material*** from the Fayum Oasis in Egypt (e. g. Andrews 19o6; Osborn 1936). In these animals trilophodonty was acquired; all later forms are at least trilophodont, save for the deinotheres, which have first molars with three lobes and second molars with just one lobe. ***They have reduced nasal bones and large nasal openings, indicating that they had trunks***. They have long diastemas and one pair of upper and one pair of lower incisors."

Accordingly, the author of the German version of the Wikipedia article comments on the trunk of *Phiomia* that "possibly the animal already possessed ***a distinctly formed trunk***, which can be deduced from the large nostril and the reduced nasal bone"[162].

The two genera have been assigned to two different families (van der Made 2010, p. 340):
Family Palaeomastodontidae: *Palaeomastodon*
Family Phiomiidae: *Phiomia*

This is in full agreement with Fossilworks (2019)[163] (by the way: *Phiomia* with subtaxa *Phiomia major*, *Phiomia serridens*, and *Palaeomastodon*[164] with subtaxa: *Palaeomastodon beadnelli*, *Palaeomastodon minor*, *Palaeomastodon parvus*, *Palaeomastodon wintoni* [165]) and PBDB (2019)[166].

If it were true that "In the early Oligocene, the various lineages of proboscideans (elephants, mammoths, and mastodonts) are very primitive[167] and ***hard to tell apart***" (Prothero 2017, p. 348) – why, then, did the best-informed elephant researchers put them into

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[156] https://www.springer.com/life+sciences/evolutionary+%26+developmental+biology/journal/12052

[157] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43252 (retrieved 21 January 2019)

[158] Prothero D R (2009): Evolutionary Transitions in the Fossil Record of Terrestrial Hoofed Mammals. *Evolution: Education and Outreach* **2**: 289-302. https://link.springer.com/content/pdf/10.1007%2Fs12052-009-0136-1.pdf

[159] Prothero D R (2009): Evolutionary Transitions in the Fossil Record of Terrestrial Hoofed Mammals. *Evolution: Education and Outreach* **2**: 289-302. https://link.springer.com/content/pdf/10.1007%2Fs12052-009-0136-1.pdf

[160] See comments on the dubious term "primitive" later in this paper.

[161] Jan van der Made (2010): The evolution of the elephants and their relatives in the context of a changing climate and geography. Chapter in book: Elephantenreich – Eine Fossilwelt in Europa. Publisher: Landesamt für Denkmalpflege und Archälogie Sachsen-Anhalt & Landesmuseum für Vorgeschichte, Halle, Editors: D. Höhne & W. Schwarz, pp. 340-360

[162] https://de.wikipedia.org/wiki/Phiomia (the English version states on *Phiomia* without rationale that "it had only a very short trunk" (retrieved 21 January 2019)

[163] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=97150 and http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43252 (retrieved 21 January 2019)

[164] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43252# (retrieved 21 January 2019)

[165] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43252 (retrieved 21 January 2019)

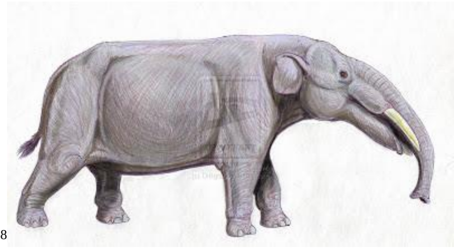
[166] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43252 and https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=86199 (retrieved 21 January 2019)

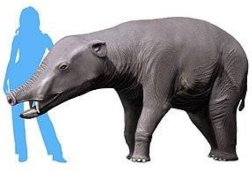
[167] "Primitive" is an inadequate description of these forms (see longer footnote below).

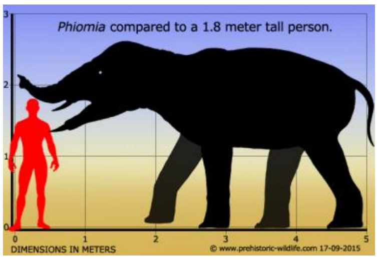
different families? So, really "hard to tell apart"? This may be true to a certain extent for the subtaxa mentioned above, but not for the different families present in the early Oligocene – as if one could not differentiate between Barytheriidae, Moeritheriidae, Palaeomastodontidae, and Phiomiidae! Incidentally, as far as I could find out, there are no fossils of Mammutidae and Elephantidae in the early Oligocene – so these "lineages" seem to be evolutionary deductions not based on fact.

So, how could it perhaps have looked like? As ever, the reconstructions differ strongly from each other, in part reflecting the evolutionary preferences of their authors. – So, some animals have been drawn with short trunks, others with long ones (also, the height of the animal has been presented very differently, yet this could be distinct in various species):


1[168]

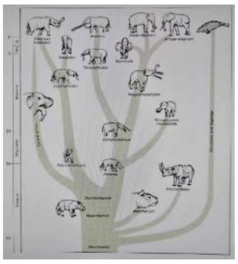

2[169]


3[170]



4[171]


5[172]


6[173]

Different reconstructions of *Phiomia* (see links below). Second row right: "Evolutionary history of the elephants and their kin (Proboscidea)" according to Prothero 2009, p. 300 (note *Phiomia* now on the main trunk leading to modern elephants and further differences to his "Evolutionary history" in his book of 2007 and 2017 (see above).

So, what do we really know?

Gradualism: Minimal time for ***Gomphotherium*** to evolve from ***Phiomia*** again transgressing a family boundary at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Gomphotherium*** to evolve from ***Phiomia*** (according to Gould's criteria): again ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because also in this case the family boundaries have to be transgressed by probably not only one genus but several genera – let's assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Phiomia*** did not evolve into ***Gomphotherium***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.)

Differences between *Phiomia* and *Palaeomastodon*: Possibly the key is to cope with the different ecological niches they were designed for. The two genera lived contemporaneously for almost 11 Ma, as reported in Fossilworks (check "Oligocene"), PBDB, and Shoshani and Tassy (see below) and at the same time also with *Moeritherium* (see below), and partially with *Barytherium* and *Eritreum*.

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[168] Reconstruction of *Phiomia* according to http://dinosaur.wikia.com/wiki/Phiomia (retrieved 21 January 2019)

[169] http://laignoranciadelconocimiento.blogspot.com/2011/12/phiomia.html (retrieved 21 January 2019)

[170] https://en.wikipedia.org/wiki/Phiomia (retrieved 21 January 2019)

[171] http://www.prehistoric-wildlife.com/species/p/phiomia.html (retrieved 21 January 2019)

[172] https://de.wikipedia.org/wiki/Phiomia (retrieved 22 January 2019)

[173] See again: Prothero D R (2009): Evolutionary Transitions in the Fossil Record of Terrestrial Hoofed Mammals. *Evolution: Education and Outreach* **2**: 289-302. https://link.springer.com/content/pdf/10.1007%2Fs12052-009-0136-1.pdf

Numidotherium

Family: Numidotheriidae Jaeger 1986

According to Prothero – in clear contrast to the majority of other authors favouring *Moeritherium* instead of *Numidotherium* here (compare, please, the evolutionary trees reproduced in the present paper, including that by the best-informed elephant researchers like Shoshani and Pascal below) – next in the assumed line of progenitors, is *Numidotherium*:

> ***Numidotherium*** Jaeger 1986 Total: 3 collections each including a single occurrence, subtaxa *Numidotherium koholense*, *Numidotherium savagei*. Eocene of Algeria (1 collection), Libya (1), Western Sahara (1)
>
> Age range: 55.8 to 33.9 Ma according to Fossilworks[174]. Very similar age specifications in PBDB[175]

So, in clear disagreement to Prothero's figure above, ***Numidotherium* appears in the fossil record at least 8 Ma prior to *Moeritherium***.

> Speer, Smith & Maguire (2010): "***Other ancestral proboscideans include Numidotherium, Barytherium, and Deinotherium.*** Remains of these early proboscideans were recovered in northern Africa along what was once the southern shore of the Tethys Sea during the Oligocene. ***Numidotherium* stood about 1.5 meters tall and had a trunk about the length of a tapir's**. … ***Deinotherium* had a fully functioning trunk** and downward recurving tusks in the lower jaw, a trait present in no other proboscidean. …Deinotheres roamed the planet **for 20 million** years, living in Africa, Europe and Asia beginning in the middle Miocene; they persisted in Eurasia until the Pliocene and in Africa until just over one million years ago. "[176]
>
> "*Numidotherium* ("Numidia beast") is an extinct genus of early proboscidean, discovered in 1984, that lived during the middle Eocene of North Africa some 46 million years ago. It was about 90-100 centimeters tall at the shoulder and weighed about 250-300 kilograms.[1]
>
> The type species, *N. koholense*, is known from an almost complete skeleton from the site of El Kohol, southern Algeria, dating from the early/middle Eocene period. The animal had the size and **the appearance of a modern tapir**. In appearance, it was more slender and more plantigrade than an elephant, its closest modern relative."[177]

First, let's raise our question again: What did *Numidotherium* possibly look like? As almost always: Reconstructions differ strongly from each other: Sometimes the trunk is rather short (as in a tapir), sometimes it is longer, – seems again to depend somewhat on the evolutionary aims of the author.


(1)[178]


(2)[179]


(3)[180]

Now, (1) is *Numidotherium* the ancestor of *Palaeomastodon* and thus of almost all the other elephant genera? (*Cf*. Prothero's figure and that of some other authors.) Or (2) is *Moeritherium* the next progenitor of *Palaeomastodon*? Or (3) is *Numidotherium* but a side branch on the evolutionary trees, as shown by *The Royal British Columbia Museum's Exhibit on Mammoths and Ancient Proboscideans* (2016) and further authors, among of them *Geology and Paleontology Department of Sofia University*?

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[174] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=98252 (retrieved 8 January 2019)

[175] http://www.paleobiodb.org/classic/basicTaxonInfo?taxon_no=98252 (retrieved 8 January 2019)

[176] http://www.ucmp.berkeley.edu/mammal/mesaxonia/proboscidea.php (retrieved 8 January 2019)

[177] http://www.wikiwand.com/en/Numidotherium (retrieved 11 January 2019)

[178] https://www.kaieteurnewsonline.com/2009/04/12/the-tapir/ (retrieved 9 January 2019)

[179] https://www.google.de/search?q=Numidotherium&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiP-fD7ju7fAhWRzKQKHfkTB0gQ_AUIDigB&biw=1139&bih=954#imgrc=NTSdRHMV8rgo3M: retrieved 14 January 2019)

[180] https://www.deviantart.com/fotostomias/art/Numidotherium-200927056 (retrieved 9 January 2019)

Or (4) is paleontologist and systematist Gareth Nelson right to emphasize that, to repeat:

> “It is a mistake to believe even that one fossil species or fossil “group” can be demonstrated to have been ancestral to another. The ancestor-descendant relationship may only be assumed to have existed in the absence of evidence indicating otherwise.” … “***The history of comparative biology teaches us that the search for ancestors is doomed to ultimate failure***; thus, with respect to its principal objective, **this search is an exercise in futility**. Increased knowledge of suggested “ancestors” usually shows them to be too specialized to have been direct ancestors of anything else.”

And specialized they were: *Cf*. the original paper by Mahboubi et al. (1986, p. 41/42)[181].

After enumerating several shared derived features with the two modern groups, the Elephantoidea and Deinotheriidae, and pointing out that “some of these characters may have been required through parallel evolution, synchronously or heterochronously” and that “one must be very careful when using them”, they emphasize, among other things:

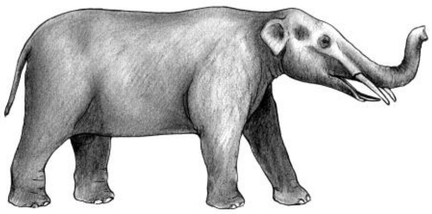
> “Nevertheless, ***Numidotherium exhibits some particular (autapomorphic) derived characters which in our opinion exclude it from the direct ancestry of modern proboscideans***”, pointing (pp. 41/41 with further explanations) to:
>
> – ‘the great width of the skull at the level of the frontals’
> – ‘the fusion of the distal ends of the forearm bones’
> – ‘the almost complete disappearance of the cingulum of the premolars and molars’
> – ‘the bilophodonty of the molars, more advanced than in the most primitive known Elephantoidea’

So, conforming to Dollo’s law, Nelson and Platnick appear to be right:

> “The notion that phylogeny can be read directly from the rocks ***is superstition and nothing more***.”

Apart from the facts just given, putting *Palaeomastodon* and its presumed ancestor *Numidotherium* site-by-site and considering their individual spezialisations, the *hiatus* between these two forms is immense and vast and can only be overlooked by those to which Lord Acton’s verdict may be applied: “The worst use of theory is to make man insensible to fact.”

Numidotherium



Palaeomastodon

As for evolutionary numbers of transitional links and possible times involved, we can apply our calculations almost seamlessly from the pair *Gomphotherium*/*Palaeomastodon* now to the putative evolution of *Numidotherium* to *Palaeomastodon*:

Gradualism: Minimal time for ***Numidotherium*** to evolve into ***Palaeomastodon*** again transgressing a family boundary at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Numidotherium*** to evolve into ***Palaeomastodon*** (according to Gould’s criteria): again ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case the family boundaries have to be transgressed by probably not only one genus but several genera – let’s assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Numidotherium*** did not evolve into ***Palaeomastodon***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.)

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[181] Mohammad Mahboubi, R. Ameur, Jean-Yves Crochet und Jean-Jacques Jaeger: El Kohol (Saharan Atlas, Algeria): A new Eocene mammal locality in northwestern Africa. Palaeontographica Abt. A. 192, 1986, S. 15–49.

Moeritherium

Family: Moeritheriidae Andrews 1906

In contrast to most other authors (as mentioned above), next in the line of the putative ancestors in Prothero's "Evolutionary history of the elephants", there is (instead of *Numidotherium*) the younger *Moeritherium* with ***neither trunks nor tusks***:

> ***Moeritherium*** Andrews 1901 Total: 22 collections including 25 occurrences. Subtaxa: *Moeritherium chehbeurameuri*, *Moeritherium gracile*, *Moeritherium latidens*, *Moeritherium lyonsi*, *Moeritherium pharaonensis*, *Moeritherium trigonodont*.
>
> Age range: 40.4 to 28.4 Ma[182]. However, age specifications in PBDB: up to 47.8 Ma ("Lumachelle calcaire marin Formation, Lutetian (47.8 - 41.3 Ma)"[183].

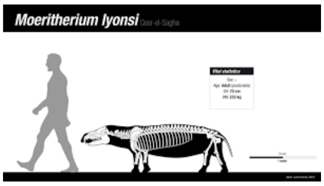
> "Evolutionary history of the elephants and their kin (Proboscidea), starting with pygmy hippo-like forms like *Moeritherium* with ***no trunks or tusks***,…" reads the text for Fig. 14.18 on p. 324 of Donald Prothero's book *Evolution What the Fossils Say and Why It Matters* (2007). And the next figure (14.19) about "***the details of the evolution*** of the skull, tusks, and trunk of the proboscideans, **from the pygmy hippo-like *Moeritherium*** through mastodons with longer tusks and trunks to mammoths". The latter text is reproduced for his altered Figure 14.20 of the second edition 2017, p. 350).

So, what may *Moeritherium* have looked like? Here are two skulls and an entire skeleton und five different reconstructions (some without any trunks, others with already considerably long trunks, although there seems to be a general consensus among paleontologists that it did not have a trunk).

1[184]

2[185]

3[186]



4[187]

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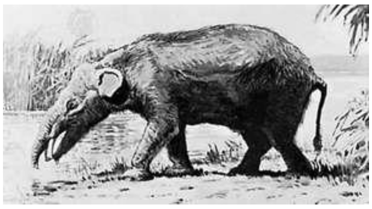
4[189]

5[190]



5[191]

6[192]

7[193]

The *Moeritherium* reconstructions with trunks are fine examples of evolutionary phantasies in contrast to the results of scientific investigation that "pygmy hippo-like forms like *Moeritherium* [had] no trunks or tusks", even in the assessment of Prothero who, however, later speaks of the "hippo-like *Moeritherium* through mastodons

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[182] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=43238 (retrieved 12 January 2019)

[183] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43238; see for Senegal https://paleobiodb.org/classic/displayCollResults?taxon_no=43238&max_interval=Eocene&country=Senegal&is_real_user=1&basic=yes&type=view&match_subgenera=1 (retrieved 12 January 2019)

[184] https://en.wikipedia.org/wiki/Moeritherium#/media/File:Moeritherium_sp.jpg (retrieved 12 January 2019)

[185] https://en.wikipedia.org/wiki/Moeritherium#/media/File:Moeritherium_andrewsi.jpg (retrieved 12 January 2019)

[186] https://en.wikipedia.org/wiki/Moeritherium#/media/File:Moeritherium_sp.jpg (retrieved 12 January 2019)

[187] https://www.facebook.com/EoFauna/photos/a.494257077281866/1054017527972482/?type=3&theater (retrieved 12 January 2019)

[188] https://fineartamerica.com/featured/moeritherium-michael-longscience-photo-library.html?product=metal-print (Can be bought as a metal print.) (retrieved 12 January 2019)

[189] https://upload.wikimedia.org/wikipedia/commons/e/e4/Moeritherium_lyonsi_skull_front.jpg (retrieved 12 January 2019)

[190] http://www.dinocasts.com/prod_productDetails.asp?ProductId=501 (retrieved 12 January 2019)

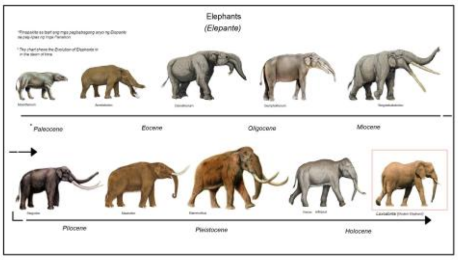
[191] https://www.google.de/search?q=moeritherium&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjZyZX0rOjfAhWPPFAKHYWyBJAQ_AUIDigB&biw=1354&bih=947#imgrc=6-FiqFe4f7CgQM (retrieved 12 January 2019)

[192] http://www.dinosaurjungle.com/prehistoric_animals_moeritherium.php (retrieved 12 January 2019)

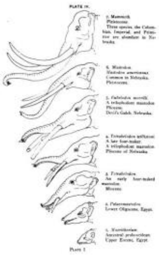
[193] https://www.flickr.com/photos/helensanders/18793163030 (retrieved 12 January 2019)

with longer tusks and trunks to mammoths." How can it be "longer" if *Moeritherium* had neither tusks nor trunks? (He later relativized this by saying "it had very short tusks in the upper and lower jaws").

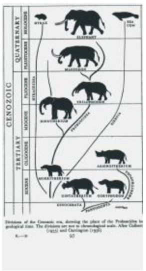
Anyway, *Moeritherium* has been asserted by some authors to be the "earliest known ancestor" of the "elephant family tree" in many figures like the following ones[194] (see also two of the figures above):



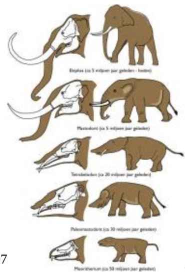
1[195]



2[196]



3[197]



4[198]

After mentioning *Palaeomastodon* and *Phiomia* of the early Oligocene from the famous Fayûm beds of Egypt, Prothero goes on to assert his readers (2017, p 348, same sentence in the first edition) that:

> "These primitive forms can be traced back to the ***ultimate transitional fossil***, *Moeritherium*, from the late Eocene of Egypt."

His strong claim about *Moeritherium* as the ***ultimate transitional fossil***[199] is – scientifically analyzed – sheer nonsense, or in the words of evolutionary biologists Nelson and Nelson and Platnick as well Patterson[200], as quoted above:

> "The notion that phylogeny can be read directly from the rocks is ***superstition and nothing more***", for the "suggested "ancestors" usually shows them to be ***too specialized*** to have been direct ancestors of anything else, and "that one can go to the fossil record and expect to empirically recover an ancestor-descendant sequence, be it of species, genera, families or whatever, ***has been, and continues to be, a pernicious illusion***, responsible, in my opinion, for much of the current confusion within the field of comparative biology." "That a known fossil or recent species, or higher taxonomic group, however primitive it might appear, is an actual ancestor of some other species or group, is an assumption **scientifically unjustifiable**, for science never can simply assume that which it has the responsibility to demonstrate." "Fossils may tell us many things, but one thing they can never disclose is whether they were ancestors of anything else."

However, apart from Prothero's statement of faith and the phylogenetic presentations just shown, in the majority of the cases the authors have presented *Moeritherium* as a side branch of Proboscidea (see also most of the evolutionary trees on the preceding pages). Even the authors of Wikipedia (totally dominated evolutionarily) write *"Moeritherium* is not thought to be directly ancestral to modern elephants; it was a branch of Proboscidea **that died out**, ***leaving no***

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[194] 24,439 views since 2008: https://www.flickr.com/photos/baggis/3007274136 (retrieved 28 November 2018)

[195] https://sites.google.com/site/evolutionoftheelephant/ances (retrieved 12 January 2019)

[196] https://www.pinterest.de/pin/572238696380963780 (retrieved 12 January 2019)

[197] https://www.pinterest.de/pin/185562447116948251/ (retrieved 12 January 2019)

[198] https://www.pinterest.de/pin/399413060685536504/ (retrieved 12 January 2019)

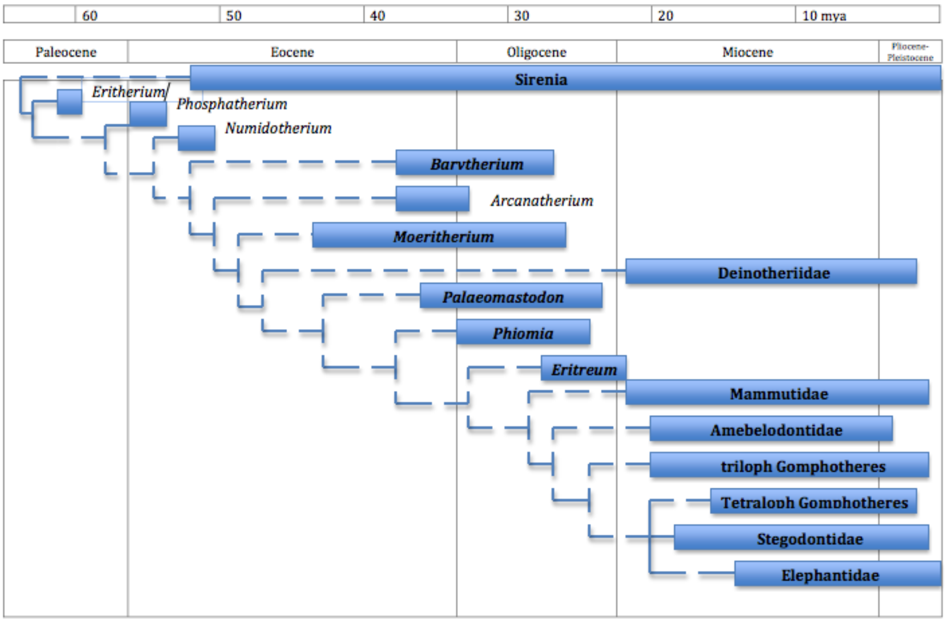
[199] Prothero tries to substantiate his claim about "the ultimate transitional fossil" by stressing several anatomical characters "unique to the Proboscidea as well" – but is totally overlooking/ignoring/disregarding/neglecting all the specializations ("heterobathmies", "Spezialisationskreuzungen", a translation of Dollo's "chevauchement [overlappings] de specialisation", in English also "specialization-crossings" and "cross-specializations") of this genus telling his readers only that (2017, p. 348): "Superficially, it looked more like a tapir or a pygmy hippo than an elephant and probably [?] only had a short proboscis, not a long trunk. But a close look at the skull shows that it had very short tusks in the upper and lower jaws, the teeth of a primitive mastodont (not those of a tapir or hippo), and the details of the ear region and other part of the skull (such as the condition of the jugal bones in the zygomatic arch) are unique to the Proboscidea as well." So far okay. However, were does he mention the Spezialisationskreuzungen? Anyway, what do such similarities really prove? Paleontologist Oskar Kuhn: ***"The similarity of forms was explained by evolution, and evolution in turn was proven by the various grades of similarities***. It was hardly noticed that ***here one has fallen victim to circular reasoning; 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 repeatetly 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." See reference in http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf

[199] Whom Prothero called "my friend" (2017, p.144).

descendants."[201] Just an example concerning the ear region according to Schmitt and Gheerbrant (2016, p. 148): "*Moeritherium* has a non-homoplastic autapomorphy: the cochlea has a rather conical aspect (aspect ratio > 0.65)."[202] Autapomorphies exclude species displaying them as progenitors from others without them.

So, evolutionary biologists Jeheskel Shoshani and Pascal Tassy have been absolutely correct stating (2013, p. 174) that:

> "Despite our increasing knowledge of the early history of the Proboscidea, there is still much uncertainty concerning the place of the origin of this group of mammals." [203]



"Tentative schematic phylogenetic tree of proboscid evolution. Dark bands indicate known fossil data. [Dashed lines] indicate supposed relationships (after Tassy 1996 Gheerbrand &Tassy 2009)." Redrawn 2019 by Berthold Winterlich, Düren.

The "tentative schematic phylogenetic tree of proboscid evolution"[204] by Shoshani and Pascal (2013, p. 175) appears to demonstrate forcefully our calculations on the lack of transitional fossils presented above according to the expectations of gradualism and *punk eek*.

As for evolutionary numbers of transitional links and possible times involved, we can apply our calculations almost seamlessly from the former cases to the putative evolution of *Numidotherium* to *Moeritherium* (or *vice versa* from *Moeritherium* to *Numidotherium* according to Prothero and other authors):

Gradualism: Minimal time for ***Moeritherium*** to evolve into ***Numidotherium***, again transgressing a family boundary, at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

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[201] https://en.wikipedia.org/wiki/Moeritherium (retrieved 11 January 2019) whom Prothero has called "my friend" 2017, p. 144.

[202] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4694154/pdf/JOA-228-137.pdf
Kenneth D. Rose (2006, p. 264), after enumerating numerous derived traits shared with proboscideans, continues to point out that Moeritherium's "mosaic features – including bunodont to bunolophodant cheek teeth, primitive retention of three upper incisors and an upper canine (…), lack of extensive cranial pneumatization, **absence of a trunk**, and presence of an elongate thoraculumbar region – make its position among primitive proboscideans controversial. It has variously been considered to be the most primitive known prboscidean (e.g. Tassy, 1996) or a uniquely derived eearly off shoot (Court, 1995)". https://www.amazon.de/Beginning-Age-Mammals-Kenneth-Rose/dp/0801884721

[203] Jeheskel Shoshani and Pascal Tassy (2013, 174): Order PRBOSCIDEA – Elephants. Chapter in Volume I of Mammals of Africa. Bloomsbury. London (2103)

"Professor Jeheskel "Hezy" Shoshani (1943 – May 20, 2008) was an evolutionary biologist and an elephant specialist who studied the evolution of elephants for over 35 years. Hezy was a passionate advocate of elephant conservation. … Shoshani was among several people killed in a terrorism-linked explosion in a public minibus in downtown Addis Ababa, Ethiopia, on May 20, 2008." May I add that this terror-attack resulted in an enormous loss for scientific elephant research and perhaps also for the protection and preservation of the African elephant.
https://en.wikipedia.org/wiki/Jeheskel_Shoshani

[204] The white parts of the tree have been substituted by dashed lines.

Punk eek: Minimal time for ***Moeritherium*** to evolve into ***Numidotherium*** (according to Gould's criteria): again ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31; no transional forms found). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case, too, the family boundaries have to be transgressed by probably not only one genus but several genera – let's assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Moeritherium*** did not evolve into ***Numidotherium***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.)

So, the assessment of Sylvia Sikes "who wrote the first authoritative guide to the African elephant and established wildlife conservation programmes in Nigeria"[205], still seems to be more up-to-date than ever (1971, p. 4):

> "Perhaps there is a valid case for a comprehensive reappraisal of the assumptions of earlier authors regarding the phylogeny of this order, and *perhaps we should admit that the* ***siting of Moeritherium in an intermediate position*** *in the 'Paenungulate' family tree* ***savours more of the artistic requirements of the drawing board than an honest admission of ignorance as to its proper position***."[206]

To repeat: Georges Cuvier: "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."

Antoine-Laurent de Jussieu: "It is in this mutual dependence of functions, and this reciprocal assistance, that the laws which determine the relations of their organs are founded, and which are of a necessity equal to that of the metaphysical or mathematical laws: for it is evident that the proper harmony between the organs which act upon one another is a necessary condition of the existence of the being to which they belong, and that if one of its functions be modified in an incompatible manner with the modifications of others, this being could not exist."

W-E L: Any scientist who has ever systematically worked with mutants will immediately be able to give a range of examples corroborating this verdict. 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. For Cuvier and Antoine-Laurent de Jussieu *cf.* links above.

Phosphatherium

Family: Phosphatheriidae Gheerbrandt et al. 2005

In Prothero's "Evolutionary history of the elephants", *Phosphatherium* is the first genus and something like the direct ancestor not only of all the other elephants (including the "heavy beast" *Barytherium*[207]) but also of the Arsinotheres[208] and even the Manatees[209] and dugongs[210]. A similar scientifically unfounded assertion[211] has been given by Emmanuel Gheerbrant (2009, p. 10717): "Elephants are the only living representatives of the Proboscidea, a formerly diverse mammalian order **whose history began with the 55-million years (mys) old *Phosphatherium***."[212]

However, other authors (see above and Seiffert et al. 2012[213]) put it on a side-branch of their phylogenetic trees, probably leaving no descendants at all.

Phosphatherium Gheerbrant et al. 1996

Age range: 55.8 to 48.6.4 Ma.

"Distribution: found only at Ouled Abdoun Basin (*Phosphatherium* type specimen) (Eocene of Morocco)."[214]

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[205] https://www.thetimes.co.uk/article/sylvia-sikes-6vgtn0h2n59 (retrieved 13 January 2019)

[206] Sikes S K (1971): The Natural History of the Elephant. Weidenfels & Nicolson. London.

[207] https://en.wikipedia.org/wiki/Barytherium (retrieved 15 January 2019)

[208] https://de.wikipedia.org/wiki/Arsinoitherium (retrieved 15 January 2019)

[209] https://en.wikipedia.org/wiki/Manatee (retrieved 15 January 2019)

[210] https://de.wikipedia.org/wiki/Dugong (retrieved 15 January 2019)

[211] Recall, please, Kuhn as quoted above: "The similarity of forms was explained by evolution, and evolution in turn was proven by the various grades of similarities. It was hardly noticed that here one has fallen victim to circular reasoning; 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." [Etc.] See also the scientifically correct objections concerning such evolutionary derivations by Nelson, Nelson and Platnick, Patterson and many other authors as shown above.

[212] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705600/pdf/zpq10717.pdf and/or https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705600/

[213] See also the phylogenetic tree of Seiffert et al (2012) in: Diversity in the later Paleogene proboscidean radiation: A small barytheriid from the Oligocene of Dhofar Governorate, Sultanate of Oman. Naturwissenschaftem 99: 133-141: https://www.researchgate.net/publication/221734443_Diversity_in_the_later_Paleogene_proboscidean_radiation_A_small_barytheriid_from_the_Oligocene_of_Dhofar_Governorate_Sultanate_of_Oman (retrieved 15 January 2019)

[214] http://fossilworks.org/bridge.pl?a=taxonInfo&taxon_no=98250# (retrieved 15 January 2019)

In stark contrast to the generally rich, “excellent”, “very complete” elephant fossil record, displaying an “enormous quantity of fossil bones”[215], now in the case of *Phosphaterium* the following few fragments was almost all we had for a about decade:

> (Wikipedia 15 January 2019:) “*Phosphatherium* is known ***primarily from two maxilla fragments*** dated to the latest Paleocene deposits of the Ouled Abdoun Basin, Morocco, which date from the Thanetian epoch. Not only is it one of the smallest (estimated to be about 30 cm tall at the shoulder and weigh about 17 kilograms)[4] member of the proboscidea family, but it is also the oldest in the family.[5] Like its later relative, *Moeritherium*, the animal was probably an amphibious browser that fed on aquatic plants, akin to a very small tapir. Both animals are included in the family Numidotheriidae, together with *Numidotherium*.”[216]

However, in 2005 and the following years Gheerbrant et al. published several papers on additional *Phosphatherium* fossil material[217] so that more is known in the interim:

> “*Phosphatherium* war ein kleines Rüsseltier, das möglicherweise zwischen 10 und 15 kg gewogen hat.“ Die äußeren Ränder der Nasenlöcher zeigten “keine Erweiterung, wie es bei den späteren Rüsseltieren der Fall ist und die Ansatzstelle des Rüssels angeben.“ ("*Phosphatherium* was a small proboscidean that weighed perhaps between 10 and 15 kg." The outer edges of the nostrils showed "no dilatation, as is the case with the later mammals, indicating the point of attachment of the proboscis.”)

Some paragraphs further on we read:

> “Dem Bau der Nase betreffend mit den kaum verlängerten Nasenlöchern ist anzunehmen, dass *Phosphatherium* ***keinen Rüssel*** ausgebildet hatte.“ ("The construction of the nose with the barely extended nostrils probably implies that *Phosphatherium* had formed ***no proboscis***.")[218]

Kenneth D. Rose 2006, p. 263:

> “The nasal opening is at the front of the snout, not retracted as in most proboscideans; hence *Phosphatherium* ***lacked a proboscis***”[219]:

Jeheskel Shoshani and Pascal Tassy 2013, p. 174:

> “*Phosphatherium escuilliei* was about the size of a dog (10-15 kg), but it was not a dwarf; ***it did not have a trunk***, tusks, nor horizontal displacement of premolars and molars.”[220]

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[215] As enumerated in detail above – the subfamiliy of elephantinae alone with “1056 collections including 1170 occurences” (just made up of Primelephas, Loxodonta, Palaeoloxodon, Mammuthus, and Elephas).

[216] https://en.wikipedia.org/wiki/Phosphatherium

[217] http://sciencepress.mnhn.fr/sites/default/files/articles/pdf/g2005n2a4.pdf

[218] https://de.wikipedia.org/wiki/Phosphatherium (retrieved 15 January 2019) Full context: *Phosphatherium* war ein kleines Rüsseltier, das möglicherweise zwischen 10 und 15 kg gewogen hat. Am besten ist der Schädel bekannt, der von zahlreichen Funden überliefert ist. Dieser war 17 cm lang mit weit ausladenden Jochbeinen. Vor allem der Gesichtsbereich war sehr ausgedehnt, was vor allem durch das langgestreckte Nasenbein verursacht wurde. Dabei zeigten die äußeren Ränder der Nasenlöcher ***keine Erweiterung, wie es bei den späteren Rüsseltieren der Fall ist und die Ansatzstelle des Rüssels angeben***. Auch hatte das Nasenbein keine Verbindung mit dem Zwischenkieferknochen. Insgesamt wirkte das Rostrum sehr schmal. Das Hinterhauptsbein besaß eine eher rechtwinklige Form und war sehr flach ausgebildet, die Gehirnhöhle zeigte seitliche Verschmälerungen.[1]

Der Unterkiefer erreichte eine Länge von 10 cm und besaß einen recht niedrigen Körper. Die Zahnanzahl war gegenüber älteren Rüsseltieren etwas reduziert. Erwachsene Tiere besaßen folgende Zahnformel: 3.1.4.3 2.1.3.3 {\displaystyle {\frac {3.1.4.3}{2.1.3.3}}} {\frac {3.1.4.3}{2.1.3.3}} Dabei erstreckte sich die Zahnreihe über eine Länge von 8 cm und nahm dabei nicht einmal die Hälfte der Schädellänge ein. Im Oberkiefer war der zweite Schneidezahn (I2) vergrößert und konisch geformt, stand aber senkrecht im Knochen. Im Unterkiefer dagegen zeigte der erste Schneidezahn (I1) deutliche Vergrößerungen. Beide Zähne bildeten aber noch keine echten Stoßzähne aus. Die vordere Bezahnung wies keine geschlossene Zahnreihe auf, im Oberkiefer befand sich ein zusätzliches kleines Diastema hinter dem ersten Prämolaren. Die Prämolaren insgesamt waren recht einfach gebaut und wenig molarisiert, das heißt, sie ähnelten kaum den Molaren. Diese hatten einen bilophodonten Aufbau mit zwei deutlich ausgebildeten querstehenden Schmelzleisten. Der hinterste Molar des Unterkiefers allerdings besaß eine dritte Schmelzleiste. Allgemein waren die Zähne niederkronig (brachyodont).[2][1]

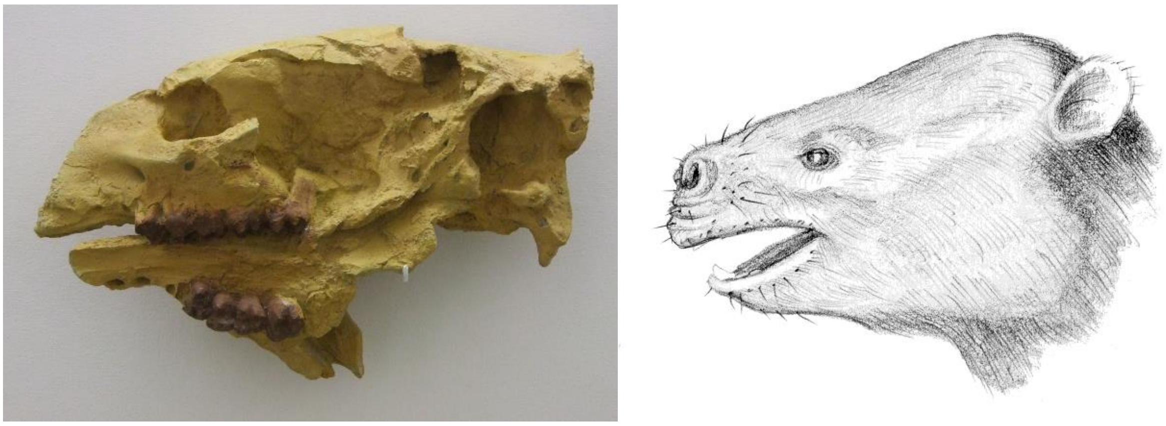
Zu den wenigen bisher gefundenen postcranialen Skelettelementen zählen einige mittlere Finger- oder Zehenknochen mit einer Länge von 1,5 cm, die aber nur wenige Aussagen über den Bau der Füße oder Hände zulassen.[1]“

[219] https://www.amazon.de/Beginning-Age-Mammals-Kenneth-Rose/dp/0801884721

[220] See reference above.

So, why then “Rüsseltier“ (proboscid), if it had no proboscis etc.? Well, because of some anatomical features it had in common with the proboscidea. Which ones? “Shoshani and Tassy continue: “Nevertheless, *Phosphatherium* was a proboscidean since it possessed unique proboscidean characters such as a well-developed zygomatic process of the maxillary bone (Gheerbrant et al. 2005).” Well, this feature is also known in humans[221]. Or Prothero 2017, p. 348: “The teeth already show the distinctive mastodont pattern at the very beginning of proboscidean evolution.”

This statement presupposes as fact (1) the questionable macroevolution theory by random (‘micro’-)mutations[222] and natural selection[223] and implies (2) that *Phosphatherium* was “at the very beginning of proboscidean evolution” – both ideas are scientifically unproven (anatomical similarities between different genera prove nothing but the circular reasoning applied by some authors as evidence of macroevolution). Autapomorphies of *Phosphatherium* are discussed by Erdal et al. (2016)[224], excluding it from the “very beginning of proboscidean evolution”.



Skull of *Phosphatherium* and possible reconstruction of its head[225]

As to the assertion that “The teeth already show the distinctive mastodont pattern at the very beginning of proboscidean evolution” – well, I would not be surprised about further studies detecting some more? autapomorphic characters also in *Phosphatherium* teeth structure and pattern. Just to illustrate the extreme ends of the putative evolution by random (‘micro’-)mutations: Tooth row in *Phosphatherium* about 8 cm, in *Elephas* and *Loxodonta* about 21 cm (just one tooth[226]) plus tusks up to 266.7 cm und 349.25 cm respectively.

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[221] https://en.wikipedia.org/wiki/Zygomatic_process_of_maxilla (retrieved 19 Januar 2019).

[222] http://www.weloennig.de/Gesetz_Rekurrente_Variation.html http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf

[223] http://www.weloennig.de/jfterrorchipmunks.pdf http://www.weloennig.de/PlantGalls.pdf http://www.weloennig.de/BeautifulFactsPartI.pdf http://www.weloennig.de/BeautifulFactsPartII.pdf http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf

[224] Ozan Erdal, Pierre-Olivier Antoine, Sevket Sen. (2016): New material of Palaeoamasia kansui (Embrithopoda, Mammalia) from the Eocene of Turkey and a phylogenetic analysis of Embrithopoda at the species level. Palaeontology, Wiley, 2016 See:https://www.researchgate.net/publication/305076926_New_material_of_Palaeoamasia_kansui_Embrithopoda_Mammalia_from_the_Eocene_of_Turkey_and_a_phylogenetic_analysis_of_Embrithopoda_at_the_species_level (retrieved 15 January 2019)

[225] https://en.wikipedia.org/wiki/Phosphatherium#/media/File:Phosphatherium escuilliei_65.JPG and https://de.wikipedia.org/wiki/Phosphatherium (retrieved 15 January 2019)

[226] “The elephant has a total of 24 teeth, but only 2 are usually in use at any one time.” https://animalcorner.co.uk/elephant-anatomy/ (retrieved 17 January 2019)

Left and right: Jaw fragments with teeth from *Phosphatherium*. Right: Skull of it.[227]

Left: Molar of African elephant[228]. Right: “Molars of an African elephant (back) and an Asian elephant (front). Note the difference in the pattern of ridges on the grinding surface of the teeth.”[229]

It would be quite instructive to systematically compare the macro-anatomical tooth structure – molars and tusks – of the genera so far investigated above for the topic of gradualism, punk eek and ID (i.e. for *Elephas*, *Loxodonta*, *Mammuthus*, *Primelephas*, *Stegotetrabelodon*, *Gomphotherium*, *Palaeomastodon*, *Numidotherium*, *Moeritherium*, *Phosphatherium*) and clearly identify the similarities and especially the the unique ***autapomorphic features for each case***.

For example, what does it exactly mean (anatomically, developmentally, physiologically, genetically) when we are informed regarding *Numidotherium* that “the typically horizontal dental change of today's elephants” is not found in that genus, but “evolved later”[230] – now all the real/hard/definite questions about random mutations and natural selection instead of an unsubstantiated and entirely empty statement of faith in the form of “evolved later”. Do several of the new features appear upruptly/saltationally? If so, which ones? There are some hints that

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[227] https://en.wikipedia.org/wiki/Phosphatherium#/media/File:Phosphatherium_escuilliei_65.JPG and https://de.wikipedia.org/wiki/Phosphatherium (retrieved 15 January 2019)

[228] http://www.krugerpark.co.za/krugerpark-times-3-16-elephant-bluetooth-23455.html (retrieved 16 January 2019)

[229] http://wildpro.twycrosszoo.org/S/0MProboscidae/Elephantidae/elephas/Elephas_maximus/ImgAsian-Ele/HHAsEle8833AsAfr_molars.htm (retrieved 16 January 2019)

[230] https://de.wikipedia.org/wiki/Numidotherium (“...der für die heutigen Elefanten typische horizontale Zahnwechsel entwickelte sich erst später.“ (Retrieved 16 January 2019)

forms with *horizontal tooth displacement appear abruptly* in the fossil record[231]. Perhaps also these references may be checked.[232] Are specified and irreducible complexity involved in the new anatomical and other systems? What about orphan genes?

Left: A collection of elephant teeth.[233] Right: Elephant tusk.[234]

Well, the perceptive reader might ask: "developmentally, physiologically, genetically", "specified and irreducible complexity", "orphan genes"? Reflecting more deeply about such biological research possible to a large extent in living organisms, it quickly becomes clear that our way to exact knowledge is severely hampered (for many questions even totally barred) for our present methods of analyses and investigations in fossil material alone – even if the fossil record is excellent, very complete and superb (and not just as "an old paleontological in joke proclaims that mammalian evolution is a tale told by teeth mating to produce slightly altered descendant teeth"[235]).

On the similarities between elephants and sirenias and hyraxes, it has long been known that:

> "Hyraxes share several unusual characteristics with elephants and the Sirenia (manatees and dugongs), which have resulted in their all being placed in the taxon Paenungulata. Male hyraxes lack a scrotum and their testicles remain tucked up in their abdominal cavity next to the kidneys, the same as in elephants, manatees, and dugongs. Female hyraxes have a pair of teats near their armpits (axilla), as well as four teats in their groin (inguinal area); elephants have a pair of teats near their axillae, and dugongs and manatees have a pair of teats, one located close to each of the front flippers. The tusks of hyraxes develop from the incisor teeth as do the tusks of elephants; most mammalian tusks develop

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[231] William J. Sanders (2017, p. 16) Horizontal tooth displacement and premolar occurrence in elephants and other elephantiform proboscideans. Historical Biology:
https://www.researchgate.net/profile/William_Sanders2/publication/315466904_Horizontal_tooth_displacement_and_premolar_occurrence_in_elephants_and_other_elephantiform_proboscideans/links/59f89a55458515547c269c4f/Horizontal-tooth-displacement-and-premolar-occurrence-in-elephants-and-other-elephantiform-proboscideans.pdf

"The mechanism of cheek tooth emergence and replacement in modern elephants – in which deciduous premolars and molars move anteriorly along the alveolus and successively detach from the jaw until only one or two molars remain in occlusion – ***is unusual and derived compared to vertical tooth replacement and concurrent presence of adult dentition observed in most mammals***. This mechanism, 'horizontal tooth displacement' (Shoshani 1992; Tassy 1996a), is ancient, having evolved [W-E L: "evolved" – what does it exactly mean genetically?] in elephantimorph proboscideans during the Oligocene. Contextually, it is worth noting that there is a propensity among afrotheres, the higher order group to which proboscideans, sirenians, hyraxes, sengis, tenrecs, golden moles, and aardvarks belong, for delayed eruption of cheek teeth (e.g. Brash 1952; Steyn & Hanks 1983; Asher & Lehmann 2008), but besides manatees, ***none of these taxa exhibit to a similar or greater degree the pattern of horizontal tooth progression and elimination of teeth seen in elephants and other elephantimorph proboscideans***.

[232] There are also some excellent papers on microstructural elephant tooth features published 2007, 2008, 2017:
Tabuce et al. (2007): https://academic.oup.com/zoolinnean/article/149/4/611/2630925
Ferretti (2008):
https://www.researchgate.net/publication/47726440_Enamel_Structure_of_Cuvieronius_hyodon_Proboscidea_Gomphotheriidae_with_a_Discussion_on_Enamel_Evolution_in_Elephantoids
Tabuce etal. (2017): Tooth Enamel Microstructure of Living and Extinct Hyracoids Reveals Unique Enamel Types Among Mammals.
https://link.springer.com/article/10.1007/s10914-015-9317-6

[233] https://www.pinterest.de/pin/225461525070844036/ (retrieved 16 January 2019)

[234] https://www.researchgate.net/post/In_your_opinion_can_an_elephants_tusk_be_considered_as_a_an_extension_of_tooth (retrieved 16 January 2019)

[235] Gould S J (1989, p. 60): Wonderful Life. Norton Paperback 1990; reissued 2007.

> from the canines. Hyraxes, like elephants, have flattened nails on the tips of their digits, rather than curved, elongated claws which are usually seen on mammals."[236]

So, based on the commonly applied evolutionary circular reasoning ('similarity' proves evolution proved by [further] 'similarities' on all levels – from morphology and anatomy to DNA), – ***all autapomorphic characters***[237] ***being fully ignored*** (not to speak of the **abrupt appearance** of almost all these forms in the fossil record, the hundreds to thousands of missing links expected by gradualism and *punk eek* alike etc. see, please, above) – "the manatee, the rock hyrax and the elephant share a common ancestor, Tethytheria, which died out more than 50 million years ago."[238]

"Rock hyrax [left] is the elephant's closest relative" according to many authors including Jaymi Heimbuch[239]
Photo: Bartosz Budrewicz and Volodomyr Burdiak (see link in the footnote).

Incidentally, "Tethytheria" is not something like a special genus postulated to be the common ancestor of the taxa just mentioned above but has been listed as the "Suborder TETHYTHERIA" [of the "Order PAENUNGULATA"] with the Infraorders EMBRITHOPOA, SIRENIA, and PROBOSCIDEA by Kenneth D. Rose (2006, pp. 10, 213, 344) and others in the wake of a hypothesis by McKenna (1975).

Famous elephant researcher Sylvia Sikes (see above) raises the ensuing issue on Young's suggestion of the order *Paenungulata*:

> "However, if viewed with ruthless objectivity, it requires extreme elasticity of the imagination to see anything more than a very superficial resemblance between the available parts of the ***skeletons of the earliest hyraces*** and those of the *Proboscidea*. Moreover, in the light of recent comparative studies on the anatomy (including histology), physiology (including biochemistry, ecology and ethology of the living members of these orders[240], it is apparent that ***in the past disproportionate weight was sometimes given to skeletal affinities, while other important characteristics were overlooked***."[241]

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[236] https://en.wikipedia.org/wiki/Hyrax (retrieved 17 January 2019)

[237] See Prothero above on the cladists: "To be a true ancestor, the fossil must have nothing but shared primitive characters compared to its descendants. If it has any derived feature not found in a descendant [W-E L: an autopomorphy], it cannot be an ancestor."

[238] https://www.mnn.com/earth-matters/animals/photos/12-facts-change-way-see-elephants/elephants-closest-relative-rock-hyrax (retrieved 17 January 2019)

[239] https://www.mnn.com/earth-matters/animals/photos/12-facts-change-way-see-elephants/elephants-closest-relative-rock-hyrax (retrieved 17 January 2019)
Some more on the theory of tusk evolution in general: https://www.nytimes.com/2018/09/11/science/tusks-teeth-elephants-genes.html (retrieved 17 January 2019)

[240] "Paenungulata is a clade that groups three extant mammal orders: Proboscidea (including elephants), Sirenia (sea cows, including dugongs and manatees), and Hyracoidea (hyraxes)." https://en.wikipedia.org/wiki/Paenungulata (retrieved 17 January 2019)

[241] Sikes S K (1971, p. 2): The Natural History of the Elephant. Weidenfels & Nicolson. London.

Hence, unfortunately fossils can only provide a partial understanding of the biological questions, which can and should be raised about a specimen detected.

Nevertheless, most evolutionary biologists – focusing almost exclusively on homologous[242] similarities, and often totally disregarding the enormous rest of unfavourable facts against their theory – are conveying the impression to their audience that they are absolutely sure in presenting certain extinct species as progenitors/ancestors of others including extant ones and tend to classify people who doubt their assertions about evolution that – in the sense of the often quoted statements of Dawkins – "it is absolutely safe to say that if you meet somebody who claims not to believe in evolution, that person is ignorant, stupid or insane (or wicked, but I'd rather not consider that") (Dawkins). And later the same author explained:

> "I don't withdraw a word of my initial statement. But I do now think it may have been incomplete. There is perhaps a fifth category, which may belong under "insane" but which can be more sympathetically characterized by a word like *tormented*, *bullied*, or *brainwashed*. Sincere people who are not ignorant, not stupid, and not wicked can be cruelly torn, almost in two, between the massive evidence of science on the one hand, and their understanding of what their holy book tells them on the other. I think this is one of the truly bad things religion can do to a human mind. There is wickedness here, but it is the wickedness of the institution and what it does to a believing victim, not wickedness on the part of the victim himself."[243]

Just to repeat here the numbers of expected transitional links according to gradualism and *punk eek* for *Phosphatherium* and its presumed descendants:

Gradualism: Minimal time for ***Phosphatherium*** to evolve into ***Moeritherium*** or ***Numidotherium*** (depending on the evolutionary source), again transgressing a family boundary, at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Phosphatherium*** to evolve into ***Moeritherium*** or ***Numidotherium*** (depending on the evolutionary source) according to Gould's criteria: again ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case, too, the family boundaries have to be transgressed by probably not only one genus but several genera – let's assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Phosphatherium*** did not evolve into ***Moeritherium*** or ***Numidotherium***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.) However, as for the possibility in this case to detect several further intermediate forms (in contrast to "transional" ones), see below.

So, (1) was *Phosphatherium* the ancestor not only of the elephants but also of *Barytherium*, the Arsinotheres and Manatees and dugongs? (See Prothero's figure and that of some other authors again.) Or (2) is it just a potential ancestor? Or (3) is it only on a side-branch of the evolutionary tree? Or (4) are Nelson, Nelson and Platnick, and Patterson and other correct that "it is a mistake to believe even that one fossil species or fossil "group" can be demonstrated to have been ancestral to another"? (See, please quotations above). (5) Or is intelligent design involved due to autapomorphies, specified and irreducible complexity?

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[242] Into which term evolution is again already implied: "having the same or a similar relation; corresponding, as in relative position or structure" and/or "…having the same origin although now having a different purpose or shape as a result of evolution (= gradual change over millions of years) https://www.dictionary.com/browse/homologous https://dictionary.cambridge.org/de/worterbuch/englisch/homologous (retrieved 18 January 2019)

[243] https://en.wikiquote.org/wiki/Richard_Dawkins (retrieved 18 January 2019) See critique in http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf (p.51)

Eritherium

So far unassigned to any family of the Proboscidea

Since *Eritherium* is additionally presented in some of the phylogenetic trees shown above as the progenitor/ancestor of *Phosphatherium* and thus – as already mentioned above for *Phosphatherium* – of all the elephants and additionally of the "heavy beast" *Barytherium*, the Arsinotheres and even the Manatees and dugongs – we are going to eventually look also at this genus in the following paragraphs:

> "***Eritherium*** is an extinct genus of early Proboscidea found in the Ouled Abdoun basin (early Thanetian age), Morocco. It lived about 60 million years ago. It was first named by Emmanuel Gheerbrant in 2009 and the type species is *Eritherium azzouzorum*. *Eritherium* is the oldest, smallest and most primitive[244] known elephant relative."[245]

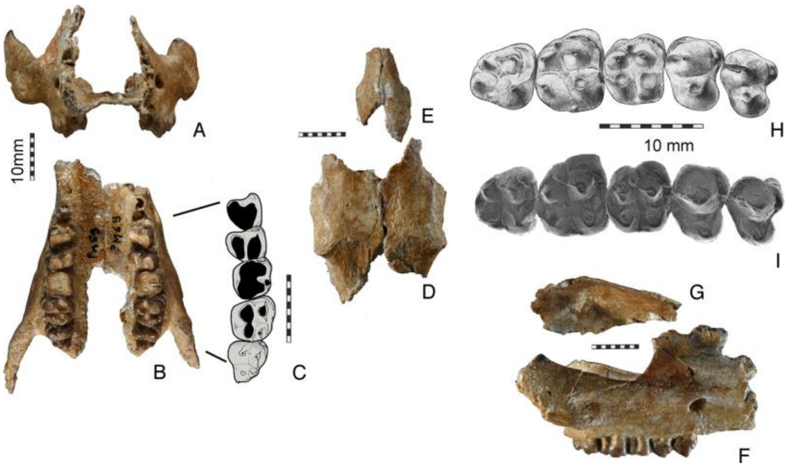

Fig. 1 of Emmanuel Gheerbrant 2009, p. 10718, with following explanation: "Skull and upper dentition of Eritherium azzouzorum n.g., n.sp. (A–G) Holotype, MNHN PM69. (A and B) Anterior part of skull (rostrum) with maxilla and jugals in mesial and ventral views and showing nasal cavity, zygomatic arches and jugal dentition. (C) Left P3–4, M1–3, occlusal sketch. (D and E) Frontals and nasals in dorsal view, specimen MHNT PAL 2006.0.18–20 (Museum National d'Histoire Naturelle de Toulouse). (F and G) Frontal and rostrum (jugal and right maxillary with P3–4, M1–3) in lateral view (G is reversed for reconstruction). (H and I) Right P3–4, M1–3 in occlusal view (H is SEM view of I). (Scale bar, 10 mm.)"[246]

These rather few and some small additional bone fragments and teeth[247] seem to be all we have at present to study this genus (21 January 2019). One may hope that much more will be detected in the future to come as close as possible to an accurate knowledge of that genus, including of all its autapomorphies (as far as this aim is attainable on basis of fossil material alone).

This would also be important to reduce the overgrowing mass of evolutionary speculations, which is often inversely proportional to the dearth/scarcity/paucity of the fossil material (as the necessary evolutionary revisions due to more

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[244] Concerning the problems/difficulties/dilemmas involved in the application of the term "primitive" (meaning **evolutionarily ancestral**), check, please, carefully the discussion in the book *Unser Haushund: Eine Spitzmaus im Wolfspelz?* http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf 2014, pp. 287/288. The term usually takes for granted/presupposes/postulates/connotates as absolutely and axiomatically true the scientifically thoroughly refuted and discredited materialistic theory of evolution by random ('micro'-)mutations and natural selection. See, please, (perhaps) again the links given above as for example (and many more): http://www.weloennig.de/Gesetz_Rekurrente_Variation.html http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf http://www.weloennig.de/jfterrorchipmunks.pdf

"At least three other sets of terms are synonymous with the terms "primitive" and "advanced". The technical terms are considered preferable because they are ***less likely to convey the sense that the trait mentioned is inferior, simpler, or less adaptive*** (e.g., as in lower and higher plants." https://en.wikipedia.org/wiki/Primitive_(phylogenetics) (Retrieved 21 January 2019). Whether "plesiomorphy" and "apomorphy" will fully solve the problem – that's open to question.

[245] https://en.wikipedia.org/wiki/Eritherium (retrieved 19 January 2019)

[246] https://www.pnas.org/content/106/26/10717.full (retrieved 19 January 2019) (P. 10717: "*Eritherium* (monotypic genus), from *eri* (g.), early, and *therion* (g.), beast; *azzouzorum*, species **dedicated to people** from Ouled Azzouz village close to Sidi Chennane, **who recovered most of the fossils**.") (Retrieved 19 January 2019)

[247] P. 10717: "There are 15 specimens representing upper and lower jugal dentition and skull part, including the holotype, MHNL PAL 2006.0.18–20 (P3–4, M1–3), OCP DEK/GE 307 (M1–3), MNHN PM50 (I2, P2–4, M1–3)."

complete material in the research history of *Ramapithecus*, *Homo habilis*, *H. erectus* and *H. sapiens neandertalensis*[248] and many other examples have clearly demonstrated). Also, I must admit that I felt a bit uncertain when I read that ***the people*** from the Ouled Azzouz village close to Sidi Chennane "***recovered most of the fossils***" (p.10717). However, I appreciate the honesty of the author.

So, what appears to be known at present?

Well, first, (as expected) it did not have a trunk. I have to confess that I was a bit surprised that this question, which is almost always the first one that almost all people associate with the characteristics of an elephant-like animal, has not been addressed at all by Gheerbrant in his original paper (2009)[249]. Only when science communicators asked that question, it was answered correspondingly:

> "Although ***it lacked a trunk*** and didn't look much like its later descendants, it did have an enlarged first incisor, the precursor to a tusk."[250] "While ***it lacked a trunk***, the animal had an enlarged first incisor, which researcher Emmanuel Gheerbrant of the National Museum of Natural History in Paris, France, says represents a primitive tusk."[251]

But it may be that for a researcher of the status of Gheerbrant who has also been the first author in the description of *Phosphatherium* (Gheerbrant et al. 1996) and author or coauthor of other important papers[252], this lack of a trunk was simply self-evident and quite obvious for him. For, if *Eritherium*'s presumed descendant *Phosphatherium* did not have a trunk – how so could its supposed progenitor have displayed one?

Thus, *Eritherium* lacked a trunk, but it is shown in several "reconstructions" with conspicuous trunks – short ones and even long ones, in spite of all the scientific evidence to the contrary – as the ensuing examples demonstrate:

1[253] 2[254] 3[255]

Reconstructions of *Eritherium* with trunks (although they had none) according to the references given in the corresponding footnotes.

Now, was *Eritherium* the progenitor and ancestor of proboscideans and other life forms?

> "It is **unlikely that *Eritherium* was the last common ancestor of all proboscideans**, but it does represent one of the first distinguishable members of the group and shows a lot of similarities to earlier hoofed mammals."[256]

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[248] See R. Junker and S. Scherer (2013): Evolution – Ein kritisches Lehrbuch. Weyel-Verlag Gießen, 7. aktualisierte und erweiterte Auflage 2013. http://www.wort-und-wissen.de/lehrbuch/index.html Entstehung der Menschheit: http://www.evolutionslehrbuch.info/teil-6.html

[249] See again https://www.pnas.org/content/106/26/10717.full

[250] https://www.theguardian.com/science/2012/sep/02/eritherium-azzouzorum-new-to-nature (retrieved 19 January 2019)

[251] https://www.livescience.com/9665-oldest-elephant-relative.html (rterieved 19. January 2019)

[252] http://paleo.mnhn.fr/fr/recherche/type/publication/field_auteurs/438

[253] https://dinopedia.fandom.com/wiki/Eritherium (rterieved 19. January 2019)

[254] https://www.google.de/search?q=eritherium+azzouzorum&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiKpfzWtPrfAhVNblAKHUzlA_gQ_AUIDigB&biw=1016&bih=926#imgrc=GcrfzSqxF3_6yM (retrieved 19. January 2019)

[255] https://www.google.de/search?q=eritherium+azzouzorum&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiKpfzWtPrfAhVNblAKHUzlA_gQ_AUIDigB&biw=1016&bih=926#imgrc=LQJeaPpnv5A3nM (retrieved 19. January 2019)

[256] https://www.nationalgeographic.com/science/phenomena/2009/07/07/an-early-rabbit-sized-elephant-relative-from-morocco/ (retrieved 19. January 2019)

In which characters does *Eritherium* differ from its putative descendant/offspring *Phoshatherium* – as far as can be derived from the fragmentary fossil material? Gheerbrant answers (2009, pp. 10717/10718):

> “Differs from *Phosphatherium* by a smaller size (60–70%) and primitive features: Bunodont-lophodont molars, small M^3_3, full eutherian lower dental formula (retention of I_3 and (d)P_1), maxillary less developed on the orbit and orbit position above P^4-M^1 level. Other primitive features: Shorter mandibular symphysis; upper premolars with no trace of protoloph and weaker metacone; more developed mesostyle and ectocingulum (upper molars); postmetacristid distinct (lower molars); C_1 larger; $I_{1–2}$ less enlarged and slender; M^2_2 less enlarged with respect to M^1_1; absence of submaxillary fossa.”

So, may we not conclude that even more important and tale-telling differences will be detected whenever additional more perfect and better conserved fossil material will be discovered? Nevertheless, the data obtained so far already show an ***enormous hiatus between these two forms***.

Strangely enough, Prothero had written (2017, p. 348) that “In the early Oligocene, the various lineages of proboscideans (elephants, mammoths, and mastodonts) are very primitive[257] ***and hard to tell apart***, typical of the early stages of an evolutionary radiation.” How can this be if it does not even apply to the morphologically closely related pair *Phosphatherium/Eritherium*?

One important question is, of course, whether *Eritherium* displays autapomorphic characters:

> “P_2 is more simplified in *Eritherium* and *Phosphatherium* (K11) (2) as ***a unique and unexpectedly derived trait*** with respect to other early proboscideans” (Gheerbrant, p. 10719).

“…a unique and unexpectedly derived trait”: Well, wouldn’t that fulfill the criteria of an autapomorphy? Yet, the author continues (p. 10719):

> “However, our analysis does not support their autapomorphic grouping, implying either convergence or reversals in proboscideans.”

On p. 10718 the author also asserts:

> “Several derived features shared with *Phosphatherium*, that are ***distinctive*** among paenungulates, ***are strikingly reversed in later proboscideans*** (Table 1). The simplified P3–4 (K14–15, K18, K21) shared with *Numidotherium* is distinctive from later proboscideans (Table 1) but also from the inferred generalized paenungulate morphotype. The cladistic analysis suggests indeed that the simplified P3–4 ***is unexpectedly reversed in Proboscidea*** with respect to the ancestral paenungulate (molarized) morphotype, and that advanced proboscideans secondarily acquired molarized premolars.”

Yet, Gheerbrant goes on to say that the “alternative hypothesis of ***convergent molarization*** of premolars in several paenungulate lineages cannot, however, be excluded, which would emphasize again the primitive[258] pattern of *Eritherium*”. – By the way, concerning autapomorphies in *Eritherium* see also Schmitt and Gheerbrant (2016, p.146)[259].

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[257] See comments on that dubious term in the footnotes.

[258] As to the problems and misunderstandings often associated with the adjective “primitive” – see longer footnote above.

[259] Arnaud Schmitt and Emmanuel Gheerbrant (2016): The ear region of earliest known elephant relatives: new light on the ancestral morphotype of proboscideans and afrotherians. *Journal of Anatomy* **228**: 137-152. P. 146: “***Eritherium* has five autapomorphies**, of which one is non-homoplastic. The promontorium becomes flat in *Eritherium* [5(1)]; however, the promontorium is also flat in *Henkelotherium* so this character is a **convergence** in our tree and is therefore homoplastic (CI = 0.500). Moreover, this character state has an ambiguous location. Indeed, we can assume that the state « flat » [5(1)] is plesiomorphic and the state « bulging » [5(0)] is apomorphic. In this case, the promontorium would be ancestrally flat and would become **convergently** bulging in zhelestids and the other proboscideans. **Other autapomorphies of *Eritherium* are non-homoplastic**: the very inflated tegmen tympani [6(1)], the superior ramus of the stapedial artery included in an ossified canal [9(1)], the pneumatized tegmen tympani [11(1)] and the lateral and posterior semi-circular canals only partially merged [13(1)]. However, the pneumatization and the inflation of the tegmen tympani are present in the afrotherian *Ocepeia* (Gheerbrant et al. 2014), suggesting they might be plesiomorphic among Afrotheria.” https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4694154/

So, what do we really know?

First, all these strikingly unexpected ***complex reversions*** would definitely ***violate Dollo's law*** and, second, ***convergence is in itself improbable***:

> "Convergence is a deeply intriguing mystery, given how complex some of the structures are. Some scientists are skeptical that an undirected process like natural selection and mutation would have stumbled upon the same complex structure many different times" (Meyer et al. 2007, p. 48).[260]

Now, for the last two genera discussed here – *Phosphatherium* and *Eritherium* – we have to realize that there is really an unfortunate dearth of intact and excellent fossil material. Nevertheless, let's try to repeat some calculations what should have happened according to the different origin hypotheses also in these cases:

Just to repeat here the numbers of expected transitional links according to gradualism and *punk eek* for *Phosphatherium* and its presumed descendants:

Gradualism: Minimal time for ***Eritherium*** to evolve into ***Phosphatherium***, possibly again transgressing a (however not yet defined) family boundary, at least 5 Ma (250,000 transitional generations; detection of transitional forms expected ~ 3,500; no series of transitional forms found). As stated above, however, gradualism – almost always asserting the incompleteness of the fossil record – usually extrapolates starkly into the past so that much higher numbers could be postulated, say ~10 Ma or more with correspondingly higher numbers of transitional generations and missing links.

Punk eek: Minimal time for ***Eritherium*** to evolve into ***Phosphatherium***, possibly again transgressing a (however not yet defined) family boundary according to Gould's criteria: ~ 45,000 years (at least 2,250 transitional generations; detection of transitional forms expected ~ 31). Maximal time ~100,000 years (5,000 transitional generations; detection of transitional forms expected ~ 70; no transitional forms found). However, because in this case possibly too, family boundaries have to be transgressed by probably not only one genus but several genera – let's assume 2 to 4 –, these numbers have to be multiplied with the corresponding numbers of further necessary transitional genera to bridge the wide gap.

Intelligent design: ***Eritherium*** did not evolve into ***Phosphatherium***, so time/transitional form issue eliminated. (Keywords: autapomorphies, specified and irreducible complexity, orphan genes; for more see, please, point 10 in the summary at the end of the paper.) However, as for the possibility in this case to detect several further **intermediate** forms (in contrast to "transional" ones), see below.

However, for the latter two cases – *Phosphatherium* and *Eritherium* – it would perhaps be possible for Gradualism and *Punk eek* to take refuge to the usually entirely misapplied excuse of the "extreme imperfection of the fossil record"[261] in contrast to the "very complete", the "excellent fossil record", "the enormous quantity of fossil bones" of almost all the other genera discussed so far – to recall some concrete numbers:

Elephas 70 collections including 75 occurrences, ***Loxodonta*** 131 collections including 137 occurrences, ***Mammuthus*** 549 collections including 567 occurrences, ***Primelephas*** 28 collections including 29 occurrences, ***Stegotetrabelodon*** 22 collections including 23 occurrences, ***Gomphotherium*** 202 collections including 206 occurrences, ***Palaeomastodon*** 4 collections including 8 occurrences, and ***Numidotherium*** 3 collections each including a single occurrence, ***Phiomia*** 10 collections including 11 occurrences, ***Moeritherium*** 22 collections including 25 occurrences.

Or just focusing exclusively on the Family Elephantidae: Total: **1164 collections including 1346 occurrences**.[262]

Of the Proboscidea enumerated in the box above, most probably more than 90% of the genera ever existing on earth have already been detected in the fossil record (*cf.* the collector curve above), but several more species may be found especially in *Numidotherium*.

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[260] Meyer S C, Minnich S, Moneymaker J, Nelson P. A. and R Seelke (2007): Explore Evolution. The Arguments For and Against Neo-Darwinism. Hill House Publishers. Melbourne and London.

[261] See extensive discussion of that question in http://www.weloennig.de/ExplosiveOrigins.pdf

[262] https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=43263 (retrieved 28 November 2018)

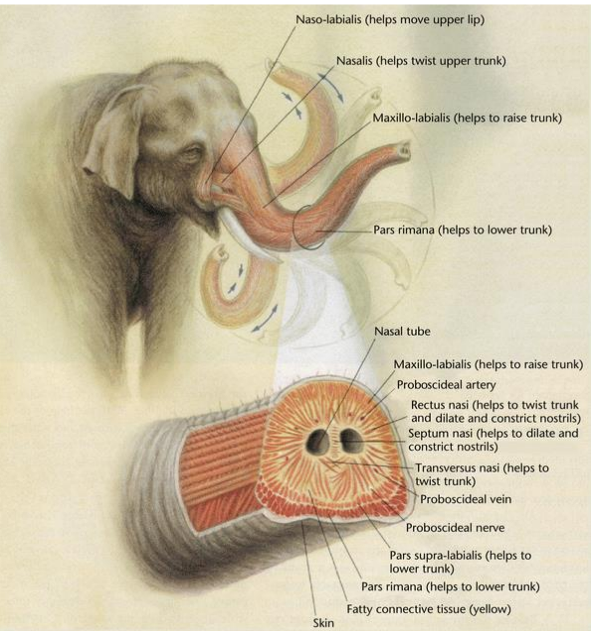
Phosphatherium and *Eritherium*: As to possible predictions of how many further *morphologically/anatomically related* species and genera have lived and may be detected in the fossil record, I would extrapolate from the data presented in http://www.weloennig.de/NeoB.Ana4.html that some 4 to 7 additional species of ***Eritherium*** and ***Phosphatherium*** respectively and 2 to 4 more anatomically related but clearly distinct genera could complete the morphological series, which latter would, of course, again be misinterpreted as ancestors and descendants of each other and as proofs for the neo-Darwinian theory by random ('micro'-)mutations and natural selection on the basis of the vicious circle discussed above ('similarity' proves evolution proved by [further] 'similarities' on all levels, ignoring all autapomorphic characters and the abrupt appearance of almost all these forms in the fossil record as well as the thousands of missing links expected by gradualism and *punk* eek alike).

The origin of the elephant's trunk and tusks

"***The trunk of an elephant***, or the proboscis, ***is its single most important feature***."
Elephant researcher **Jeheskel Shoshani** (2002, p. 8)[263].

"Anatomically it [the trunk] is a ***highly complex structure*** of superimposed, in different directions running muscle layers and a finely branched texture of of nerve cords. Forehead, nose, upper lip and cheek muscles work closely together, giving the trunk extreme elasticity and flexibility."
Martin Saller (1998, p. 60) [264]

1[265]



2[266]

Left: Jeheskel Shoshani with elephants. Right: Anatomic details of the elephant's trunk according to Shoshani (see reference below)

The elephant's trunk has been called "the most versatile and useful appendage on the planet", and it has been asserted to be "the most incredible

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[263] Jeheskel Shoshani (2002): Proboscidea (Elephants). Encyclopedia of Life Sciences (ELS). 16 pp. John Wiley & Sons. Hoboken, New Jersey.
"He [Shoshani] published about 200 scientific articles and books and edited the publication Elephant." He also established The Elephant Research Foundation.

[264] Karl Gröning (Initiator und Herausgeber dieses Buches), Text: Martin Saller: (1998) Der Elephant in Natur und Kulturgeschichte. Könemann Verlagsgesellschaft. Köln. Martin Saller was "only" a journalist – his book on elephants is "nevertheless" excellent. Original German text: "Er [der Rüssel] ist anatomisch ein höchst komplexes Gebilde von übereinanderliegenden, in verschiedene Richtungen laufenden Muskelschichten und einem feinverzweigten Gerüst von Nervensträngen. Stirn-, Nasen-, Oberlippen- und Wangenmuskeln wirken im Verbund zusammen, was dem Rüssel äußerste Elastizität und Beweglichkeit verleiht"

[265] Again: [265] https://en.wikipedia.org/wiki/Jeheskel_Shoshani (retrieved 30 January 2019)

[266] Jeheskel Shoshani (2002): Proboscidea (Elephants). Encyclopedia of Life Sciences (ELS). 16 pp. Figure 3 on p. 8. John Wiley & Sons. Hoboken, New Jersey. http://www.els.net/WileyCDA/ElsArticle/refId-a0001575.html.
See also: https://www.google.de/search?biw=1061&bih=924&tbm=isch&sa=1&ei=xeRVXN34M4HKwAKJhY-gDA&q=Jeheskel+Shoshani+Elephant+trunk&oq=Jeheskel+Shoshani+Elephant+trunk&gs_l=img.12...39824.51179..53483...0.0..0.47.573.15......0....1..gws-wiz-img.6f316UmQFFA#imgrc=LL4RvRS0PCcUkM: (Retrieved 2 February 2019)

feat of ***evolutionary engineering***” (2019)[267], or, in the words of Shoshani, that it is “one of the most versatile organs to have ***evolved*** among mammals”. Well, “evolved” through natural selection of thousands of random (‘micro-‘)mutations with “slight or even invisible effects on the phenotype”? (Mayr) “[T]he transition [between species] could, according to my theory, be effected only by *numberless small gradations*”, by “*infinitesimally small changes*”, “*infinitesimally slight variations*” etc. (*cf*. Darwin above)?

So, what do we really know about the origin of the elephant’s trunk?

Before we may look more closely at that question, we should first have some knowledge of its anatomy and functions.

Let’s speak Jeheskel Shoshani again. He comments on basic anatomy of the proboscis (2002, p. 8):

> “Lacking bones and cartilage, the trunk of an elephant is composed of muscles, blood and lymph vessels, nerves, little fat, connective tissues, skin, hair and bristles (cartilage is found at the base of the trunk, and helps divide the nostrils close to the single external bone opening on the cranium). The nostrils continue as separate openings from the base of the trunk to its tip; each is lined with a membrane; the septum is composed of tiny muscle fascicles horizontally stretched between these membranes.
>
> The famous French anatomist G. Cuvier and his colleagues examined the trunk of an elephant and estimated the number of muscles in it at **about 40 000**. Others have noted that some people ‘have attempted to count these muscles, but such an attempt is totally useless’. Like most of the body muscles, those in the trunk are paired. They may be divided into two major groups: superficial and internal, for a total of eight muscles (with multiple fascicles) on one side of the proboscis. My data on Asian elephants show that this highly sensitive organ is manipulated by a total of **about 150 000** muscle fascicles, and that the trunk appears to have a more complex internal structure than previously thought (see Figure 3).”

In his *Encyclopaedia Britannica* article (updated 2014) Shoshani adds, after some information on the trunk’s weight (about 130 kg) and power (“capable of lifting a load of about 250 kg”):

> “The proboscis comprises **16 muscles**. A major muscle covering the top and sides functions to raise the trunk; another covers the bottom. Within the trunk is an extremely complex network of radiating and transverse muscle fascicles that provide fine movement. A total of nearly **150,000 muscle fascicles** have been counted in cross sections of trunk. The trunk is innervated by two proboscidean nerves, which render it extremely sensitive. Bifurcations of this nerve reach most portions of the trunk, especially the tip, which is equipped with tactile bristles at regular intervals. At the end of the trunk are flaplike projections enabling it to perform amazingly delicate functions, such as picking up a coin from a flat surface or cracking a peanut open, blowing away the shell, and putting the kernel in the mouth.”[268]

Also, “it is said that an elephant can pick up a needle from the ground and bring it to its trainer. This sounds exaggerated, but interviews with several elephant mahouts and trainers ***and personal observations*** lead me to believe that elephants indeed are capable of picking up objects as small as a coin or a pine needle” (Shoshani in *Encyclopedia of Life Sciences*, p. 8). Moreover:

> “The trunk of an adult Asian elephant can hold 8.5 L of water, and a thirsty adult bull elephant can drink 212 L of water in 4.6 minutes. Functions attributed to the trunk include feeding, watering, dusting, smelling, touching, sound production, lifting, and use as a weapon of defence and offence. It is indispensable; undoubtedly the elephant’s most important tool in everyday living.”

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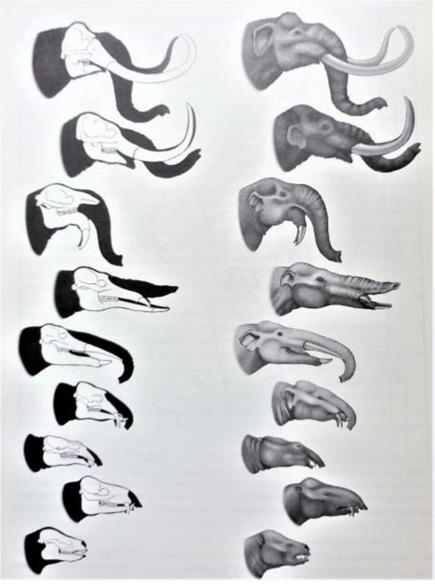
[267] http://www.eleaid.com/elephant-information/elephant-trunks/ (retrieved 30 January 2019)

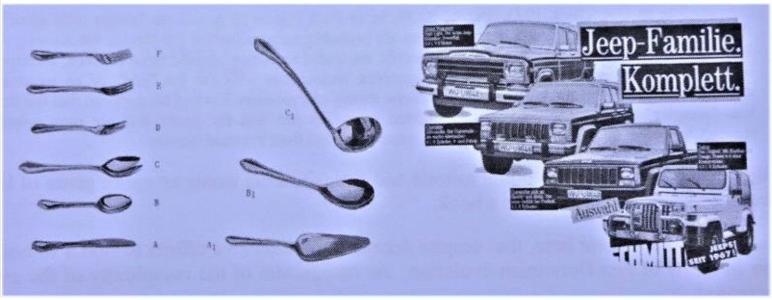
[268] https://www.britannica.com/animal/elephant-mammal

For further detailed information on several surprisingly additional functions and usage of the elephant's trunk (2 types of vocalization, rumbling sounds produced by the larynx, the particularities of hyoid apparatus, low frequency calls (5-24 hertz) up to 4 km[269], "elephants can produce a variety of other sounds by beating the trunk on hard ground, a tree, or even against their own tusks", etc.), one my check Shoshani's Open Access *Encyclopaedia Britannica* article https://www.britannica.com/animal/elephant-mammal[270] and https://asknature.org/strategy/trunks-perform-complex-three-dimensional-motions/#.XFXWpvZFwpU[271]

Concerning the question, what do we definitely know about the origin of the elephant's trunk, the answer conveyed by most evolutionary biologists is that the problem has long been solved in the sense of gradualism, i. e. by random mutations and selection over thousands of "*infinitesimally small changes*" etc. (see above).

Apart from the fact that random mutations and natural selection themselves are deeply problematic for the origin of entirely new species[272], one easily forgets that there are still many open research problems (details of ontogeny, physiology, ethology, epigenetics, how many nuclear and mitochondrial genes are involved in the formation of the elephant's trunk? Which factors besides DNA are involved in its genesis (additional cytoplasmic structures – functions of the membranes, of the cytoskeleton)? And there are further questions on the ontogeny and formation of all its other organs and their astoundingly fine-tuned cooperation with each other) – so that the answer, in its final analysis, that *accidents produced elephants*, is at least scientifically premature and is primarily ideologically conditioned: It is the answer of totalitarian materialism.





Left: FIGURE 14.20 of Prothero's *Evolution What the Fossils Say and Why it Matters* (2017, p. 350): "Details of the evolution of the skull, tusks, and trunk of proboscideans, from the pygmy hippo-like *Moeritherium* through mastodonts with longer tusks and trunks to mammoths. (Drawing by M. P. Williams)." The figure covers the entire page 350 of the book. Nevertheless, the names of most of the genera are not given.

Right: Derivation of the fork from the knife, through the spoon, and the special evolution of the soup ladle from the cake slicer. One may note especially the stepwise perfection in the fork development from the 2-pronged meat fork (D) through the 3-pronged kitchen fork (E) to the 4-pronged dining fork (F). The salad server is the intermediate link between spoon (B) and meat fork (D) (mosaic evolution!). One only needs to assume that everything is derived from primitive knives. Just to the right, as a second example, we see a number of different cross-country vehicles, which may be interpreted as an evolutionary series.

Scientifically, such morphological series prove nothing, except perhaps, the dubious methods of their authors to convince the public of their doubtful materialistic worldview:

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[269] So far I couldn't find out to what extent the trunk is involved in here.

[270] Retrieved 30 January 2019.

[271] Retrieved 2 February 2019.

[272] See perhaps again: http://www.weloennig.de/Gesetz_Rekurrente_Variation.html http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf http://www.weloennig.de/jfterrorchipmunks.pdf http://www.weloennig.de/PlantGalls.pdf http://www.weloennig.de/BeautifulFactsPartI.pdf http://www.weloennig.de/BeautifulFactsPartII.pdf http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf

(a) Prothero’s morphological series of “the details of evolution” does ***not*** show a line of descent. For example, even according evolutionary presuppositions, *Deinotherium* (third from above) cannot be the ancestor of the two other genera placed above it (like *Mammuthus*). In fact, as has been shown in detail in the text above, ***none of the fossil genera depicted here have been proved to belong to the ancestors of the modern elephants***. Recall, please, this sober evaluation of several evolutionary biologists themselves:

> “[T]he idea that one can go to the fossil record and expect to empirically recover an ancestor-descendant sequence, be it of species, genera, families or whatever, has been, and continues to be, a pernicious illusion, responsible, in my opinion, for much of the current confusion within the field of comparative biology.” “The notion that phylogeny can be read directly from the rocks is superstition and nothing more.”

(b) Almost anything can be arranged in a morphological sequence – as has already been pointed out by Darwin’s cousin Francis Galton (for example firearms and porcelain tableware). One may also think of computers, laptops, aeroplanes, ships, houses etc. This does not, of course, prove that these things came into being just by themselves and without any intelligence. Moreover, such examples also show the ***categorical difference between the adjectives “transitional” and “intermediate”*** – for there can be thousands of intermediate forms without anyone being transitional, i.e. being *genetically* ancestral to the next one, thus constituting the *hereditary* link between two forms[273]. In the figure above, the salad server (C) is, of course, not the transitional link between spoon (B) and meat fork (D)[274]. And, as already pointed out above, *Deinotherium* cannot – even on evolutionary presuppositions – be the transitional link between say *Phiomia* and different forms of *Mammuthus*.

Biologist Jacob von Uexküll had this to say on the common Darwinian method to prove evolution:

> “One saw in the animal series the proof of a gradually increasing perfection from the simplest to the most diverse structure. Unfortunately, the one thing that was forgotten was that the perfection of structure can not be inferred from its manifoldness. No one will claim that a battleship is more perfect than the modern rowboats of international rowing clubs. Also, a battleship would play a miserable role in a rowing regatta. Likewise, a horse would fill the role of an earthworm only very imperfectly.”[275]

Concerning problematic usage of *ancestry*, *links*, and *descendants* one may think as well of the periodic table of the elements[276] and of crystals. See also Oskar Kuhn about the common practice of evolutionary circular reasoning as quoted above. And, although one may draw family trees of jeeps and land

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[273] Zu einem Kolloquium über die Darwinsche Theorie in ihrer modernen Form ("Zufällige Mutation und Selektion"), in dem die Entstehung der in dem die Entstehung der Arten mit der Geschichte der Schifffahrt verglichen wurde (Ruderboot, Segelboot, Dampfschiff etc.) bemerkt der Physik-Nobelpreisträger Werner Heisenberg: (d) "Beim Durchdenken dieses Vergleichs fiel mir auf, dass der geschilderte Vorgang in der Technik gerade an einem entscheidenden Punkt der Darwinschen Lehre widerspricht; nämlich dort, wo in der Darwinschen Theorie der Zufall ins Spiel kommt. Die verschiedenen menschlichen Erfindungen entstehen ja gerade nicht durch Zufall, sondern durch die Absicht und das Nachdenken des Menschen. Ich versuchte mir auszumalen, was herauskäme, wenn man den Vergleich hier ernster nähme, als er gemeint war, und was dann etwa an die Stelle des Darwinschen Zufalls trete müsste. Könnte man hier mit dem Begriff "Absicht“ etwas anfangen?" Absicht statt Zufall ist natürlich intelligent design. See: http://www.weloennig.de/Die_Affaere.pdf , p. 48

[274] As to the objection that such things cannot reproduce, see http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf pp. 549/50, and Granville Sewell (2018): https://evolutionnews.org/2018/11/why-evolution-and-reproduction-are-unnatural/

[275] Original German text of Jacob von Uexküll: „Man sah in der Tierreihe den Beweis für eine stufenweise ansteigende Vervollkommnung von der einfachsten zur mannigfaltigsten Struktur. Nur leider vergaß man dabei das eine, dass die Vollkommenheit der Struktur gar nicht aus ihrer Mannigfaltigkeit erschlossen werden kann. Kein Mensch wird behaupten, dass ein Panzerschiff vollkommener sei als die modernen Ruderboote der internationalen Ruderklubs. Auch würde ein Panzerschiff bei einer Ruderregatta eine klägliche Rolle spielen. Ebenso würde ein Pferd die Rolle eines Regenwurms nur sehr unvollkommen ausfüllen.“ Reference: see http://www.weloennig.de/AuIDa.html

[276] See, for example: https://www.sciencelearn.org.nz/resources/1727-how-elements-are-formed: “3 helium atoms fusing to give a carbon atom: $3\alpha\ {}^{4}He \rightarrow {}^{12}C$ // carbon atom + helium atom fusing to give an oxygen atom: ${}^{12}C + {}^{4}He \rightarrow {}^{16}O$ // oxygen atom + helium atom fusing to give a neon atom: ${}^{16}O + 4He \rightarrow {}^{20}Ne$ // neon atom + helium atom fusing to give a magnesium atom: ${}^{20}Ne + {}^{4}He \rightarrow {}^{24}Mg$” (instead of a linear evolution)

rovers, everybody knows that without intelligent design, none of these things would ever have come into existence (see also "Berra's Blunder" on the evolution of the Corvettes[277]).

(c) None of the genera shown are connected by the series of transitional links as predicted by either gradualism or *punk eek* – as has been shown in detail in the discussion about them in the present paper. There is no "smooth, gradual succession of steadily longer noses, a sliding gradient of thickening muscles and more intricately dissected nerves." And nobody has reconstructed "the slow, gradual evolution of wings and of elephant trunks." And if it had been "the case that, as each extra inch was added to the length of the average trunk, the trunk became better at its job" – then why did so many genera (granted the trunks were in several cases really of strongly different length) live contemporaneously for so many millions of years partially even in the same habitat?

(d) Did the highly complex structure of the elephant's trunk consisting of "superimposed, in different directions running muscle layers and a finely branched texture of nerve cords; forehead, nose, upper lip and cheek muscles work closely together, giving the trunk extreme elasticity and flexibility"; the 16 muscles forming an extremely complex network of radiating and transverse muscle fascicles (nearly 150,000) that provide fine movement etc. – did all this (and much more) arose by accidental mutations? Does such a hypothesis not demand much more faith than deliberate intelligent design?

(e) Could "the most versatile and useful appendage on the planet" – instead of being a feat of "evolutionary engineering" – perhaps be "the most incredible feat of" an ingenious invention of a brilliant, creative, rational mind?

What has just been summed up for the elephant's trunk can in principle also be applied to the elephant's tusks: For example, why did so many elephant genera with starkly different long tusks live simultaneously together for eons of time if, to reformulate Dawkins' assertion, "each extra inch that was added to the length of the average tusk, the tusk became better at its job"? Did every very small, almost infinitesimally minute fraction of an additional millimeter decide over life and death of an elephant population? And so on, and so forth.

To repeat: Georges Cuvier: "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."

Antoine-Laurent de Jussieu: "It is in this mutual dependence of functions, and this reciprocal assistance, that the laws which determine the relations of their organs are founded, and which are of a necessity equal to that of the metaphysical or mathematical laws: for it is evident that the proper harmony between the organs which act upon one another is a necessary condition of the existence of the being to which they belong, and that if one of its functions be modified in an incompatible manner with the modifications of others, this being could not exist."

W-E L: Any scientist who has ever systematically worked with mutants will immediately be able to give a range of examples corroborating this verdict. 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. For Cuvier and Antoine-Laurent de Jussieu *cf.* links above.

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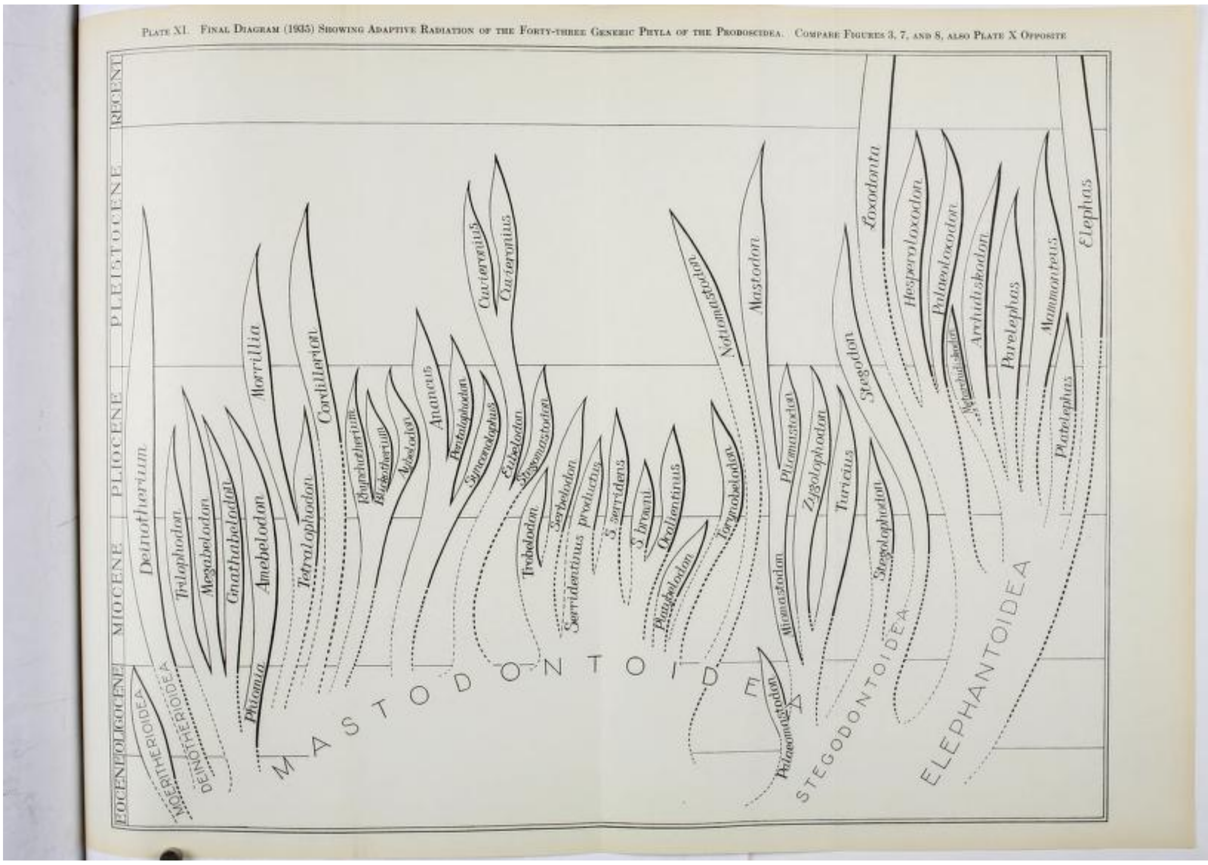
[277] https://evolutionnews.org/2018/07/berras-blunder-revs-up-again/ "Of course, every one of those Corvettes was designed by engineers. The Corvette sequence — like the sequence of Beethoven's symphonies to the opinions of the United States Supreme Court — does not illustrate naturalistic evolution at all. It illustrates ***how intelligent designers will typically achieve their purposes by adding variations to a basic design plan***." (Retrieved 2 February 2019)

So, what has our investigation shown on *Elephant Evolution: What Do We Really Know? Another Test for Gradualism, Punctuated Equilibrium, and Intelligent Design?*

In 1936/1942 Henry Fairfield Osborne's monograph on the Proboscidea was published posthumously in 2 Volumes (of altogether 1676 pp.) and republished in 2018[278]. In Volume 1 the following PLATE XI "Final Diagram (1935) Showing Adaptive Radiation of the Forty-three Generic Phyla of the Proboscidea" is displayed:



Henry Fairfield Osborne, edited by Mabel Rice Percy (1936/1942: Illustration: Foldout between pp. 684/685)

Williams and Ebach comment (2004, p. 288)[279]:

> "One diagram came from the [first] volume of Henry Fairfield Osborn's posthumous account of the Proboscidea (Osborn, 1936–1942), published in 1936 (Fig. A1). Of this tree, Nelson said: 'One expecting a tree such as an old and majestic oak (cf. Haeckel, 1866, pl. 1), with a massive central trunk and strong branches firmly attached ***is bound to be disappointed to find instead a stand of bulrushes*** [Rohrkolben] ***all waving in the breeze***.' Another tree, published 32 years after Osborn, was Erik Jarvik's (1968, p. 510, fig. 3) vertebrate phylogeny (Fig. A3; Jarvik published the first version of this tree in 1960 and continued to modify and reprint it up until 1980; Jarvik, 1960, 1980, p. 263, fig. 140). Of this tree Nelson noted, 'More Bulrushes, but of an even more slender variety'; much later Patterson (1995) said of Jarvik's tree (a comment that applies equally well to Osborn's), ***that in reality it represents 'a denial of evolution', as all the branches emerge separately, coming from nowhere***. Nelson compared Osborn's and Jarvik's trees with one published by Alfred Sherwood Romer in The Vertebrate Body, a standard zoology textbook [Fig.

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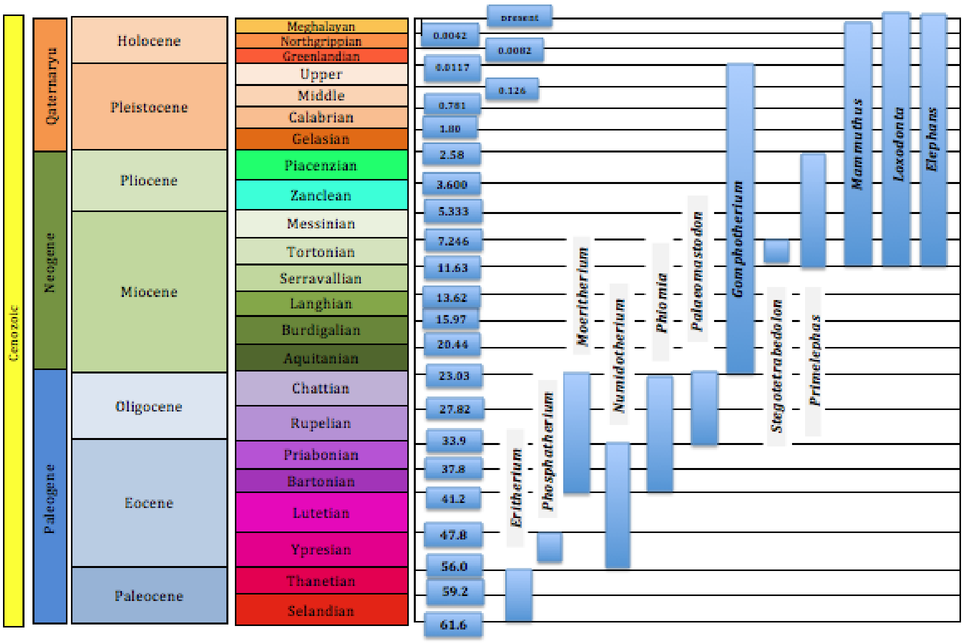
[278] See, for example: https://www.abebooks.com/products/isbn/9781528015981/22618858499&cm_sp=snippet-_-srp1-_-PLP3
https://www.amazon.com/Proboscidea-Vol-Extinction-Stegodontoidea-Elephantoidea/dp/0266925057
https://www.amazon.com/Proboscidea-Vol-Moeritherioidea-Deinotherioidea-Mastodontoidea/dp/0265901294 (retrieved 23 January 2019)

[279] David M. Williams & Malte C. Ebach (2004): The reform of palaeontology and the rise of biogeography—25 years after 'ontogeny, phylogeny, palaeontology and the biogenetic law' (Nelson, 1978), *Journal of Biogeography* **31** (2004): 685-712. Chapter pp. 288 ff. about Gareth Nelson: His lecture at the American Museum of Natural History (1969).

A2; Romer, 1962, p. 35; Romer's tree appeared in the first edition (Romer, 1949, p. 34) and remained unmodified in all subsequent editions, including the final and posthumously published 5th edition; Romer & Parsons, 1977, p. 37]."

Apart from several evolutionary speculations before his "Final Diagram", Osborne appears to have been nearer to the truth about the real origin of the 43 generic phyla of the Proboscidea known at his time than most of our present scientists and elephant researchers drawing either "tentative schematic phylogenetic tree[s] of proboscid evolution" or presenting to the public a range of contradictory trees (as shown above) to convert their readers to the "undeniable fact of evolution"[280].



Abrupt appearance and length of time of the twelve elephant genera shown in most phylogenetic trees (graph by Berthold Winterlich, Düren 2019). *Mammuthus* became extinct some 4,000 years ago.

(Time scale according to the chronostratigraphic chart: http://www.stratigraphy.org/icschart/chronostratchart2015-01.pdf)

Fact is, however, as shown above, that – thus providing a synopsis of the present paper:

Summary

(1) All the elephant genera of the putative evolutionary trees appear abruptly in the fossil record – the many transitional links between them, which have been predicted by the different evolutionary theories, are regularly missing.

(2) Except for *Phosphatherium* and *Eritherium*, these findings have to be evaluated on the background of a superb, very complete, yes, a really "excellent fossil record", i.e. in the context of an "enormous quantity of fossil bones about which so many writers have spoken" and that "the

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[280] "When he [Darwin] finished, the fact of evolution could be denied only by an abandonment of reason."—Life Nature Library, "Evolution," p. 10. "It is not a matter of personal taste whether or not we believe in evolution. The evidence for evolution is compelling."—"Evolution, Genetics, and Man," p. 319, Dobzhansky. "Its essential truth is now universally accepted by scientists competent to judge."—"Nature and Man's Fate," p. v, Hardin."The establishment of life's family tree by the evolutionary process is now universally recognized by all responsible scientists."—"A Guide to Earth History," p. 82, Carrington. "No informed mind today denies that man is descended by slow process from the world of the fish and the frog."—"Life" magazine, August 26, 1966, Ardrey. "It has become almost self-evident and requires no further proof to anyone reasonably free of old illusions and prejudices."—"The Meaning of Evolution," p. 338, Simpson. "There is no rival hypothesis except the outworn and completely refuted one of special creation, now retained only by the ignorant, the dogmatic, and the prejudiced."—"Outlines of General Zoology," p. 407, Newman. (Box: The "Tyranny of Authority used by Evolutionists": https://wol.jw.org/en/wol/d/r1/lp-e/101981690 This is one of the best compilations and commentaries concerning the evolutionary claims to absolute authority and undeniable truth of the evolutionist's worldview I could find so far.)

order [of Proboscidea] has one of the most extensive and studied paleontological records of any group of mammals" (most probably >90% of the genera have been found), thorough scientific research starting some 100 years earlier than in *Homo*. However, the distinguished elephant fossil record does not convincingly document a single instance of a series of transitional forms by "extremely slight variations" from one genus to another.

(3) All fossil Proboscidea genera display autapomorphic characters excluding them from being ancestors of others.

(4) The evolutionary trees presented in original papers, textbooks, museum exhibits and the internet alike contradict each other on many basic points – sometimes a genus is shown to be ancestor of another one, sometimes the same genus is on a side branch, sometimes a genus like *Primelephas* is asserted to be the ancestor of the modern elephants and others, but in the next figure it is replaced by *Stegotetrabedolon*. Also, some genera are presented in a contradictory time sequence (*Numidotherium* younger than *Moeritherium* or vice versa?). In Prothero's figures the trees are even different in his almost contemporaneous publications of 2007 against 2009 and back again to his earlier phylogenetic tree in 2017. This is simply contradictory, inconsistent evolutionary guesswork, not science. See systematic documentation above.

(5) The reconstructions of one and the same genus differ often strongly: sometimes the trunk is as long as in present elephants, sometimes it is rather short just as it is needed for evolutionary hypotheses. See especially *Gomphotherium*, *Palaeomastodon* and *Phiomia* as shown and discussed in the text. Even genera, which displayed neither trunks nor tusks have been "reconstructed" with both of them like *Moeritherium* and *Eritherium*.

(6) The boundaries between the families to which the different genera belong have not been adequately considered in the evolutionary trees. They are simply covered up in the phylogenetic presentations.

(7) Disregarding all autapomorphies and the abrupt appearance of new life forms in the fossil record, morphological sequences are often simply transformed into evolutionary successions, concatenations and progressions of ancestors and descendants. Vicious circle: "The similarity of forms was explained by evolution, and evolution in turn was proven by the various grades of similarities. It was hardly noticed that here one has fallen victim to circular reasoning; 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" (Kuhn).

(8) The categorical difference between *transitional* and *intermediate* forms has not been taken into account by most evolutionary biologists. There are thousands of examples of intermediate forms which are not (and cannot be) genetically transitional ones.

(9) According to the Genesis account of creation, "life appeared in stages, progressively, over periods of time", ten times emphasizing that the basic life forms were created according to their "kinds"[281].

Intelligent design, starting from the investigation of life phenomena themselves, has likewise no problem with an overall, but definitely ***not*** linear, progressive appearance of life forms, – in more or less exceptional cases[282] reflecting that phenomenon perhaps even on a smaller scale (like the first of the abruptly appearing stages within the order of the Proboscidea and the family Giraffidae[283]) over periods of time. Could also be relevant (if so) for probably differently contructed shorter trunks (with autapomorphies) in some elephant genera.

(10) The ***hypnosis*** of the evolutionary spell of materialism ("Nothing made everything for no reason and made life from non-life for no reason and made meat robots who think they have purposes but don't for no reason"[284]) has been broken by scientific facts also in the case of the elephants.

Abrupt appearances of new life forms, even entire world faunas und floras[285], autapomorhies, specified and irreducible complexity, ingenious synorganizations, orphan genes, DNA repair processes[286], histone code[287] often large input of new complex information for the origin of new genera and families, cybernetic systems in organisms being a thousandfold more complex than all human inventions dwarfing the latter almost beyond recognition, "indeed, the entire cell can be viewed as a factory that contains an elaborate network of interlocking assembly lines, each of which is composed of a set of large protein machines"[288], and many more scientific phenomena and beyond[289] assuredly, definitely, undeniably speak for intelligent design.

Is intelligent design testable? Yes, check please, the sources at:

https://evolutionnews.org/2017/08/yes-intelligent-design-is-testable-science-a-resource-roundup/

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[281] https://wol.jw.org/en/wol/d/r1/lp-e/1102010234

[282] "Considering that the total number of known fossil species is [about three hundred and ten thousand (310,000) – updated 2 February 2019], the fact that only relatively convincing morphological sequences are a handful of cases like the horse […] and which ***in many cases like the elephant may not even represent phylogenetic sequences at all***, serves to emphasize the remarkable lack of direct evidence for major transformations in the fossil record. […] It is possible to view such series in a very different light [compared to that of the traditional view of evolutionists] … They may be exceptions which prove a very different rule: that in general, nature cannot be arranged in terms of sequences and were sequence does exist it is exceptional or relatively trivial" (Michael Denton 1986, p. 185: Evolution – A Theory in Crisis. Adler & Adler. Bethesda, Maryland). Update of the number fossil species: "…Raup, 1986[19] includes data based on a compilation of 250,000 fossil species so the true number is undoubtedly somewhat higher than this. It should also be noted that the number of described species is increasing by around 18,000–19,000 extant [more! W-E L], and ***approaching 2,000 fossil species each year at the present time***.". Well, 18,000 x 33 (from 1986 to 2019) = 59,400 or 2000 x 33 = 66,000. 250,000 + say 60,000 = 310,000. *Cf*. https://en.wikipedia.org/wiki/Global_biodiversity (retrieved 2 February 2019, This Wikipedia page was last edited on 13 January 2019.

[283] http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf

[284] https://evolutionnews.org/2016/09/atheism_is_a_ca/

[285] See, for example: H Nilson (1953), S C Meyer (2013/2014), Lönnig (2018) – references above (and directly: http://www.weloennig.de/ExplosiveOrigins.pdf)

[286] Introduction into the topic https://de.wikipedia.org/wiki/DNA-Reparatur

[287] https://evolutionnews.org/2019/02/histone-code-a-challenge-to-evolution-an-inference-to-design/

[288] Bruce Alberts (1998): The Cell as a Collection of Protein Machines: Preparing the Next Generation of Molecular Biologists. *Cell* **92**: 291-294. https://www.cell.com/cell/fulltext/S0092-8674%2800%2980922-8

[289] *Cf.* Aann Gauger (2019): The Transcendental Treasury of Truth, Beauty, and Goodness. https://evolutionnews.org/2019/01/the-transcendental-treasury-of-truth-beauty-and-goodness/ (retrieved 2 February 2019)

If it is true that “No other animal has left such a rich and plentiful succession of traces of its prehistoric physical existence in such a dense sequence extending over many of millions of years, nor provided deeper insights into evolutionary processes over the immense span of earth history, as the elephant”[290], then (in contrast to Prothero[291]) we may agree, on the basis of the many scientific facts and arguments presented above, with Edward Topsel (circa 1572-1625), a contemporary of Shakespeare (1564-1616), when he wrote in his “The History of Four-footed Beasts and Serpents” (1607/1658, p. 149):

> “There is no creature amongst all the Beasts of the world, which hath so great and ample demonstration of the power and wisdom of Almighty God as the Elephant: both for proportion of body and disposition of spirit.”[292]

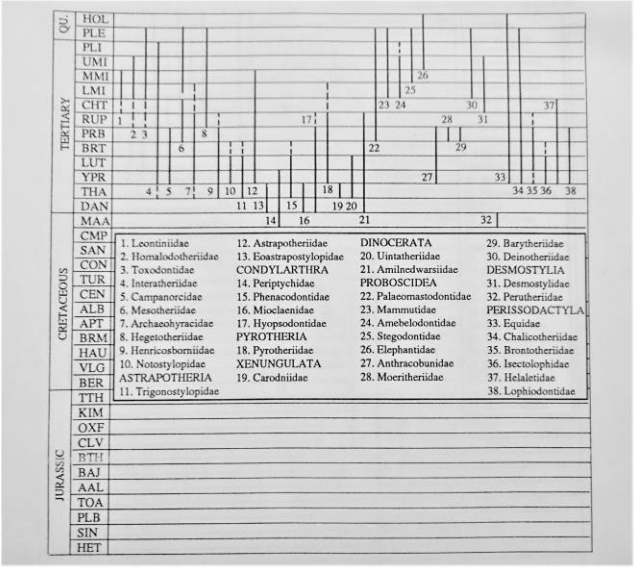
In his book review of *ELEPHANT MEMORIES: Thirteen Years in the Life of an Elephant Family* written by Cynthia Moss (Fawcett Columbine), Christopher Lehrmann-Haupts commented in the New York Times:

> “'However much one may resist at the start, one is soon swept away by this 'Babar'[293] for adults. By the end, one even begins to feel an aversion for people. One wants to curse human civilization and cry out, ‘Now God stand up for elephants!’”[294]

Moreover, one may sympathize with Cynthia Moss quoting V. S. Pritchett's statement: “If the elephant vanished the loss to human laughter, wonder and tenderness would be a calamity.'”

Supplement

(1) Example from paleontologist Michael J. Benton:



Benton M J (1994, p. 764)/ Paperback (2016): Fossil Record 2. Springer.
https://www.abebooks.co.uk/servlet/BookDetailsPL?bi=19667798720 (retrieved 26 January 2019):
Proboscidea: Numbers 22-30

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[290] Karl Gröning (Initiator und Herausgeber dieses Buches), Text: Martin Saller: (1998) Der Elefant in Natur und Kulturgeschichte. Könemann Verlagsgesellschaft. Köln. German original text (p. 39): “Kein anderes Tier hat so viele Spuren seiner prähistorischen Körperlichkeit in so dichter, über viele Jahrmillionen reichender Folge hinterlassen und tiefere Einblicke in evolutionäre Abläufe während der erdgeschichtlichen Unendlichkeiten eröffnet wie der Elefant.“

[291] Who cites Edward Topsel to refute him by his further explanations (2007/2017).

[292] https://archive.org/details/historyoffourfoo00tops/page/148 (retrieved 3 February 2019)

[293] https://de.wikipedia.org/wiki/Babar (retrieved 3 February 2019)

[294] https://www.nytimes.com/1988/03/10/books/books-of-the-times-the-allure-of-elephants-in-their-grace-and-folly.html

(2) Excerpt from an interview with Professor Marcel-Paul Schützenberger[295] on *The Miracles of Darwinism*[296]:

> **Q: In what sense are you employing the word 'miracle'?**
>
> **S:** A miracle is an event that should appear impossible to a Darwinian in view of its ultra-cosmological improbability within the framework of his own theory. Now speaking of ***macromutations***, let me observe that to generate a proper elephant, it will not suffice suddenly to endow it with a full-grown trunk. ***As the trunk is being organized, a different but complementary system - the cerebellum - must be modified in order to establish a place for the ensemble of wiring that the elephant will require to use his trunk.*** These macromutations must be **coordinated** by a system of genes in embryogenesis. If one considers the history of evolution, we must postulate thousands of miracles; miracles, in fact, without end. No more than the gradualists, the saltationists are unable to provide an account of those miracles. The second category of miracles are directional, offering instruction to the great evolutionary progressions and trends - the elaboration of the nervous system, of course, but the internalization of the reproductive process as well, and the appearance of bone, the emergence of ears, the enrichment of various functional relationships, and so on. **Each is a series of miracles**, whose accumulation has the effect of increasing the complexity and efficiency of various organisms. From this point of view, the notion of bricolage [tinkering], introduced by Francois Jacob, involves a fine turn of phrase, but one concealing an utter absence of explanation.

Well, concerning the observation that "As the trunk is being organized, a different but complementary system – the cerebellum – must be modified in order to establish a place for the ensemble of wiring that the elephant will require to use his trunk. These macromutations must be coordinated by a system of genes in embryogenesis" etc. – this is, of course, ***also true for 'micro'-mutations*** with "slight or even invisible effects on the phenotype", i. e. by the many thousands of microevolutionary steps of gradualism[297].

In my book about the giraffe[298] I mentioned the ensuing points:

> 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 [for example] on the eye (2nd edition 1989 – internet-edition 2003: http://www.weloennig.de/AuIn.html [and several further papers, see the links above as well as http://www.weloennig.de/internetlibrary.html (2019)].

The result of these investigations was that the theory of additive typogenesis (gradualism including *punk eek*[299]) does not function, neither mathematically nor

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[295] https://de.wikipedia.org/wiki/Marcel_Sch%C3%BCtzenberger

[296] http://www.arn.org/docs/odesign/od172/schutz172.htm (retrieved 6 February 2019)

[297] A friend commented (e-mail 14 February 2019): "I would make much more of this. The circulatory system has to be altered as the trunk extends. The muscle structure has to accomodate the greater weight. There will have to be stronger mounts for the origin and insertion of each muscle; extra sensory feedback would be necessary for all the extra skin. Increased circulation capillaries would be required to provide adequate circulation for the increased length. And that's just the obvious stuff, before we get into mucous membranes, expanding/dilating, etc. This is redesign, not accident."

[298] http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf (pp. 3/4and 128-130)

[299] See discussion of details above.

experimentally, and thus (to come back to the topic of this paper) – apart from all the autapomorphic features characterizing each of the entire spectrum of the different genera of the proboscidea (not to mention here many more scientific facts; see, please, summary above) – can neither explain the origin of any of their synorganized characters, last not least the specified and probably also irreducible complexities of the elephant's trunk.

(3) Let's apply the calculations of the evolutionary biologists N. Luodo Badlangana, Justin W. Adams and Paul R. Manger (2009, pp. 753/754)[300] concerning the gradual elongation of the giraffe's neck to the idea of a likewise gradual elongation of the elephant's trunk. (Recall, please, Dawkins: "In the evolution of the elephant from its shortnosed ancestors, there must have been a smooth, gradual succession of steadily longer noses, a sliding gradient of thickening muscles and more intricately dissected nerves.")

First, the authors explain the microevolutionary scenario – after mentioning that in the literature that "there is a tendency to argue towards the microevolutionary gradualistic occurrence, where slow, progressive elongation of the giraffe neck took place" – as follows:

> "If such a microevolutionary scenario holds true, where a series of adaptive morphological changes occurred in response to climatic and vegetative variation during the Miocene, then individual cervical vertebral lengths and entire vertebral column lengths for fossil species in the Palaeotraginae should gradually adopt extant giraffe-like proportions. Over this 2-Myr period, based on a generation time of 5 years between birth and first parturition in extant female giraffes (Dagg & Foster, 1976), and a generation time of less than 3 years in extant okapi (Bodmer & Rabb, 1992), between 400 000 and 666 666 generations of palaeotragines may have occurred. The lengthening of the cervical region between *P. primaevus* and *P. germaini* was in the range of 350—570 mm (... [method of calculation given]), thus requiring an average increase in CVLs [total cervical vertebrae lengths] of between 0.72 and 1.19 µm per generation to reach extant giraffe proportions in this time period."

I formulated the ensuing comment and questions regarding these considerations (Giraffe, p. 129):

> "Not the extant giraffe proportions, but only the difference between *Palaeotragus primaevus* and *P. germaini* (see the details above). ***Thus, are there really decisive selective advantages for the survival of giraffe populations of about 1 millionth of 1 meter or 1 thousandth of 1 mm higher in each generation***? And that for about 500,000 or so generations each reaching 1 thousandth of 1 mm higher than their ancestors into the canopy of the last leaves during a dearth? (Not to mention the smaller females, juveniles and Haldane's dilemma.)"

Subsequently Badlangana et al. continued with their calculations on the punctuated equilibrium scenario (p. 752):

> "With a generation time of 5 years between birth and first parturition among extant female giraffes (Dagg & Foster, 1976), and less than 3 years in extant okapi (Bodmer & Rabb, 1992), between 2000 and 3333 generations could occur in the 10 000 years allowed for in a punctuated event by Eldredge & Gould (1972). A punctuated event occurring over such a brief period of geological time could be essentially invisible in the fossil record. Given that we are most likely to be discussing an increase in total length of the cervical vertebrae of approximately 477 mm between *P. primaevus* and *P. germaini*

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[300] The giraffe (*Giraffa camelopardalis*) cervical vertebral column: a heuristic example in understanding evolutionary process? Zool. J. Linnean Soc. 155: 736–757.

> (calculation presented above), an average increase of 143.1-238.5 μm per generation would be sufficient in the time proposed for a punctuated event to acquire extant giraffe cervical proportions."

After several further points (reasons for "again definitely not "extant giraffe cervical proportions""), I asked the following questions:

> "So, there would be an ***increase of about 0,2 mm per generation*** and very similar questions like those for the microevolutionary scenario may be raised: ***Hence, are there actually decisive selective advantages for the survival of giraffe populations of about 0.2 mm higher in each generation***? And that for about almost 3000 or so generations each reaching ca. 0.2 mm higher than their ancestors into the canopy of the last leaves during a dearth?"[301]

Now, applying these exemplary calculations and questions to the elongation of the elephant's trunk, yet taking into account the updated *punk eek* theory:

Since *Numidotherium* (age range: 55.8 to 33.9 Ma) is the first genus of the Proboscidea probably displaying if only a rather short trunk-like structure perhaps similar in its appearance to that of a modern tapir's, let's start with this genus (in spite of all the autapomorphic features mentioned above).

The time gap between *Numidotherium* (Family: Numidotheriidae) and *Elephas*, *Loxodonta*, *Mammuthus*, *Primelephas*, and *Stegotetrabelodon* (family: Elephantidae) – applying the hypothesis of Shoshani (2003, p. 13) and many other authors that among the "major trends observed" in the phylogeny of the Proboscidea was "increase in trunk length" until the length displayed by the modern elephants and some of their relatives was reached – was about 44 Ma (assuming that the branch leading to the Elephantidae started early).

44 Ma : 20 (generation time of elephants – although it can be assumed that the earliest members of the Proboscidea showed most probably a much shorter generation time) = 2,200,000 generations. Let's assume, moreover, that the trunk's length increased from say 20 cm to 200 cm during these 44 Ma. (Length of a modern elephant's trunk: "average 6 feet, sometimes as long as 7 feet"[302]. Again: "An elephant's trunk is usually around 6 feet in length, but can be up to 7 feet long."[303] 1 ft = 30.48 cm, so 6 feet = 182.88 cm and 7 feet = 213,36 cm. So, let's simplify somewhat and assume an average length of some 2 m.)

180 cm : 2,200,000 = 0. 000 0 818 18 18 182 cm pro generation
Or 0. 000 818 18 18 182 mm pro generation (= 0.8181... μm)

Now, the basic questions for **gradualism**:

Are there really decisive selective advantages for the survival of Proboscidea populations ***each with a trunk of less than one thousandth of a mm longer in each generation? And that for about ca. 2,200,000 generations***, i.e. each displaying a proboscis less than 1 thousandth of 1 mm longer than that of their ancestors? (Not to mention the proboscis length of smaller females, juveniles, and also Haldane's dilemma for large mammals.)

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[301] The reader may look again at http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf (pp. 128-130)
[302] https://www.animalfactsencyclopedia.com/Elephant-facts.html (retrieved 7 January 2019)
[303] http://www.elephantsforafrica.org/elephant-facts/ (retrieved 7 January 2019)

That such numbers are not fictional for gradualism is shown, for example, by the calculations of George Gaylord Simpson, one of the most renowned proponents and pioneers of the synthetic theory of evolution in paleontology, who estimated a growth rate in horse teeth of about one millimeter per million years, and assumes that even his millimeter is gradually bridged by numerous intermediate forms (*cf.* Artbegriff 1993, p. 448).

Punk eek: Since for the elongation of the elephant's trunk at least three family boundaries have to crossed (Palaeomastidontidae, Gomphoteriidae, and Elephantidae) we would have to multiply the 45,000 or 100,000 years for each punctuation event at the very least[304] thrice, that is 135,000 or 300,000 years respectively.

135,000 : 20 = 6750 generations.
180 cm : 6,750 = 0.0267 cm or 0.267 mm pro generation

Or 300,000 : 20 = 15,000 generations.
180 cm : 15,000 = 0.012 cm or 0.12 mm pro generation

Now, the basic questions for *punk eek*:

Are there really decisive selective advantages for the survival of Proboscidea populations ***each with a trunk of 0.12 to 0.267 mm longer in each generation? And that at least for about ca. 6,750 to 15,000 generations***, i.e. each displaying a proboscis of 0.12 to 0.267 mm longer than that of their ancestors? (Not to mention the trunk length of smaller females, juveniles, and also Haldane's dilemma for large mammals.)

Encyclopaedia Britannica (2019)[305]
Cydney Grannan

What's the Difference Between Asian and African Elephants? [In simple clear words]

"You may have been taught that there are only two species of elephants: the African elephant and the Asian elephant. In 2000, scientists recategorized the African elephant species into two distinct species, the larger being the African savanna elephant and the smaller being the African forest elephant. While the two African species are about as genetically different as tigers and lions, they still have more features in common with one another than with their Asian counterpart, and it's important to know how to tell the difference. Asian and African elephants can be differentiated most easily by their ***ears, their head shape, and their tusks***.

The easiest way to distinguish African elephants from Asian elephants is to look at the **ears**. African elephants have much larger ears that look sort of like the continent of Africa, while Asian elephants have smaller, round ears. Elephants' ears dissipate their body heat, and African elephants need to dissipate more heat than Asian elephants, since they live in a hotter climate (that's getting even hotter with climate change). African elephants and Asian elephants also differ in **head shape**. African elephants have rounded heads, while Asian elephants have a twin-domed head, which means there's a divot line running up the head. Finally, you can look at the **tusks**. Both male and female African elephants can have **tusks, but only male Asian elephants can grow them**. It's important to note, however, that not all male Asian elephants nor all African elephants necessarily develop tusks.

There are plenty of other minute features, such as **skin texture, number of toenails, and trunk characteristics that can differentiate the two types of elephants**. Additionally, there's a **size difference**: African savanna elephants are about **8,000 kg** (9 tons) and are between 3 and 4 meters tall (between 10 and 13 feet) at the shoulder. African forest elephants are a bit smaller than their savanna counterpart, and Asian elephants weigh **5,500 kg** (about 6 tons) and, at most, are 3.5 meters tall at the shoulder (11.5 feet).

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[304] Recall, please, that for the transgression of a family boundary we may reckon not only with one genus but several genera – let's assume 2 to 4 –, so the numbers may have to be multiplied with the corresponding numbers of further necessary genera.

[305] https://www.britannica.com/story/whats-the-difference-between-asian-and-african-elephants (quotation added here 9 March 2019)

Photographs of Asian and African Elephants (16 and 17 Febr. 2019)

Asian elephants (*Elephas maximus*). Note especially the long proboscises.
Photographs by Wolf-Ekkehard Lönnig (16 February 2019)[306]

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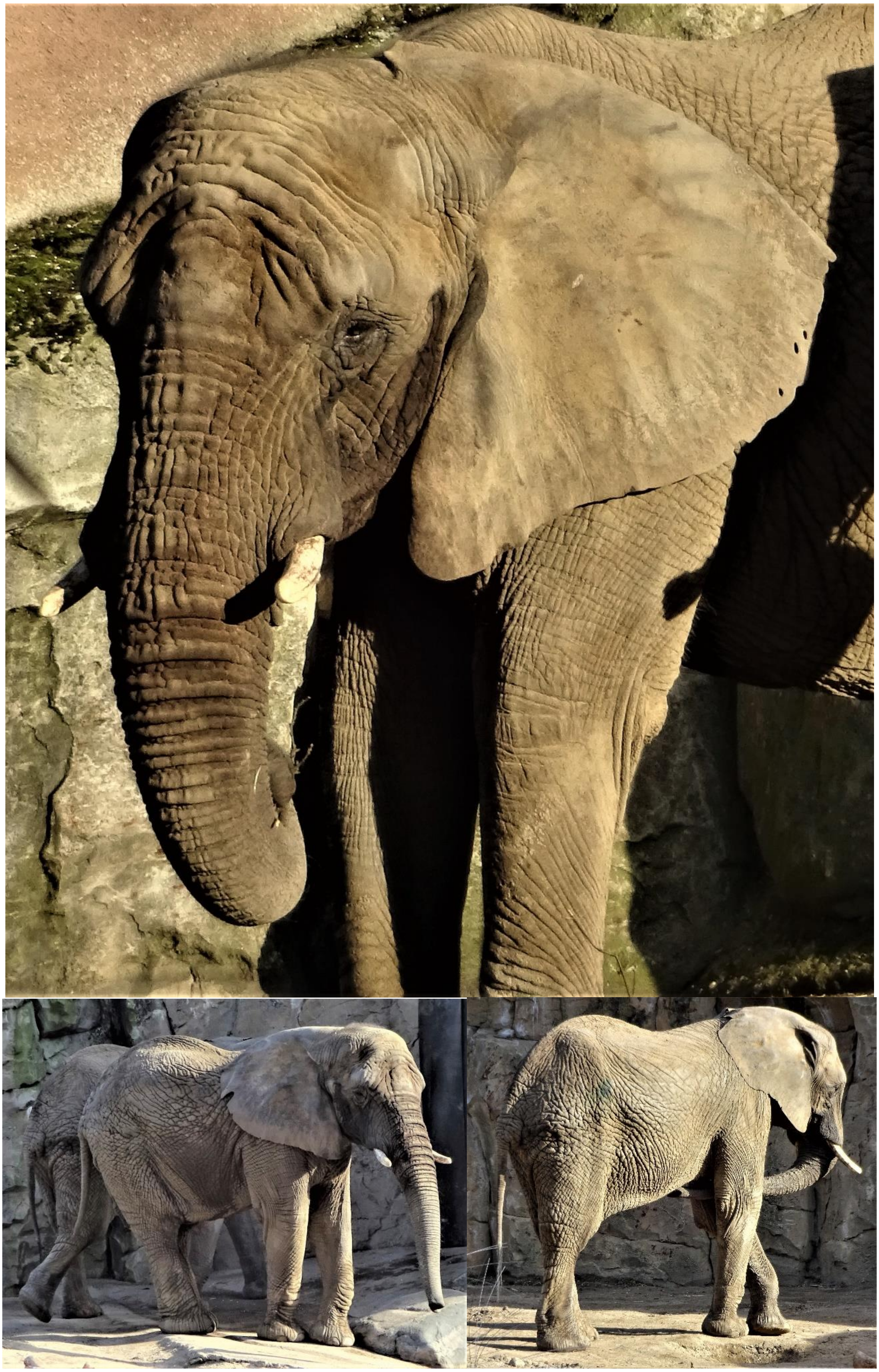
[306] All photographs of the Asian elephants were taken at Cologne Zoo on 16 February 2019, all African elephants at the Zoo in Duisburg

Above left Asian elephant (*Elephas maximus*) in comparison to right, African elephant (*Loxodonta africana*). Note, please especially the much larger ears of *L. africana* (below shown from behind: ears turned forwards). Photograph right by Biene Lönnig, the others by Wolf-Ekkehard Lönnig (2019)



African Elephants (*Loxodonta africana*): Note again the large ears, observe also, that the lenght of the proboscis reaches almost to midst the belly on the photograph below right.
Photos Wolf-Ekkehard Lönnig.

African Elephants (*Loxodonta africana*): Photos Wolf-Ekkehard Lönnig.

"The proboscis comprises **16 muscles**. A major muscle covering the top and sides functions to raise the trunk; another covers the bottom. Within the trunk is an extremely complex network of radiating and transverse muscle fascicles that provide fine movement. A total of nearly **150,000 muscle fascicles** have been counted in cross sections of trunk. The trunk is innervated by two proboscidean nerves, which render it extremely sensitive. Bifurcations of this nerve reach most portions of the trunk, especially the tip, which is equipped with tactile bristles at regular intervals. At the end of the trunk are flaplike projections enabling it to perform amazingly delicate functions, such as picking up a coin from a flat surface or cracking a peanut open, blowing away the shell, and putting the kernel in the mouth" (Jeheskel Shoshani: see reference in main text above).

Above: Front views: Comparison of African elephant (*Loxodonta africana*; above left) with Asian elephant (*Elephas maximus*; above right). Below left: Side view of Asian elephants and below right of African ones. Photos Wolf-Ekkehard Lönnig.

Asian elephants (*Elephas maximus*). Above: Elephant cow with calf. Below left: just two further exemplars of Asian elephants viewed somewhat from above. Right: Probably elephant cow with two calves on its right hand side. Photos Wolf-Ekkehard Lönnig.

“Gestation in elephants typically lasts around two years with interbirth intervals usually lasting four to five years. Births tend to take place during the wet season. Calves are born 85 cm (33 in) tall and weigh around 120 kg (260 lb). Typically, only a single young is born, but twins sometimes occur. The relatively long pregnancy is maintained by five corpus luteums (as opposed to one in most mammals) and gives the foetus more time to develop, particularly the brain and trunk. As such, newborn elephants are precocial and quickly stand and walk to follow their mother and family herd. A new calf is usually the centre of attention for herd members. Adults and most of the other young will gather around the newborn, touching and caressing it with their trunks. … When a predator is near, the family group gathers together with the calves in the centre.” https://en.wikipedia.org/wiki/Elephant#Birth_and_development (retrieved 19 February 2019).

Above left Asian elephant (*Elephas maximus*) in comparison to right: African elephant (*Loxodonta africana*). Note, please especially the much larger ears of *L. africana*.
Photographs by Wolf-Ekkehard Lönnig (2019)

Elephant Information Repository[307]: “The ear serves a very important function for elephants in regulating its body temperature.” … “Although, the ear serves to help regulate an elephant's body temperature in both species of elephants, it is more effective in African elephants because of their larger ears[308]. With a wide surface area of outer ear tissue, hot blood in the arteries is cooled as it is filtered through the vast network of capillaries and veins. Thus, the body temperature is regulated with the cooled blood returning to the main body. This is observed more frequently as the outside temperature rises. Actually, it increases a great deal in conditions of little to no wind, and temperatures above 25 degrees Celsius. Where it is windy, it is not uncommon to see an elephant will facing down find and extending its ears to allow the cool air to blow across the hot arteries.”

“One of the most fascinating features of the elephant ear is its infrasound capabilities for long range communication. To the average observer of elephants it may seem as though the elephant is incapable of listening and communicating with elephant in the distance. However studies have proven that elephants can communicate over great distances, many times being warned about an impending danger in the far distance.”[309]

Back to Internet Library

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[307] http://elephant.elehost.com/index.html

[308] One may, of course, ask **why natural selection has been less efficient in the Asian elephant**. See the problems of natural selection again at
http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf (2018)
http://www.weloennig.de/NaturalSelection.html (2001)
http://www.weloennig.de/jfterrorchipmunks.pdf (2016)

[309] http://elephant.elehost.com/About_Elephants/Anatomy/The_Ears/the_ears.html (retrieved 19 February 2019)