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Can Neo-Darwinism Explain the Origin and Variation of the Hummingbirds?

Applying the Facts Discovered by Mutation Genetics, Natural Selection, and Population Genetics to the Humming Birds



One of several outstanding examples of variation in the hummingbirds (Trochilidae) - More see please below

Above: *Eutoxeres aquila* (White-tipped Sicklebill). Author: Mike Melton: https://www.inaturalist.org/taxa/6044-Eutoxeres-aquila/browse_photos

Below: *Eutoxeres aquila* approaching a blossom of *Heliconia* spec. Clip of a photograph by Steven Easley: Also https://www.inaturalist.org/taxa/6044-Eutoxeres-aquila/browse_photos

(There a series of additional excellent photographs by further authors; the two photos above were retrieved 16 December 2023)



More of such marvellous, phenomenal, magnificent examples in the Family Trochilidae (hummingbirds):

https://commons.wikimedia.org/wiki/File:Haeckel_Trochilidae.jpg (1899/1904) Hummingbirds ("drawn from millinery specimens, body positions are not natural" – but many display a range of different body positions often including positions shown here by Haeckel) For the names of the birds, see please the Wikipedia article. You'll find *Eutoxeres condamini* left below the middle of that figure. **"Hummingbirds** are birds native to the Americas and comprise the biological family **Trochilidae**. With about 366 species and 113 genera, **they occur from Alaska to Tierra del Fuego**, but most species are found in Central and South America." https://en.wikipedia.org/wiki/Hummingbird

Abstract

According to Richard Dawkins as one of the leading spokesmen of the Synthetic Theory (Neo-Darwinism) being in full agreement with virtually all his colleagues, "evolution not only is a gradual process as a matter of fact; *it has to be gradual if it is to do any explanatory work*"¹. So, the entire array of the fascinatingly different 366 hummingbird species of this family (Trochilidae) being "distinctly different than all other avians", has evolved by natural selection of – in Darwin's words – "infinitesimally small changes", "infinitesimally slight variations", "insensibly fine steps" and "insensibly fine gradations", even many of them thought to have been mutations with just "invisibly effects on the phenotype" (Mayr). However,

"Even a new mutation that is slightly favorable will usually be lost in the first few generations after it appears in the population, a victim of genetic drift. If a new mutation has a selective advantage of S in the heterozygote in which it appears, then the chance is only 2S that the mutation will ever succeed in taking over the population. So, a mutation that is 1 percent better in fitness than the standard allele in the population will be lost 98 percent of the time by genetic drift."

Applying this method on individual hummingbird species (including their sexual dimorphism) and corresponding flower formations of their nectar producing host plants (implying coordinated inter-kingdom mutations and interactions), five examples have been discussed in the following article: (1) the strongly curved beaks of the two species of *Eutoxeres*, (2) *Lophornis gouldii* (the dot-eared coquette), (3) *Docimastes ensifer* (Gould) = *Ensifera ensifera* (the sword-billed hummingbird), (4) *Sappho sparganurus* (the red-tailed comet), and finally (5) *Loddigesia mirabilis* (the marvelous spatuletail).

All five examples display sexual dimorphism. Now, sexual selection is regularly standing in clear opposition to natural selection: Here not only because of the fact that "conspicuously colored males preferentially fall victim to their enemies", but also due to their correspondingly often astoundingly acrobatic behavior to impress the females necessitating a *tremendous* expenditure of energy for the show and ontogenetically to develop a strikingly showy and flamboyant plumage that in the present cases nearly completely dwarfs that of the females in color, size and shape (prime example among the class Aves: the well-known peacock).

Also, sexual selection is presupposing the occurrence of a series of highly unusual mutations in the females to evolve a special preference for brightly colored males with specially formed short and/or long decorative feathers etc. – **mutations for which there is not the slightest evidence**.



Male of *Loddigesia mirabilis*. Detail of https://de.m.wikipedia.org/wiki/Datei:Loddigesia_mirabilis_%2B_Aechmea_mucroniflora by John Gould 1861

¹ As in my other articles, note please that virtually all **highlighting/emphasis in the typeface** by W.-E. L. (except italics for *genera* and *species* names as well as adding a note when the cited authors themselves emphasized certain points). Why so often? Well, *since many people do not have the time to study a more extensive work in detail, these highlights can serve as* keywords to get a first impression of what is being discussed in the respective paragraphs.

Now, for this abstract let's have a brief look at the species mentioned above, yet in the reverse order, beginning with (5) *Loddigesia*: For the males (see figure on the previous page) this would additionally mean thousands of (likewise unknown) mutations to evolve their two stunningly long tail feathers ending in large flat violet-blue discs in a process of continuous evolution – by mutations with "slight or even invisible effects on the phenotype", each new step implying the substitution of the entire population of birds – and all this would have happened regularly in opposition to natural selection. Moreover, the females have been described as "not easily impressed" by the show of the males. So, one may ask: are there really decisive selective advantages for the survival of spatuletail populations of about 1 millionth of 1 meter or 1 thousandth of 1 mm of the male's two tail feathers longer in intermittend generations?

This immensely improbable process of continuous evolution, always implying thousands of mutations (with visible or invisible effects on the phenotype) for each species each time selected with certainty by the respective females, can now also be applied to (4) the "deeply forked, spectacular, long, iridescent, golden-reddish tail, longer than the length of the body" of *Sappho sparganurus* (the red-tailed comet), (3) the enormously long bill being the most distinctive feature of *Docimastes ensifer* (the sword-billed hummingbird), and (2) the "long dark rufous feathers [that] on its crown form a crest" plus the "long white feathers with shiny green dots [that] make tufts that fan out and back on the cheeks" of *Lophornis gouldii* (the dot-eared coquette), and (1) the strongly curved beaks of the two species of *Eutoxeres* (the sicklebills) seemingly in coordination with the flower forms of *Centropogon* and *Heliconia* (see details and references in the text).

Concerning the origin of the hummingbirds I have argued that if the Synthetic Theory cannot even explain differences between the hummingbirds themselves (including their sexual dimorphism), so what then can we expect when it comes to the origin of the entire family of this anatomically and physiologically so well-defined group of birds? From an evolutionary standpoint in agreement with many hummingbird researchers the clear statement of Jillian Mock is that "the origins of hummingbirds are still a major mystery".

Applying the ID-theory ("The theory of intelligent design holds that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection" (Meyer); ID is usually recognized by "a purposeful arrangement of parts" (Behe)²), I have argued that the hummingbirds show **brilliant**, **ingenious artwork**, not the work of an endless number of infinitesimally small coincidences haphazardly chained together by the "truly hideous process" of natural selection, being "rife with happenstance, contingency, incredible waste, death, pain and horror" etc. (see further similar expressions/descriptions of natural selection by leading Darwinians in the article).

Conclusion in contrast to Neo-Darwinism: An absolutely ingenious artist was at work here, transcending all human abilities, ideas and power.

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² For all the references, see please the text below.

Long Introduction: Let's first apply our general question (*Can Neo-Darwinism Explain the Origin and Variation of the Hummingbirds*?) on the example of Sicklebill Hummingbirds (Eutoxeres aquila and E. condamini ?) just shown above. How to do so? Answer: By Applying the Facts Discovered by Mutation Genetics, Natural Selection, and Population Genetics to the Humming Birds and then later turn to the question whether intelligent design can explain their origin as well as that of other bird and animal families.

Since I have so often discussed the Darwinian method to explain the origin of species including their adaptations, I hope it will be enough here just to remind the reader of the basic points (for more details and extensive analyses check please the original articles):

"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**. It is thus basically a synthesis of mutationism and environment" (Ernst Mayr – one of the main architects of the "Modern Synthesis", also called Neo-Darwinism).³

If this two-factor theory conclusively explains the peculiar bills of Sicklebill Hummingbirds (*Eutoxeres aquila* and *E. condamini*) – the first question is: So, what is to be explained?

"The peculiar bill is an **adaption to the shape of certain flowers**, namely of the genera *Centropogon* and *Heliconia*. It feeds mainly by trap-lining. In addition to nectar, it will also catch small arthropods."⁴

Variation (Mutationism):

The Law of Recurrent Variation and Selection Limits:

Mutations are thought to be the ultimate basis for evolution by natural selection. So, let's have a look at the question of whether mutations could have provided the raw materials for natural selection for the origin of all species and life forms of the earth. Having investigated the question for about 55 years now including field work with collections of mutants of four model plant species (the pea, the snapdragon, *Misopates* and Chinese lantern – more than 2 million plants), I have come to a conclusion strongly differing from the modern synthesis concerning the potential of mutagenesis. The results I have summed up in "the law of recurrent variation" (Kunze et al. 1997; Lönnig 1993, 1995, 2005, 2006). This law specifies that, for any case thoroughly examined (from pea to man), *mutants occur in a large, but nevertheless limited spectrum of phenotypes which – in accordance with all the experiences of mutation research of the 20th [and the 21^{st}] century taken together – cannot transform the original species into an entirely new one.⁵</sup>*

Macromutations? According to Neo-Darwinism: Definitely NOT!

Ernst Mayr, "In due time it was realized that the spectacular De Vriesian mutations were exceptional phenomena and that the normal genetic changes are "small" mutations (Baur, East, Johannsen, Morgan) which...have *only slight or even invisible effects on the phenotype*" (similarly Heberer, Stebbins, Dobzhansky et al., Rensch, I. R. Bock and many other authors up to the present).⁶

"Reviewing the history of macroevolutionary theories, the American evolutionary biologist Douglas J. Futuyma notes that since 1970, two very different alternatives to Darwinian gradualism have been proposed, both by Stephen Jay Gould: mutationism, and punctuated equilibria. Gould's macromutation theory gave a nod to his predecessor with an envisaged "Goldschmidt break" between evolution within a species and speciation. His advocacy of Goldschmidt was attacked with "highly unflattering comments" by B. Charlesworth and Templeton. Futuyma concludes, following other biologists reviewing the field such as K. Sterelny and A. Minelli, that *essentially all the claims of evolution driven by large mutations could be explained within the Darwinian evolutionary synthesis*."⁷

Thus, according to the ruling theory of Neo-Darwinism, evolution is driven by selection of mutations "with slight or even invisible effects on the phenotype". Or, in

³ http://www.weloennig.de/Staatsexamensarbeit.pdf

⁴ https://en.wikipedia.org/wiki/Buff-tailed_sicklebill (Retrieved 27 November 2023). Similarly on White-tipped sicklebill: "The white-tipped sicklebill primarily feeds on nectar. Its curved bill is an adaption to the shape of flowers, especially those of genera *Centropogon* and *Heliconia*, and it typically clings to the flower as it feeds." https://en.wikipedia.org/wiki/White-tipped_sicklebill (Retrieved 28 November 2023)

⁵ http://www.weloennig.de/NaturalSelection.html (updated 28 November 2023)

⁶ http://www.weloennig.de/AesV3.Konti.html

⁷ https://en.wikipedia.org/wiki/Saltation_(biology)#Macromutation_theory (Retrieved 29 November 2023), see also:

http://www.weloennig.de/ExplosiveOrigins.pdf

the words of **Richard Dawkins**, "evolution not only is a gradual process as a matter of fact; <u>it has to be gradual</u> if it is to do any explanatory work."⁸

So how "small" are the mutations with "only slight or even invisible effects on the phenotype" in the "gradual process" of evolution thought to be?

Since this key point of the theory – gradual evolution –, its bottom line, core and essence, even "the same yesterday, and today and forever" – gradualism in combination with omnipotent natural selection – can hardly be overemphasized, I would like to continue to point out that Darwin correspondingly imagined the origin of species (and, in fact, of all life forms) by selection 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" (All emphasis added).

In the 1st edition of Darwin's Origin (1859) we find his assertion that "Natura non facit saltum" ("nature doesn't jump") eight times and in the 6th edition (1872) twelve times, so even four times more. Darwin comments inter alia (1872, p. 166): "On the theory of natural selection we can clearly understand the full meaning of that old canon in natural history, "Natura non facit saltum." This canon, if we look to the present inhabitants alone of the world, is not strictly correct; but if we include all those of past times, whether known or unknown, it must on this theory be strictly true."⁹

Virtually the same answer is presented by Neo-Darwinism today (see Mayr, Dawkins and others above).

Yet, in the context of the *fertilization mechanisms of orchids and Asclepiadaceae* and later the anatomy and physiology of the stinging nettles, the botanist Ernst Georg Pringsheim¹⁰ of the University of Göttingen raised the following question:

"In the stinging nettle, which stores a secretion in its stinging hairs that contains formic acid, acetylcholine and histamine – chemical compounds that are otherwise unknown in the Urticaceae – "several of the properties of these unicellular hairs ... must work together to achieve deterrence"... "How can such an intricate structure have developed through an accumulation of mutations that are independent of each other?" ... "But where two or more living organisms are required to co-operate in a lawful manner to maintain the biological system, any [Neo-Darwinian] understanding of the development of the correct equilibrium ceases."¹¹

Natural Selection: The Limits

"Can the struggle for existence create? It can and must eradicate, hence kill. But it can't create anything. *Just as a sieve cannot create new grains, but can only sift the existing ones*."¹² Population Genetics: "Even a new mutation that is slightly favorable will usually be lost in the first few generations after it appears in the population, a victim of genetic drift. If a new mutation has a selective advantage of *S* in the heterozygote in which it appears, then the chance is only 2*S* that the mutation will ever succeed in taking over the population. So, a mutation *that is 1 percent better in fitness than the standard allele in the population will be lost 98 percent of the time by genetic drift.*" ... [Moreover] "The calculations are invalid for small populations where most of the evolutionary novelties are said to have arisen according to the Neo-Darwinian theory of evolution and punctuated equilibrium alike [references]. In a small population the rate of advantageous mutations is extremely low (*if they appear at all; eons of time are needed to obtain the average 50 identical advantageous dominant mutations for one success*) and genetic drift is almost totally substituting natural selection. Also, it is not possible in nature to raise mutation rates indefinitely since error catastrophe occurs when the mutation rate is too high, thereby terminating the existence of the population."¹³

And that would comprise just *the first little step* of the postulated continuous evolution by "infinitesimally small changes", "infinitesimally slight variations" etc. or, in Neo-Darwinian terms, by mutations with "slight or even invisible effects on the

"Wo aber gar zwei bis mehrere Lebewesen gesetzmäßig zusammenarbeitend zur Erhaltung des biologischen Systems nötig sind, hört jedes Verständnis für die Entstehung des richtigen Gleichgewichtes auf." For the reference and larger context see http://www.weloennig.de/Staatsexamensarbeit.pdf (See p. 39) ¹² http://www.weloennig.de/OmnipotentImpotentImpotentNaturalSelection.pdf

¹³ See references in http://www.weloennig.de/NaturalSelection.html

⁸ Dawkins R (2009): The Greatest Show on Earth. Free Press, New York (2009, p. 155)

⁹ https://evolutionnews.org/2020/02/neo-darwinism-and-the-big-bang-of-mans-origin/ http://www.weloennig.de/Rhinoceros.pdf (p.6)

http://www.weloennig.de/SauropodDinosaur.pdf (p. 23)

 ¹⁰ https://de.wikipedia.org/wiki/Ernst_Pringsheim_junior (Retrieved 7. December 2023). He was also professor for Biochemistry and Botany at the Universities of Berlin, Prag and Cambridge. Pringsheim, E. G.: *Die Unzulänglichkeit der herrschenden Abstammungslehre*. Österr. Botanische Zeitschrift 118: 30. November 1970.
 ¹¹ Original German text: "Bei der Brennnessel, die in ihren Brennhaaren ein Sekret speichert, welches Ameisensäure, Acetylcholin und Histamin enthält –

chemische Verbindungen, die sonst bei den Urticaceen unbekannt sind – müssen "mehrere der Eigenschaften dieser einzelligen Haare … zusammenwirken, damit eine Abschreckung erreicht wird."… "Wie kann ein so verwickeltes Gebilde sich durch Häufung voneinander unabhängiger Mutationen entwickelt haben?" Wo aber ogr zusei bie mehrere Labaveren gesetzmäßig zusammengrheitend zur Erbaltung des biologischen Stetame nätigt inder Verstündnis für die

phenotype" – so just one little step of hundreds and perhaps altogether even thousands of the "infinitesimally small changes" adding up to clearcut new characteristics like the sickle bills of *Eutoxeres aquila* and *E. condamini*, for (to repeat) "evolution not only is a gradual process as a matter of fact; *it has to be gradual if it is to do any explanatory work*" (see above) – thus macromutations excluded¹⁴.

Main Part. Now, Heliconias and Hummingbirds:

"Heliconias in the tropics rely [almost] exclusively on hummingbirds for pollination. This accounts for their bright red, yellow and orange colors, which attract hummingbirds. In addition to their colors, the Heliconias have developed long flower tubes with rich nectar contents. While obtaining the energy-rich food that they need to survive, brush pollen off onto the sticky surface of the stigma, the female organ of the Heliconia flower. The pollen may be obtained from the anther, the male organ of a different heliconia flower, or perhaps of the same flower, since heliconias are also self-compatible. Thus, in this way hummingbirds help Heliconias to propagate their species. Heliconia with hummingbird (A plant is called self-compatible if a viable fruit containing fertile seeds can be obtained when a pollen from a flower of the plant fertilizes the egg in the same flower.) The hummingbirds also evolved long curved bills to be able to reach to the bottom of the flower tube to obtain the nectar. Even their tongue is long -- twice as long as the bill -- so that they can reach even further down the tube.

In most cases the size of the flower tube on the plant matches the exact size of the bill on the pollinating hummingbird. Certain Heliconias with deep flower tubes rely on a specific hummingbird with an extra long bill to pollinate them.

Unlike most other flowers, Heliconias have evolved a relationship that gives hummingbirds "exclusive" feeding (and pollination) rights, because neither color nor smell has developed to attract insects. Hummingbirds have no sense of smell. And different species of heliconia uses the birds in different ways. Each species places its pollen on a specific part of a hummingbird's body to avoid pollen waste and contamination from other Heliconia species in the same region."

"...A few Heliconias, the green ones, rely on nectar-eating bats for pollination."15

Eutoxeres aquila: "The white-tipped sicklebill primarily feeds on nectar. Its curved bill is an adaption to the shape of flowers, especially those of genera Centropogon and Heliconia, and it typically clings to the flower as it feeds. It is a "trap-line" feeder, visiting a circuit of flowering plants and not defending any particular area. Sicklebills also feed on insects by gleaning them from spiderwebs or trunks and branches."¹⁶

"Understanding the mechanisms enabling coevolution in complex mutualistic networks remains a central challenge in evolutionary biology. We show for the first time, to our knowledge, that a tropical plant species has the capacity to discriminate among floral visitors, investing in reproduction differentially across the pollinator community."¹⁷

Recall please: "But where two or more living organisms are required to co-operate in a lawful manner to maintain the biological system, any [Neo-Darwinian] understanding of the development of the correct equilibrium ceases" (see botanist E. G. Pringsheim above).

Why? Well, the ensuing sentence concerning the origin of plant galls can also applied to the *inter-kingdom* interactions between the hummingbird bill structures and flower forms: 'These ingenious plant-animal *inter-kingdom* complexities, co-adaptations and synorganizations are reflected by correspondingly intricately fine-tuned and exactly (key and lock-like) fitting synorganized structures and systems on the level of molecular genetics¹⁸ of the flowering plants and the hummingbirds. Or, in other words "the [exact]

¹⁴ See also the mathematical argumentation against macromutations now by Darwin critic Marcel-Paul Schützenberger (1996): The Miracles of Darwinism. http://www.arn.org/docs/odesign/od172/schutz172.htm (Among many other points, see the case of the elephants trunk.)

¹⁵ Cloudbridge Nature Reserve - Nature Notes No. 22; Heliconias and Hummingbirds (without year when the comment was written; for the site in general 2023 was given) Retrieved 3 January 2024.

¹⁶ https://en.wikipedia.org/wiki/White-tipped_sicklebill. Also retrieved 3 January 2024.

¹⁷ https://www.researchgate.net/publication/273156439_Pollinator_recognition_by_a_keystone_tropical_plant Matthew G. Betts, Adam S. Hadley, and W. John Kress (2015): Pollinator recognition by a keystone tropical plant. PNAS (Proc Natl Acad Sci U S A. 2015 Mar 17;112(11):3433-8. doi: 10.1073/pnas.1419522112. Epub 2015 Mar 2.

See also: Judith L. Bronstein and Sarah K. Richman (2015): Active pollinator choice by Heliconia 'fits the bill'. Trends in Plant Science 20: 403-404. (P. 404: ...the most effective pollinator species were those visitors that removed the most nectar. This result is somewhat surprising from the standpoint of mutualism theory. The net effect of any mutualist is the benefit of its effects minus the costs involved in attracting and rewarding it. Hence, selection should favor partners whose benefits can be obtained at the lowest cost [8]. However, in this case, the best mutualists are intrinsically the most energetically demanding ones (because they are large and fly long distances). That is, to receive a high benefit, H. tortuosa may be forced to make a high investment. The present study serves to emphasize that costs and benefits can act as constraints upon each other.") ¹⁸ W.-E. Lönnig (2020): http://www.weloennig.de/PlantGalls.xyz.pdf p. 3 (for both framed treatises quotrd above)

match between the shape and size of bird bills and ornithophilous flowers"¹⁹ occurred on all biological levels – according to evolutionary theory – *after more than 500 million years of phylogenetic developments, all the mutations being absolutely independent of each other.*

Really just due to selection of accidental/haphazard/random DNA mutations producing "innumerable slight variations", "extremely slight variations" and "infinitesimally small inherited variations" etc. for – to emphasize again this key point in Dawkins' words – "evolution not only is a gradual process as a matter of fact; it has to be gradual if it is to do any explanatory work". And how does natural selection work?



Now, one may ask: So, what?

So, according to the Darwinian authors just quoted above, — by the 'ugly' and 'truly hideous' and 'horrible process' of natural selection, 'the blindest, and most cruel way of evolving new species', – by the 'original brutality' (Urbrutalität) of a 'perpetual', 'relentless war of all against all' (letting the miniscule minority of the strongest live and the billions of the weakest mercilessly die) and through the sheer 'primeval stupidy' (Urdummheit) of random micro-mutations, a progress of evolution, walking 'over billions of corpses' by 'happenstance, contingency, incredible waste, death, pain and horror', — nature achieved the essence, the embodiment, the epitomy of 'beautiful consequences', namely life's "endless forms most beautiful and most wonderful, which have been, and are being, evolved" (in Darwin's final words of the Origin), and all this in the absolutely abominable manner just quoted.

Many authors cannot help but sense an utmost contradiction, i.e. an enormous inner conflict, inconsistency and illogicality, a total *non sequitur* between this Darwinian evolutionary method consisting, to emphasize this point again, of *primeval stupidity and original brutality*, of *incredible waste, death, pain and horror* and the **totally unexpected result consisting of life's 'endless forms most beautiful and most wonderful'**.

Or in one word: There is an immense tension, inadequacy and deficiency between the infinitely ugly causes (*unfathomable* stupidity and *unrivalled* brutality) and the unspeakably beautiful and most wonderful effects they are thought to have produced – the exquisite complexity of living beings – specified and to a large part irreducible.²⁰

¹⁹Alejandro Rico-Guevara, Kristiina J Hurme, Rosalee Elting, Avery L Russell (2021): Bene"fit" Assessment in Pollination Coevolution: Mechanistic

Perspectives on Hummingbird Bill-Flower Matching. Integr Comp Biol 6: 681-695. doi: 10.1093/icb/icab111 (p. 681).

²⁰ http://www.weloennig.de/BeautifulFactsPartI.pdf (2018, p. 1 and p. 7). Of course, someone might object that "ugliness" is not yet a scientific argument. But the method is not only "ugly" but also impotent. See details in http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf

 $see in this context perhaps also http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdf and/or http://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf \\$

Perhaps a task for my readers: Now please keep all these points cited above in mind (evolution has to be gradual, law of recurrent variation, natural selection cannot create anything — just as a sieve cannot create new grains, but can only sift the existing ones, a mutation that is 1 percent better in fitness than the standard allele in the population will be lost 98 percent of the time by genetic drift, the vast improbabilities to produce by accidental mutations *inter-kingdom key and lock-like synorganized structures and systems*²¹ etc.)

and apply them to all the extravagant features shown above, including "the match between the *shape and size of bird bills and ornithophilous flowers*", head, wing, and leg forms, all the different feather forms and colors of the wings, tails and bodies²² – not to speak of the bird's instinctive behaviors.

Question: The origin of the sicklebills and their correspondingly formed ornithophilous host flowers – really by natural selection, this "truly hideous sum total of misery" choosing from an endless array of "infinitesimally small inherited variations", i.e. accidental, haphazard, random DNA ("micro"-)mutations, adding thousands of mostly invisible or almost invisible of them (on top some 98 % of them lost by genetic drift anyway) leading – one microscopic little step after the other – to the extraordinarily well functioning coadapted sicklebill and flower forms?

In other words: According to Neo-Darwinism thousands of *entire* bird <u>and</u> flowering plant *populations* were each regularly totally substituted (one after another in differently longtime lags or intervals with some 98 % losses from the outset) by the one supposedly genetically advanced sicklebill individual and its descendants (about 2 eggs per nest), assuming that many being *invisibly* more finetuned to *Heliconia*- and *Centropogon*-like flower forms and *vice versa* (*cf.* Haldane's dilemma – or in the words of zoologist Robert Nachtwey²³: "Whoever happened to change like that was left over [and finally reproduced successfully] in the struggle for existence." Or: "Whoever happened to make such an accidental change was the only one left over" to reproduce).

Let's keep in mind that the two – bird beak and blossom form – are thought to have mutated independently of each other in thousands of infinitesimally small steps in all and any directions – eventually really resulting in such a coordinated adaptation/ synorganization as found in these cases of birds and their host flowers?

²¹ Although such enormous improbabilities for synorganized features are also true within kingdoms, the examples of synorganization between the evolutionarily postulated independently arisen plant and animal kingdoms may reinforce the evidence against Darwinism *ad oculus*. For the general method to detect design, see for example, William A. Dembski and Winsto Ewert (2023): The Design Inference: Eliminating Chance through Small Probabilities. Discovery Institute; 2nd ed. Edition (16. November 2023). 583 pp.

²² In the sense of "the main part of a person's or animal's body, without the head, or without the head, arms, and legs"

https://dictionary.cambridge.org/de/worterbuch/englisch/body

²³ http://www.weloennig.de/AuIDa.html: "The theory only says that something has survived in the struggle for existence, but to our question as to how this something actually came into being, it always has only one answer: "Through a random hereditary change!" You have to apply Darwin's formula to intricately constructed organs such as the human eye and the visual process to understand the emptiness and hollowness of such a view:

[&]quot;How did the transparent and curved cornea of the eye come into being?" – "Whoever happened to change in this way survived in the struggle for existence!" – "How did the retina, which has 100,000 to 180,000 light-sensitive rods or cones on a single square millimeter, come into being?" – "Whoever happened to change like that was left over!" – "How is it that the rods react to the stimulus of white light, but the cones react to colored light?" – "Whoever happened to accidentally change like that was left over!"

[&]quot;How did the pigment skin develop, which sends its black pigment into tiny projections between the rods and cones and thus produces image sharpness?" -"Whoever happened to accidentally change like that was left over!"

[&]quot;How did the lens with its facilities, its ability to adapt to near and far, come into being?" – "Whoever changed like that by chance, that's who was left over!" Nachtwey continues with a series of further questions and with, in principle, the same Neo-Darwinian answer.

Original German text; "Die Theorie sagt nur, dass etwas im Daseinskampf übriggeblieben ist, aber auf unsere Frage, wie dieses Etwas denn eigentlich entstanden ist, hat sie stets nur die eine Antwort: "Durch eine zufällige erbliche Abänderung!" Man muss die Darwinsche Formel einmal auf verwickelt gebaute Organe, wie etwa das menschliche Auge und auf den Sehvorgang anwenden, um die ganze Leere und Hohlheit einer solchen Anschauung zu begreifen: "Wie entstand die durchsichtige und gekrümmte Hornhaut des Auges?" – "Wer zufällig so abänderte, der blieb im Daseinskampf übrig!" – "Wie entstand die

[&]quot;Wie entstand die durchsichtige und gekrümmte Hornhaut des Auges?" – "Wer zufällig so abänderte, der blieb im Daseinskampf übrig!" – "Wie entstand die Netzhaut, die auf einem einzigen Quadratmillimeter 100 000 bis 180 000 lichtempfindliche Stäbchen oder Zapfen trägt?" – "Wer zufällig so abänderte, der blieb übrig!" – "Wie kommt es, dass die Stäbchen auf den Reiz des weißen Lichtes reagieren, die Zäpfchen aber auf das farbige Licht?" – "Wer zufällig so abänderte, der blieb übrig!"

[&]quot;Wie entstand die Pigmenthaut, die ihren schwarzen Farbstoff in winzige Fortsätze zwischen Stäbchen und Zapfen entsendet und damit Bildschärfe erzeugt?" – "Wer zufällig so abänderte, der blieb übrig!"

[&]quot;Wie entstand die Linse mit ihren Einrichtungen, ihrem Anpassungsvermögen an Nähe und Ferne?" - "Wer zufällig so abänderte, der blieb übrig!". Nachtwey continues with a series of further questions and with, in principle, the same Neo-Darwinian answer.

The following comment on the origin of plant galls, which are intricately matched in form and function to their *insect* visitors, by Jean Meyer from his book on *Plant Galls and Gall Inducers*²⁴ appears to be relevant for the questions of the context above stating:

"Zoocecidia arise from the meeting of two kingdoms, plant and animal. By virtue of their diversity, the psychophysiological faculties brought into play by the animal, and the capacity of the plant for coadaptive reaction, these galls cannot but elicit the wonder of the naturalist. [True also for the synorganized birds and flowers.]

We are obliged to admit that there is nothing fortuitous about this meeting. However, even if it is not within the realm of science to **explain the fact of finality**, which is a logical implication of this meeting and *which insures the preservation of thousands of species*, we still cannot evade the following question, posed by one of our master biologists, BOUNOURE²⁵, in 1956. After having analyzed various components of the animal sexual instinct, he queried: "What is this specific order, wherein life behaves according to the law of cause-and-effect?" He states that "A certain exact science denies all reality beyond that which can be perceived, and prefers nothingness to the unknowable." [Again true also for the synorganized hummingbirds and their flowers.]

For him, however (and we adopt his reflection): "c'est l'honneur de l'esprit et la táche de la métaphysique, là où échoue la physique, de tendre des antennes vers les espaces interdits." "...*it is the honor and privilege of the intellect and the task of metaphysics to depart from the point at which the physical sciences fail, and stretch out feelers toward forbidden realms.*" [Now, who is strictly forbidding the metaphysical realm? And do we have obedient to them?]

So, Jean Meyer emphasized that "we adopt his reflection". Today Meyer would possibly extend his reflections and address/include **the scientific theory of ID** (see below). And this can, in principle, also be applied to the special host angiosperms and their bird visitors as the example of the sicklebills and the corresponding flowers shows.

For additional illustrations, let's have look at some (more) examples from Haeckel's Trochilidae²⁶ (and subsequently come back to the genus *Eutoxeres*):

So, second (after *Eutoxeres*), now *Lophornis gouldii* (Gray) = *Lophornis gouldii* (Lesson, 1833)²⁷, third *Docimastes ensifer* (Gould) = *Ensifera ensifera* (Boissonneau, 1840), and forth *Sappho sparganurus* (Shaw, 1812).

Second, *Lophornis gouldii*: "The dot-eared coquette is 6.8 to 7.6 cm (2.7 to 3.0 in) long and weighs 2.4 to 2.8 g (0.085 to 0.099 oz). Both sexes have a short, straight, black-tipped red bill. The adult male's forehead is glittering golden green. *Long dark rufous feathers on its crown form a crest*. Its upperparts are bronzy green with a white band across the rump. Its throat is glittering emerald green. *Long white feathers with shiny green dots make tufts that fan out and back on the cheeks*. Its underparts are grayish green. Its central tail feathers are bronzy green and the rest rufous with bronzy green tips and edges. **The adult female does not have the male's crest or cheek tufts**. Its upperparts are colored like the male's but with a bronzy iridescence. Its throat is rufous with a grayish green lower border. Its tail is bronze with rufous tips."

Now, compare please the Neo-Darwinian hypothesis of the doubtful "evolution by creeps"



(Gould) with the intelligent design explanation

("The theory of intelligent design [ID] holds that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection"; ID is usually recognized by "a purposeful arrangement of parts"²⁸)

just for the "long dark rufous feathers on its crown form a crest" and "long white feathers with shiny green dots make tufts that fan out and back on the cheeks". In my view **this is brilliant, ingenious artwork**, not the work of an endless number of infinitesimally small

coincidences haphazardly chained together by the "truly hideous process" of natural selection, being "rife with happenstance, contingency, incredible waste, death, pain and horror", "the

²⁴ Jean Meyer (Former Director of the Cecidology Laboratory (C.N.R.S. – Université L. Pasteur de Strasbourg; Honorary Director of Research. Botanical Institute, Strasbourg (1987): Plant Galls and Gall Inducers. With 271 figures Gebrüder Bornträger Berlin und Stuttgart.

²⁵ For Louis Bounoure, see http://www.weloennig.de/internetlibrary.html of 3 October 2023 and comment in http://www.weloennig.de/KidneyEvolution.pdf footnote to p. 12 (21 September 2023)

²⁶ Cf. for the taxonomic names https://de.wikipedia.org/wiki/Datei:Haeckel_Trochilidae.jpg

²⁷ https://en.wikipedia.org/wiki/Dot-eared_coquette (retrieved 7 January 2023)

²⁸ https://intelligentdesign.org/whatisid/ https://www.discovery.org/v/what-is-intelligent-design/ more articles here: https://evolutionnews.org/

blindest, and most cruel way of evolving new species", by "primeval stupidity and original brutality".

However, some Neo-Darwinians may object that the differences between the exorbitantly decorated males and the generally more modest females ("the adult female does not have the male's crest or cheek tufts") are due to a special form of natural selection, namely **sexual selection**, which, however, is at least as problematic as natural selection *per se* and is, moreover, usually in conflict with the latter:

F. Schmidt mentions some difficulties regarding this topic as follows:

"In sexual selection the choice of the sex partner is apparently determined by an inborn behaviour program. In most cases it stands in definite opposition to natural selection. This is illustrated clearly by the birds of paradise [and others]. Let us assume, for example, that a female, due to a highly unusual mutation – for which there is not the slightest evidence – has obtained a special preference for brightly coloured males with long decorative feathers. For the species as a whole, there is no recognizable selection advantage for this mutation. On the contrary: conspicuously coloured males preferentially fall victim to their enemies. ... The long tail feathers reduce the ability to fly and are also a hindrance in the search for food. One should assume, according to the principle of natural selection, that behaviour mutations that lead to sexual selection with a disadvantage for the species as a whole, would be soon eliminated. It can, in the case of the bird of paradise as well as the Irish Giant Deer, be passed on, not in accord with, but only against natural selection. There must therefore be a factor that is stronger than Darwinian selection."

The author assumes this factor to be an "endogenous orthogenetic developmental tendency", and he further remarks:

"That selection cannot be the decisive factor for the long decorative feathers of the birds of paradise, peacocks and diamond pheasants, and so forth, follows from the fact that *we find this in only relatively few bird species*, at least to this degree."

Similarly, evolutionary biologist J. Endler remarks:

"...sexual selection may sometimes be disadvantageous, or opposed by other components of natural selection (Darwin 1871; Ghiselin 1974; Wade and Arnold 1980)."

Reinhard Eichelbeck comments the question of sexual selection as follows:

"For Darwin »sexual selection« had two aspects. The first dealt with the struggle of the male for possession of the female animal. Here he was of the opinion, that »the struggle is possibly the most violent between males of polygamous animals, and they often seem to be equipped with special weapons«. In any case, these »weapons«, as we know, for most animals are so constructed that they serve to avoid injuries rather than to inflict ones – various horns and antlers, for example. Rutting fights are in many, perhaps even in most cases, ritualistic show fights. And what kind of a battle is it, where the hummingbirds are armed with beauty and blackbirds with song? Even Darwin realized, that for example, with birds »the competition often has a peaceful character«, and thus he preferred the second aspect of »sexual selection« in which the female animals of some species prefer magnificent, handsome males, or those who are especially good at dancing, singing, performing somersaults, or building artistically decorated nests.

In Australia and New Guinea there are several species of **so-called catbirds/bowerbirds**. For their mating ritual, they build small huts, which they decorate artistically with all sorts of objects, with stones, fruits, feathers, snail shells, and recently with pieces of glass and bottle tops. One species decorates its huts with flowers that are changed daily, another paints them with fruit pulp using for this purpose a piece of bark as a spatula. When scientists changed around their decorations while the birds were absent, the birds restored the original order when they returned. The artist knows what he wants. Then he entices the hen he had chosen into his love nest and courts her until she belongs to him – or maybe not. After all, the ladies have their own artistic taste.

There are so many bizarre mating customs among birds that one could write a book about it. There are aesthetic orgies, in view of which only the *most dusty academic could arrive at the idea that everything in Nature is about survival and maximizing reproduction*. The motto is not only »make love, not war«, but also »make art, not sex«. With the immense effort that the foreplay costs, there does not remain much time for reproduction. But apparently everything is allowed - »natural selection« closes one, if not both, eyes. Especially with the artistic feather costumes that some birds wear, and which **not only hinder flying, but also running** – and all this only because the ladies want it like this? »I see no reason to doubt«, wrote Darwin, what female birds, by preferring the most musical and handsomest males, during thousands of generations, could produce a remarkable effect.« In crows, however, which have similar voice organs to those of the nightingale, though seemingly not. Or should the female crows have a preference for cawing black-coated males? Against the assumption that the artistic pattern of birds or insects have arisen through gradual accumulation of small variations and the special tastes of the females, there are indeed a couple of

arisen through gradual accumulation of small variations and the special tastes of the females, there are indeed a couple of objections. One problem is the so-called »rejection reaction« among animals that live in groups. When an animal distinguishes himself from the others to a certain degree, he is chased away or even killed."

Then Eichelbeck describes some drastic examples and concludes that *conspicuous* changes may be rejected or even be fatal, "On the other hand changes that [according to human measures] are not conspicuous do not attract attention [in the animal kingdom either] and thus cannot have a significant effect" (p. 204; for further evidence with impressive examples – colour patterns in butterflies, behaviour of North American sage grouse – the reader is referred to the original work). (For the exact references see http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf)

Thus, the concept of sexual selection by an endless sequence of "infinitesimally small inherited variations" selected by the females is not only questionable in many areas of biological research but also extraordinarily unable to convincingly explain the example of the stark differences in the female and male individuals not only of *Lophornis gouldii*, but also of all the other cases of sexual dimorphism, now for instance:

Third: *Docimastes ensifer* (Gould) = *Ensifera ensifera* (Boissonneau, 1840):

"The sword-billed hummingbird is among the largest species of hummingbirds. Adults are 13-14 centimetres (5.1-5.5 in) long excluding the bill and weigh 10-15 g (0.35-0.53 oz), with males being slightly larger on average than females. The most distinctive feature of the species is the enormous bill, which is 8-12 centimetres (3.1-4.7 in) long. The bill is the largest of any hummingbird and the largest with respect to body length for any bird.

The sword-billed hummingbird displays sexual dimorphism. Males have shorter bills but longer wings and tails than females. Males have bronze-green upperparts with coppery-bronze heads, a discreet white spot behind the eye, dusky throats, metallic green underparts, a dark gray belly, and a forked blackish bronze-green tail. Some males have white on the chin and throat. Females have similar upperparts, but have white underparts and grayish throats and bellies speckled with green. The tail is less *deeply forked* and is edged grayish white. Juveniles look similar to females.

The sword-billed hummingbird is the only known bird whose bill is longer than the rest of the body, excluding the tail. It is black, heavy, and slightly upturned. The extremely long bill helps the species feed on flowers with long corollas that are inaccessible to other species."29



First row above: Left: Ensifera ensifera. "Cutting from picture Image: Haeckel Trochilidae.jpg"30

Middle of the first row above: Ensifera ensifera³¹ is shown on the righthand site of the picture, but left of that same photo it is shown with a buff-tailed coronet (Boissonneaua flavescens), which - apart from the short bill - appears to be looking very similar to Ensifera ensifera³². Right of the first row: https://it.wikipedia.org/wiki/Ensifera_ensifera

Middle row: Left: "Description: Two male and one female Sword-billed Hummingbirds. Image/photo credit: Drawing from the "Illustrated Natural History of the Animal Kingdom, Being a Systematic and Popular Description of the Habits, Structure, and Classification of Animals, from the Highest to the Lowest Forms, with Their Relations to Agriculture, Commerce, Manufactures, and the Arts," by S. G. Goodrich, Vol. II, 1859. Colored by Hummingbird Pictures Guide 33 Middle photo of the middle row: Züchner, T. and G. M. Kirwan (2020). Sword-billed Hummingbird (Ensifera ensifera), version 1.0. In Birds of the World (J. del

Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. 34 Middle row right: Sword-billed Hummingbird (Ensifera ensifera). iNaturalist Photo by Randy Vickors. See please the series of very fine Photos by Randy Vickors: https://www.inaturalist.org/taxa/6458-Ensifera-ensifera/browse_photos: How the bird approaches, and how it enters the flower somewhat to get the nectar and possibly also some insects. (Similar photo by Juan Carlos Pachón Arttesano on: https://www.inaturalist.org/observations/4313496)

For the latter action (bird partly in the flower), see also https://www.inaturalist.org/observations/8538132

Below: Skeleton of Sword-billed Hummingbird (Ensifera ensifera): photo scan by Slater Museum of Natural History, University of Puget Sound.³⁵

²⁹ https://en.wikipedia.org/wiki/Sword-billed_hummingbird (retieved 10 January 2024)

Concerning variation in Passiflora mixta cf. https://www.researchgate.net/figure/Passiflora-mixta-C-John-Ocampo-30-31_fig5_317142455

See also bird and flower at: https://www.flickr.com/photos/95362111@N06/39191572234 ³⁰ https://upload.wikimedia.org/wikipedia/commons/6/63/Ensifera_ensifera.jpg (retrieved 12 January 2024)

³¹ https://commons.wikimedia.org/wiki/File:Ensifera_ensifera_(Pico_de_sable)_(14182491210).jpg (author: Alejandro Bayer Tamayo from Armenia, Colombia 14 October 2012) (Retrieved 12 January 2024) ³² For several further photos of *Boissonneaua flavescens*, see https://en.wikipedia.org/wiki/Buff-tailed_coronet

³³ https://fohn.net/hummingbird-pictures/pictures-html/sword-billed-hummingbird1.html (also retrieved 12 Jaanuary 2024)

³⁴ https://doi.org/10.2173/bow.swbhum1.01https://birdsoftheworld.org/bow/species/swbhum1/1.0/introduction

Fourth: Sappho sparganurus (Shaw, 1812):

"The red-tailed comet is one of the largest hummingbirds, and *males reaching a length of 22 cm, females up to 15 cm*. The plumage of males is largely green, with a shining gorget. The head is green, while the back and rump are reddish violet. *The male has a deeply forked, spectacular, long, iridescent, golden-reddish tail, longer than the length of the body*, while the female has a shorter reddish-bronze tail. The species has a hoarse chattery call."³⁶



Left: Adult female https://ebird.org/species/retcom1?siteLanguage=de Jorge Quiroga 24 July 2018 Middle: "Sappho sparganurus, on display at the Museo Civico di Storia Naturale Federico ed Ettore Craveri in Bra" https://en.wikipedia.org/wiki/File:Trochilidae_-_Sappho_sparganurus.JPG "Hectonichus 3 August 2016 [his] Own work." Right: https://commons.wikimedia.org/wiki/File:Red-tailed_comet.jpg

Now, let's apply in some detail the mutation-selection theory to the origin of (2) *Lophornis gouldii* (the dot-eared coquette), (3) *Ensifera ensifera* (the sword-billed hummingbird), and (4) *Sappho sparganurus* (the red-tailed comet).

According to the Neo-Darwinian concept of sexual selection by a virtually unlimited sequence of "infinitesimally small inherited variations" the females had unerringly selected in a gradual succession of male mutants always choosing those 'displaying' a "slight or even invisible effect" on the phenotype in (2) *L. gouldii* of the "*long dark rufous feathers on its crown [to] form a crest* etc. (see above), and produced especially the "*long white feathers with shiny green dots making tufts that fan out and back on the cheeks*".

Let's have a brief look at these features $again^{37}$. Either mutations with *invisible effects* on the phenotype or one *tiny fraction of a tenth of a millimeter* at a time to develop the long white feathers, one step after the other



(including a loss of ca. 98%), in millions of years selected by the females in opposition to natural selection?" And what about the nerves, muscles and instincts to move them at the right time and effective direction? And the shiny green dots, which would have hardly been seen (or even been invisible) in the beginning of their continuous evolution? Same question for the "long dark rufous feathers on its crown [to] form a crest. So, we have also to assume that the female, due to a highly <u>unusual series of mutations</u> "for which there is not the slightest evidence" has obtained a special preference for males with long

decorative feathers in very different but specific colours, forms, substructures, patterns and places? "For the species as a whole, there is no recognizable selection advantage for such mutations. On the contrary: conspicuously coloured males preferentially fall victim to their enemies"?

Well, we may ask again: Actually, by such processes of sexual and natural selection, these being – apart from the fact that they contradict each other – *in the clear words of Darwinians* and all the known biological facts, often extraordinarily/extremely/

³⁶ https://en.wikipedia.org/wiki/Red-tailed_comet (retrieved 15 January 2024)

³⁷ https://de.wikipedia.org/wiki/Gouldelfe (retrieved 15 January 2024)

exceedingly "truly hideous", frequently ineffective and definitely limited processes, being "rife with happenstance, contingency, incredible waste, death, pain and horror", "the blindest, and most cruel way of evolving new species"?

Does this "ugly process" really have – not only "beautiful consequences" – but does it undoubtedly also explain all the irreducibly and specified features characterizing living organisms?

The protagonists of that theory unanimously say YES!

Natural selection has become the proverbial "untouchable holy cow" for almost all of evolutionary biology, starting substantially with Darwin's Origin of Species from 1859 onwards: For many biologists it appears to be totally "verboten" even to look at that largely imaginary female cattle critically, and the option that its god-like power could be doubted for scientific reasons is, in fact, absolutely beyond the vision of virtually all Neo-Darwinian evolutionists. Metaphorically speaking: Instead of producing a range of valuable dairy products and for the carnivores some flesh and meat, this ingenious cow is thought to have created, unconditionally, without the slightest exception, hook, line, and sinker, completely/ totally/ utterly/ sure as hell, the entire world of life forms ever existing on earth including man and thus, in the approving words of John C. Avise, Distinguished Professor of Ecology & Evolution, University of California, Irvine (1998, p. 208), "Natural selection comes close to omnipotence"5, and professor Christopher Exley (2009, p. 589) from Keele University is, indeed, convinced that "both the beauty and the brilliance of natural selection are reflected in its omnipotence to explain the myriad observations of life" (vitally in agreement with Dawkins, Coyne, Futuyma, Todd, Ayala, Mayr and many other renowned evolutionary authors; see below).

See please discussion in http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf

Prof. Ferdinand Schmidt has stated on such Neo-Darwinian 'statements of faith' (that I would call it) the following comment:

"Neo-Darwinism has replaced a divine creator with the god of chance, who is just as omnipotent, omniscient and omnipresent. He can do anything: He makes countless of the most amazing inventions. He knows everything: He sovereignly masters all biochemical, biophysical and biological laws and far outshines all scientific achievements in these fields. He is in action everywhere and yet he is invisible - invisible and incomprehensible in the truest sense of the word. Even his origin resembles that of a god: he too is immortal and has always been there."

Some similar questions like those formulated for the origin of sexual dimorphism in Lophornis gouldii above may now be raised for Ensifera ensifera (the sword-billed hummingbird). Let's first have a look again on the differences of bill length between a 'normal' hummingbird and the sword-billed hummingbird, whose "most distinctive feature of the species (both sexes) is the enormous bill, which is 8–12 centimetres long".



Just to focus on the origin of this enormous bill and its corresponding long tongue: One tiny fraction of a tenth of a millimeter at a time to develop this extraordinarily long bill, one step after the other (including again a loss of ca. 98%) in millions of years - but now definitely not selected by the females in opposition to natural selection, but according to the theory in the present case by just 'pure' natural selection alone. For "males have shorter bills but longer wings and tails than females". Should we now assume that the males have regularly chosen those females with longer beaks than they displayed themselves showing "white underparts and grayish throats and bellies speckled with green. The tail is less deeply forked and is edged grayish white". And what about the co-evolution of the tongue, without which the mighty bill would be all in vain? Nerves, muscles and instincts co-evolved them exactly at the right time and direction? Moreover, for our discussion it should not be neglected that – although the extremely long bill helps the species feed on flowers with long tubular corollas – the long bill beak poses some stark difficulties for the bird:

As the convinced Darwinian Sir David Attenborough (whom I appreciate for his extraordinarily fine documentations) mentions the following points: "But having a beak longer than your body does have its drawbacks. For a start it's tricky to keep it clean. Harder still, how do you preen your body feathers. Unlike the other hummers, sword bills can't reach their feathers with their beak [showing in the video how the others do it]. The only option a good old scratch. It is a little unrefined, but a small price to pay for an exclusive food supply."35

³⁸ Ferdinand A. Schmidt, Professor at the University of Heidelberg, Germany. Quotation from *BIOLOGY TODAY* August 1989, p. 3. Original German text: ", Der Neodarwinismus hat an die Stelle eines göttlichen Schöpfers lediglich den Gott Zufall gesetzt, der ebenso allmächtig, allwissend und allgegenwärtig ist. Er kann alles: Er macht unzählige der erstaunlichsten Erfindungen. Er weiß alles: Er beherrscht souverän alle biochemischen, biophysikalischen und biologischen Gesetze und stellt alle wissenschaftlichen Leistungen auf diesen Gebieten weit in den Schatten. Er ist überall in Aktion und ist doch unsichtbar - unsichtbar und unfassbar im wahrsten Sinne des Wortes. Sogar seine Herkunft gleicht der eines Gottes: Auch er ist unsterblich und war schon immer da." For his curriculum vitae, see: https://www.kipnis.de/index.php/alexander/kurzbiografien/208-schmidt-ferdinand-1923-2006-mediziner-krebsforscher

Similarly, the zoologist Robert Nachtwey: According to [Darwin's theory], blind chance is said to have not only produced the first living cell with the wonderful mechanism of its metabolism with the ability to choose, adapt and reproduce [in selected small steps], but this dead, blind and mindless majesty "chance" is also called considered the originator of all the countless, magnificent blueprints of living creatures, including humans. Mere chance is said to have constructed the nervous systems of animals so ingeniously that their rational actions, which we call "instincts," must necessarily proceed like the movements of a machine. Darwin explained instinct as an "inherited modification of the brain". Small, random changes in the nervous system are said to have caused a change in habits. Of course, just as many (indeed even more) senseless habits as useful ones would have arisen in this way. According to Darwin, the struggle for existence by eliminating the unsuitable did everything else to create the unified, consistent instinctual action out of this chaos of diverse and contradictory habits. This is quite

unbelievable, because this struggle can only eradicate inferiority, but it cannot put together a harmonious action out of thrown together habits. The strangest miracle, which Darwin in no way explained, is that with these random changes in the nervous system there was always a change in all of the organs and body fluids that the animal had to use in its new habits. Should we also believe in this fabulous coincidence? Such a "coincidence" would be the greatest sorcerer of all time. For the original German text, ³⁹ See please Attenborough's BBC documentation *The World's Longest Beak*: https://www.youtube.com/watch?v=7xRxpicxeFQ

Also, Victoria Restrepo in *Nature Documentaries* added: "This amazing bird stands with its head angle upwards to reduce the strain of [relatively] heavy beak and to improve balance"⁴⁰



Studying this enormous beak more carefully (*cf.* also larger picture above) it is obvious that the development of this relatively huge beak requires a great deal of energy and 'material' for this small bird: "Bird bones are relatively thin, but are stiff and dense compared to mammal bone." Bone composition: "Inorganic matrix: Bone mineral content = bone ash is approximately 55-

65% of bone by dry weight. Consists of hydroxyapatite, which has the chemical formula Ca5(PO4)3(OH) and is a crystal produced by calcium and phosphorus. It is the major component of bones and teeth and provides strength and hardness. Organic matrix (35%) = protein which is mostly type 1 collagen, which gives bone flexibility.^{v41} But what about netar, hummingbirds' primary food source? "*The main ingredients in nectar are sugars in varying proportions of sucrose, glucose, and fructose*.^{v42} Although minority of additional componants are found in nectar – this is certainly not the best starting point to built such an enormous beak. It almost as if this feature has been regularly generated/developed *against the constaints of natural selection*. This may also may partly explain *the strong variation of 8–12 centimetres* in bill length. However, we should also consider the factor "modification" ("a nonhereditary change in an organism; e.g., one that is acquired from its own activity or environment"⁴³) – an very important, critical, far reaching factor, which has often been totally neglected in publications on the topic of character variation in natural populations.

Concerning Attenborough's "A small price to pay for an exclusive food supply?" Well, first: It is definitely not exclusive! There are *many other hummingbird species using a different method to get hold of the sweet nectar*: They do so by puncturing the base of the flower tube drinking the nectar directly without any detour of its beak into the tube. Carlos Lara and Juan Francisco Ornelas enumerated the following nectar robbers: "Species of *Aglaiocercus, Anthracothorax, Chalybura, Chlorostilbon, Chrysolampis, Colibri, Eulampis, Eupherusa, Heliothryx, Thalurania, and Trochilus* are *consistently reported to act as nectar robbers* [long list of authors]."⁴⁴

And what do we know on the importance to "preen your body feathers", which has been lost in the sword-billed hummingbird? "Because feathers are critical to a bird's survival – contributing to insulation, waterproofing and aerodynamic flight – birds spend a great deal of time maintaining them." And:

"Displaced feathers can cause birds considerable trouble; such feathers might become damaged, could interrupt the smooth flow of air over a flying bird, or might allow the bird's body heat to escape. Preening allows a bird to reposition such displaced feathers. There is evidence that filoplumes, specialised feathers buried under a bird's outer covering of contour feathers, help to

⁴² https://en.wikipedia.org/wiki/Nectar
⁴³ https://www.biologyonline.com/dictionary/modification

⁴⁰ Victoria Restrepo: https://www.youtube.com/watch?v=cmO23N9GqHM (retrieved 16 January 2024)

⁴¹ Rob Porter (2012) https://www.pheasant.com/resources/avian-skeletal-system (retrieved 17 January 2023). See also https://en.wikipedia.org/wiki/Beak: **Development**: The beak of modern birds has a fused premaxillary bone, which is modulated by the expression of *Fg/8* gene in the frontonasal ectodermal zone during embryonic development. The shape of the beak is determined by two modules: the prenasal cartilage during early embryonic stage and the premaxillary bone during later stages. Development of the prenasal cartilage is regulated by genes *Bmp4* and *CaM*, while that of the premaxillary bone is controlled by *TGFβlr*, *β*-catenin, and *Dickkopf-3*. *TGFβllr* codes for a serine/threonine protein kinase that regulates gene transcription upon ligand binding; previous work has highlighted its role in mammalian craniofacial skeletal development. *β*-catenin is involved in the differentiation of terminal bone cells. *Dickkopf-3* codes for a secreted protein kinase that regulates gene transcription upon ligand binding; previous work has highlighted its role in mammalian craniofacial development. The combination of these signals determines beak growth along the length, depth, and width axes. Reduced expression of *TGFβllr* significantly decreased the depth and length of chicken embryonic beak due to the underdevelopment of the premaxillary bone. Contrarily, an increase in *Bmp4* signaling would result in a reduced premaxillary bone due to the overdevelopment of the premaxillary, which takes up more mesenchymal cells for cartilage, instead of bone, formation. "(Also retrieved 17 January 2023)

⁴⁴ See the full original paper at: Carlos Lara and Juan Francisco Ornelas (2001), written from their sectionist point of view:

 $https://www.researchgate.net/publication/226556678_Preferential_nectar_robbing_of_flowers_with_long_corollas_Experimental_studies_of_two_hummingbird_species_visiting_three_plant_species:$

[&]quot;We compared two hummingbird species with similar bill lengths (*Lampornis amethystinus* and *Colibri thalassinus*) visiting floral arrays of artificial flowers with exaggerated corolla lengths, and also evaluated how the birds extract nectar rewards from medium to long corollas of three hummingbird-pollinated plants (*Salvia mexicana, S. iodantha* and *Ipomoea hederifolia*).... Nectar robbing was not observed on short-corolla flowers of *Salvia* spp., but robbing negatively affected seed production of long-tubed flowers of *I. hederifolia*. *Significant differences between hummingbird species in the use of this behavior were observed, but males and females behaved alike*. We suggest that short-billed hummingbirds with enlarged bill serrations (the edge of both tomia finely toothed) may have an advantage in illegitimately feeding at long-corolla flowers. This raises the possibility of counter-selection on increasing corolla length by nectar robbers." From the Introduction: "Long floral tubes (corollas) have been traditionally viewed as a floral adaptation for pollination by long-tongued and long-billed pollinators (Darwin 1859, 1877; Feinsinger and Colwell 1978; Stiles 1981; Feinsinger 1983). In this view, longer corollas are favored because pollinators remove more pollen grains from them (Darwin 1862; Wolf et al. 1976; Nilsson 1988; Fenster 1991). However, *this situation may be complicated by visitors that extract nectar by piercing floral tissues without contacting the anther and stigma* (nectar robbing; Feinsinger et al. 1987; Ornelas 1994; Navarro 1999; Maloof and Inouye 2000). Short-billed hummingbirds often obtain the nectar of flowers by making perforations at the base of the corolla tube or using a hole already made by insects and birds [long list of references]. Insofar as birds preferentially rob flowers with longer corollas, from which they cannot efficiently extract nectar through the corolla mouth, they may have played a role as a selective force countering corolla lengation."

[&]quot;Skutch (1954) stated that nectar robbing is quite a rare behavior among tropical hummingbirds, but species of Aglaiocercus Anthracothorax, Chalybura, Chlorostilbon, Chrysolampis, Colibri, Eulampis, Eupherusa, Heliothryx, Thalurania, and Trochilus are consistently reported to act as nectar robbers [long list of authors]."

signal when contour feathers have been displaced. Mechanoreceptors at the base of the filoplumes only fire when contour feathers are displaced or the filoplume moves. Preening enables birds to remove dirt and parasites from their plumage, and assists in the waterproofing of feathers. During moult, birds remove the sheaths from around their emerging pin feathers while preening.

.... Because feathers are critical to a bird's survival – contributing to insulation, waterproofing and aerodynamic flight – birds spend a great deal of time maintaining them. When resting, birds may preen at least once an hour. Studies on multiple species have shown that they spend an average of more than 9% of each day on maintenance behaviours, preening occupying over 92% of that time, though this figure can be significantly higher. Studies found that some gull species spent 15% of daylight hours during the breeding season preening, while another showed that common loons spent upwards of 25% of their day preening. In most of the studied species where the bird's sex could be determined in the field, males spent more time preening than females, though this was reversed in ducks."⁴⁵

Is this enormous loss in the sword-billed hummingbird really just "a small price to pay for an exclusive food supply?" Well, as we have seen, their food supply is not exclusive and obviously they have to pay high price just for this loss of preening. And a "good old scratch" is definitely not an adequate compensation for this deficiency.

Moreover, as to the first point mentioned by David Attenborough: "But having a beak longer than your body does have its drawbacks. For a start *it's tricky to keep it clean*." Wildlife biologist Kirk A. Janowiak answers the general question. "Why do birds rub their beaks?" as follows:

"Eating with a beak means that stuff will stick to the beak no matter how careful you are. Birds rub the beak to clear the beak of leftovers, bits and pieces of food that may get stuck on the edges, hulls of seeds that get wedged onto the edges of the beak, and the dried blood and guts from insects and other animals that some birds may eat."⁴⁶

Now can all these drawbacks (head angle upwards to reduce the strain of the heavy beaks; many other hummingbird species using a different method to get hold of the sweet nectar in plants with long tubular corollas; loss of body preening, tricky to keep 'your beak' clean?) in *Ensifera ensifera* actually be explained by the assumed process of natural selection? – And why then do the males have shorter bills than the females when, as is commonly/time and again asserted:

"The sword-billed hummingbird displays **extreme coevolution with the passionflower** *Passiflora mixta*. The two species evolved together during the early radiation of the subgenus *Tacsonia*, because the species exclusively pollinated *P. mixta*. The position of the flower's anthers and stigmas, along with the length of the corolla tube, make it an **inaccessible food source to nearly every species except the sword-billed hummingbird**. This mutualistic relationship lets *P. mixta* depend on the bird for pollination, *while the bird obtains a high-quality food source*. To obtain nectar, the hummingbird will stick its long bill down the tube of the corolla (**both of which are almost exactly the same length**), drink, and then retreat and hover for a few seconds before repeating the process.³⁴⁷

As the as the attentive reader will have already noticed, the paragraph contains several questionable statements: "...while the bird obtains a high-quality food source" – the nectar? (See note on the nectar above.) Or does it eat also much pollen?

"Hummingbirds *do not directly consume pollen*, but a great deal of pollen can be stuck to their tongues and bills when they sip nectar from flowers. Some of that pollen is ingested, and it can be a minor source of protein even though it wasn't directly eaten. ... Nectar does not, however, meet hummingbirds' needs for protein, amino acids, and different vitamins and minerals, and they must eat other things to have a balanced and healthy diet. ... *Small insects, larvae, insect eggs, and spiders are critical food sources for hummingbirds. Insects provide the fat, protein, and salts the birds cannot derive from nectar, and these are crucial nutritional components, especially for rapidly growing hatchlings.* Hummingbirds may hunt insects in several ways, including gleaning or picking them from bark, flowers, or leaves; hawking them in midair; or plucking them from spider webs or sticky sap. To get the required amount of protein for a healthy diet, an adult hummingbird must eat several dozen insects each day. They will eat many more, however, if they need to regurgitate this nutritious food to hungry hatchlings, or if they are in the midst of a long migration.

... Certain ripe or juicy fruits may attract hummingbirds. Hummingbirds have been known to discreetly sip the juices from berries, apples, pears, and oranges if they are peeled, cut open, or if the flesh is otherwise exposed.³⁴⁸

And, is it just *Passiflora mixta* from which the sword-billed obtains its nectar? Well, "it is known to feed from flowers with long pendant floral tubes including probably *Brugmansia*, *Columnea*, *Datura sanguinea*, *Datura tatula*, *Fuchsia*,

⁴⁵ https://en.wikipedia.org/wiki/Preening

⁴⁶ https://www.quora.com/Why-do-birds-rub-their-beaks

⁴⁷ https://en.wikipedia.org/wiki/Sword-billed_hummingbird (all retrieved 17 January 2024)

⁴⁸ Melissa Maynitz (2022): https://www.thespruce.com/what-do-hummingbirds-eat-386568

Passiflora mixta, *P. parritae*, *P. tripartita* var. *mollissima*, *P. tarminiana*, *P. pinnatistipula*, *Salpichroa & Solanum*. When it feeds its neck or head will be dusted with pollen & sometimes it will perch below the flowers when feeding. As nectar is low in protein it also feeds on insects, catching them in the same way as a swift in flight."⁴⁹

Does the "extreme coevolution" with the passionflower *Passiflora mixta* also apply to all the other plant species mentioned above? In that case this one species of hummingbird with its so extraordinarily long beak probably would have had to do much more than it would have been capable to manage.

Also, as shown in the respective figure above⁵⁰, *E. ensifera*, feeds not only on angiosperms developing flowers with long tubes *but also on shorter ones*.

Moreover, "by applying molecular phylogenetics and a so-called molecular clock, Renner and her colleagues Stefan Abrahamczyk (now at the University of Bonn) and Daniel Souto-Vilarós were able to show that the dependency of *Tacsonia* species on *Ensifera ensifera* for pollination *has been lost several times* over the course of a relatively brief period, geologically speaking."⁵¹

Now let's turn briefly to (4) Sappho sparganurus (the red-tailed comet):



As shown above, this is a very strong case of sexual dimorphism and one could repeat – in principle – the questions raised for *Lophornis gouldii* (the dot-eared coquette):

One tiny fraction of a tenth of a millimeter at a time to develop *now a very different feature*. Namely the "*deeply forked, spectacular, long, iridescent, golden-reddish tail, longer than the length of the body*", one step after the other (including a loss of ca. 98% of the steps), in millions of years selected by the females **in opposition to natural selection**?" And what happened to the nerves, muscles and instincts to move them at the right time and in the most effective direction? And what about the first steps, which would have hardly been seen (or even been invisible) in the beginning of their continuous evolution? So, we have also to assume that the female, due to a highly unusual series of mutations "for which there is not the slightest evidence" has obtained a special preference for males with long decorative tail feathers in very different but specific colours, forms, substructures, patterns and places?

"For the species as a whole, there is no recognizable selection advantage for such mutations. On the contrary: conspicuously coloured males preferentially fall victim to their enemies".

(Up to 21 Feb.) Furthermore, it would *not be easy to argue* that most of these characters were *not* developed from scratch – yet, they are often so totally different (position, very different but specific colours, forms, substructures, patterns) that *it would be in vain to postulate a common developmental starting point for them all.*

Now, let's return to our first example - *Eutoxeres* - mentioned and partly discussed above, extending it on the basis of the three additional examples, which we have just dealt with in some detail.

For *E. aquila* and *E. condamini* the same or very similar questions now arise due to the prevailing Neo-Darwinian view of continuous evolution with almost innumerable transitional forms both for the nectar-producing host plants (as of the genus *Heliconia*) and for the *Eutoxeres* hummingbirds: The improbable postulate of parallel but assumed completely independent random mutations in the animal and plant kingdoms with barely perceptible or even invisible effects on the phenotype, which are supposed to have led to perfect mutual adaptation/synorganization, much like a key fitting the perfectly designed lock for it – until the beak was so crooked

⁴⁹ https://www.passionflow.co.uk/hummingbirds-passion-flower-passiflora-pollinators/

⁵⁰ Middle row in the middle.

⁵¹ https://newsofbird.wordpress.com/2014/10/08/escape-from-an-evolutionary-cul-de-sac/

(as shown above) and the corresponding flowers had achieved the corresponding form and function we find established today, now becoming *largely dependent* for their reproduction on certain hummingbirds (is such a dependency really a selective advantage?). How probable, or rather improbable, are the postulated immense numbers of random mutations, which often could not even have been be perceived by natural selection or lost by genetic drift.

Let us recall that the *Neutral Theory*, a theory that is so strongly opposed to Neo-Darwinism and that had worried it so much that many of its protagonists felt compelled to refute this approach as thoroughly as possible. However, the Darwinian counter arguments largely failed, so that even strong advocates of the Synthetic Theory (like Deborah and Brian Charlesworth⁵²) have taken part to defend the Neutral Theory to a certain degree⁵³.

To illustrate some of the basic problem for "omnipotent selection"⁵⁴, I would like to briefly focus the reader attention to Chapter 15 of my book on the origin of the domestic dog, namely *Copy Number Variants/Variations* (CNVs) und *Single Nucleotide Polymorphisms* (SNPs), as well as short indels, pp. 150 to about 183/184.

Already in 2008, Cruz et al. have published the following numbers just for some wolves and dog races:

"Uniquely placed sequence reads from pooled DNA representing **12 wolves of worldwide distribution and 60 dogs from 14 diverse breeds** (Supplementary Table 1) covered 91.6% and 94.6%, respectively, of the 2,385 megabases (Mb) of **autosomal** sequence in the CanFam 2.0 genome assembly11. The aligned coverage depth was 29.83 for all dog pools combined and 6.23 for the single wolf pool (Supplementary Table 1 and Supplementary Fig. 1). We **identified** <u>3,786,655 putative single nucleotide</u> <u>polymorphisms</u> (SNPs) in the combined dog and wolf data, **1,770,909** (46.8%) of which were only segregating in the dog pools, whereas **140,818** (3.7%) were private to wolves (Supplementary Table 2). Similarly, we <u>detected 506,148 short indels</u> <u>and 26,619 copynumber variations</u> (CNVs) (Supplementary Files 1 and 2). We were able to experimentally validate 113 out of 114 tested SNPs (Supplementary Table 3 and Supplementary Discussion, section 1)."

Well, no selection could control such high frequency changes in detail. And this appears to be generally true for almost all species around the globe. Just to have a look at humans (2023/2024):

"In genetics and bioinformatics, a single-nucleotide polymorphism (SNP /snip/; plural SNPs /snips/) is a germline substitution of a single nucleotide at a specific position in the genome that is present in a sufficiently large fraction of considered population (generally regarded as 1% or more). ... More than 600 million SNPs have been identified across the human genome in the world's population. A typical genome differs from the reference human genome <u>at 4 to 5 million sites</u>, most of which (more than 99.9%) consist of SNPs and short indels.⁵⁵

"Copy number variation (CNV) is a phenomenon in which sections of the genome are repeated and the number of repeats in the genome varies between individuals. Copy number variation is a type of structural variation: specifically, it is a type of duplication or deletion event that affects a considerable number of base pairs. Approximately two-thirds of the entire human genome may be composed of repeats and <u>4.8–9.5% of the human genome can be classified as copy number variations</u>. In mammals, copy number variations play an important role in generating necessary variation in the population as well as disease phenotype.⁵⁶

"An **indel** is a short polymorphism that corresponds to the addition or removal of a small number of bases in a DNA sequence. Indels are quite abundant, although not quite as abundant as SNPs. It is estimated that there are <u>1-2 million short indels</u> segregating at low to high frequency in modern human populations. The vast majority of indels occur in short tandem repeats."⁵⁷

⁵² See, for example http://www.weloennig.de/ExplosiveOrigins.pdf p. 5

⁵³ The importance of the Neutral Theory in 1968 and 50 years on: A response to Kern and Hahn 2018

Jeffrey D. Jensen et al 2018/2019 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6496948/

 ⁵⁴ http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf
 ⁵⁵ https://en.wikipedia.org/wiki/Single-nucleotide_polymorphism (retrieved 6 February 2024)

⁵⁶ https://en.wikipedia.org/wiki/Copy_number_variation (also retrieved 6 February 2024)

⁵⁷ https://genome.sph.umich.edu/wiki/Indel (retrieved 6 February 2024 as well)

And this is, in principle, also true for birds.⁵⁸

To reemphasize: With these huge numbers, running into the **hundreds of thousands** <u>and millions</u>, it is absolutely incomprehensible that selection, postulated as being "omniscient", should control all such small changes, as Darwin and the Neo-Darwinists have been emphatically demanding for more than 150 years⁵⁹.

The majority of these mutations, i.e. over 99.999%, now **fall into the 100% completely neutral range**, apart from the fact that mutations with invisible effects on the phenotype did not seem convincing to me from the outset to explain new complex anatomic and physiological – often irreducible complex – features like the bacterial flagellum and the trap of *Utricularia vulgaris* and many others.

Back to natural selection: As has already been emphasized repeatedly, 98% of mutations with a 1% selection advantage are lost again due to genetic drift. And such a mutation would have to appear recurrently around 50 times in order to become established in a population. And this would occur intermittently at long intervals regularly substituting entire populations.

Moreover, it must also be taken into account that these mutations *would be distributed over differential time and space in large populations*. It is usually not possible for them to occur additively in one and the same small population, as the probability of 50 such intermittently sequential occurrences would hardly be given there⁶⁰.

Genetically, there are also much deeper problems for Neo-Darwinism, but many more scientific arguments for intelligent design than I have pointed out so far.

⁵⁸ https://onlinelibrary.wiley.com/doi/abs/10.1046/j.0962-1083.2001.01452.x

http://www.wildlifegenetichealth.org/projects-research/hummingbirds/

As for the differences in our hummingbird examples (sexual dimorphisms, morphological and anatomic as well as (complex) physiologic distinctions between species and genera) shown and discussed in some detail above – none of them have been shown so far to be due to mutant alleles, SNPs, CNVs and/or indels However, certain alleles and SNPs could perhaps be important for adaptation to differences in altitude – such as for hummingbirds in the Andes. For the enforcement of such alleles, however, the above-mentioned findings of mutation and population genetics naturally also apply. Note please especially the waiting time problem https://www.sciencedirect.com/science/article/pii/S0022519321000795 https://evolutionnews.org/2022/09/fossil-friday-walking-whales-and-why-all-critiques-of-the-waiting-time-problem-fail/: https://www.youtube.com/watch?v=G6PpVwJTNrI From an evolutionary point of view: https://inference-review.com/article/haldanes-dilemma (2015). From the viewpoint of Message Theory, see Walter James ReMine in THE BIOTIC MESSAGE (1993). ⁵⁹ *Cf. perhaps again the detailed documentation* in http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf ⁶⁰ The following points from Stephen C. Meyers's bestselling book DARWIN'S DOUBT (HarperOne 2013, pp.144/145 and p. 146) on the topic of punctuated

⁶⁰ The following points from Stephen C. Meyers's bestselling book DARWIN'S DOUBT (HarperOne 2013, pp.144/145 and p. 146) on the topic of punctuated equilibrium in connection with large and small populations appear especially relevant in this context: "The late-Precambrian and Cambrian fossil records present another difficulty for punctuated equilibrium. Though Gould and Eldredge envisioned new traits

[&]quot;The late-Precambrian and Cambrian fossil records present another difficulty for punctuated equilibrium. Though Gould and Eldredge envisioned new traits becoming fixed in small isolated populations where speciation eventually occurs, *they envisioned these traits first arising during periods of stasis in the large populations from which the smaller populations later separated.* Gould realized that only stable large populations would afford enough opportunities for mutations to generate the new traits that macroevolution requires. At the same time, he recognized that these new traits would have a far greater chance of *being fixed* into small, isolated populations where the random loss of some traits makes the fixation of others more likely [...] By relying on large populations to generate enew traits and small populations to fix them throughout a population, Gould wanted to provide both a plausible (if finely tuned) mechanism to explain both macroevolutionary change and the absence of fossil intermediates. The late University of Chicago paleontologist Thomas J. M. Schopf described the balance this way, under punctuated equilibrium, evolution proceeds "in populations large enough to be reasonably variable, but small enough to permit large changes in gene frequencies due to random drift."

By relying on the accumulation of new traits within large parent populations, Gould undercut his own rationale for concluding that the fossil record should not preserve many intermediate forms. The reason for this is obvious: if large numbers of novel genetic traits arise within a large population of organisms, they should eventually be expressed in different combinations within new organisms in the population. Organisms with new and unique combinations or mosaics of traits represent nothing less than new forms of life. Such organisms possessing different combinations of novel genetic traits should eventually leave behind fossil evidence of their existence, especially if they come from large, long-lived populations, even if the traits they embody do not become fixed across the whole of the population in which they arise. Thus, the process by which Gould envisions new genetic traits arising in large populations implies that new forms of life—some presumably transitional to other forms—should be commonly preserved in the fossil record. *Yet the Precambrian fossil record fails to preserve such a wealth of biological experiments during the long periods of relative stability in large populations that Gould's theory envisions.*

^{.....} 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." (For all the references, see please the original work of Meyer.)

The Origin of the Hummingbird Family (Trochilidae)

Conclusions: As we have shown above, the Neo-Darwinian theory has already enormous problems to convincingly explain the usually astonishing differences between the species and genera within the family Trochilidae. Now, if the Synthetic Theory cannot even explain the often strong differences between the hummingbirds themselves (not to speak about their sexual dimorphism), so what then can we expect when it comes to the origin of the entire family – this anatomically and physiologically so well-defined group of birds without any *continuous* series of intermediate forms⁶¹ to any other group of birds?

Since many people, especially young ones, first check the Wikipedia when looking for information about a topic they are especially interested in, let's have a closer look at the article about evolution of the hummingbirds in The Free Encyclopedia, which is a source so many people rely on. Most of these statements there are in full agreement with scientific literature on these questions, which is usually also referred to:

"Evolution Hummingbirds split from other members of Apodiformes, the insectivorous swifts (family Apodidae) and treeswifts (family Hemiprocnidae), about 42 million years ago, probably in Eurasia⁶². Despite their current New World distribution, the earliest species of hummingbird occurred in the early Oligocene (Rupelian about 34-28 million years ago) of Europe, belonging to the genus Eurotrochilus, having similar morphology to modern hummingbirds."63

How do the authors of the Wikipedia, as well as those of the respective scientific ornithological papers being in agreement with these statements, know that the "Hummingbirds split from other members of Apodiformes, the insectivorous swifts (family Apodidae) and treeswifts (family Hemiprocnidae), about 42 million years ago, probably in Eurasia"?

Well, they have, of course, never seen it, most of them have never ever critically checked the basic data of the evolutionary theory, so *they don't really know it*. They simply presuppose as an indubitable/undeniable fact the idea of the entire evolution of all life forms by natural selection of mutations with 'slight or even invisible effects on the phenotype', evolution by Darwin's "infinitesimally small changes" etc. (cf. perhaps footnote below again), the assumed truth of evolution - which is "not only a gradual process as a matter of fact", but "has to be gradual if it is to do any explanatory work" (see Dawkins above).64

In the face of an uninterrupted suggestive chain of factual assertions ("evolution is a fact, Fact, FACT"⁶⁵, etc.) in combination with a systematic

⁶¹ Although even a series of morphologically intermediate forms would not necessarily be the same as a series of evolutionary transitional forms.

⁶² See also https://www.sciencedaily.com/releases/2014/04/140403132207.htm McGuire: "The new, time-calibrated evolutionary tree shows that ancestral hummingbirds split from the swifts and treeswifts about 42 million years ago, probably in Eurasia." The full text and figures of the original paper by J. A. McGuire et al. (2014) here https://www.cell.com/current-biology/fulltext/S0960-9822(14)00275-9?_returnURL Yet, *cf.* also https://pubmed.ncbi.nlm.nih.gov/29245495/: "The generic nomenclature of the hummingbirds is unusually complicated. McGuire et al.'s (2014) recent phylogeny of the Trochildae based on DNA sequence data has greatly clarified relationships within the family but conflicts strongly with the traditional classification of the family at the genus level, especially that of the largest and most recently derived clade, the Trochilini or "emeralds". We'll see whether the results of McGuire et al will be the last word on this problem. For often, when several independent molecular studies in other organisms have been made - the DNA results strongly contradicted each other. See examples in S. C. Meyer (2013): Darwin's Doubt. And J. Wells (2022): https://evolutionnews.org/2022/02/top-scientific-problems-with-evolution-molecular-phylogeny/ "In 2005, three biologists who compared 50 DNA sequences from 17 animal groups concluded that "different phylogenetic analyses can reach contradicting inferences with [seemingly] absolute support." In 2012, four evolutionary biologists reported "incongruence between phylogenetic contradicting inferences with [seemingly] absolute support." In 2012, four evolutionary biologists reported "incongruence between phylogenetic conflict-is-common-and-the-hierarchy-is-far-from-perfect/ "The scientific literature is replete with conflicts among evolutionary trees, where phylogenetic analysis of different genes in the same group of plants, animals, or other organisms generate conflicting family trees." Or p.125 of http://www.weloenig.de/Uricrularia2011Buch.pdf (long footnote) ⁶³ https://en.wikipedia.org/wiki/Hummingbird. - A different taxonomy has been presented by Charles Sibley and John E. Ahlquist: "Traditionally, the bird order

Apodiformes /'appadiformiz/ contained three living families: the swifts (Apodidae), the treeswifts (Hemiprocnidae), and the hummingbirds (Trochilidae). In the Sibley-Ahlquist taxonomy, this order is raised to a superorder Apodimorphae in which hummingbirds are separated as a new order, Trochiliformes. With nearly 450 species identified to date, they are the most diverse order of birds after the passerines. (Both retrieved 21 February 2024).

⁶⁴ Recall please also that according to this theory of Dawin and today's Neo-Darwinians the origin of species (and, in fact, of all life forms including, of course, our humming birds) arose "...by selection 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" etc. ⁶⁵ https://www.discovery.org/v/darwin-dissenters-speak/

devaluation of all critics⁶⁶ of this view – no matter how well-founded the criticism is from a purely scientific point of view and no matter how well founded the alternative of intelligent design has been presented – most scientific authors actually no longer even think of questioning the foundations of the theory of evolution and thoroughly analyzing works such as those by Michael J. Behe, Stephen C. Meyer and others⁶⁷.

Well, let's first briefly turn to the fossil record for our topic of the Origin of the Hummingbird Family (Trochilidae):

Although the probability to detect a rich fossil record of the hummingbirds appears to be very small from the outset, some very interesting discoveries have, nevertheless, been made⁶⁸:



Let's first have a look at the paleontologically oldest fossils constituting the genus *Eurotrochilus*⁶⁹.

⁶⁸ Data according to https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39427&is_real_user=1 (retrieved 21 February 2024)

⁶⁶ Recall perhaps from http://www.weloennig.de/HumanEvolution.pdf pp. 5/6 first citing **Ulrich Kutschera** on the origin of humans (2019): "... it is possible to present a plausible16 account of the fossil record as well as of DNA sequence analyses ... on the human ancestry of an ape-like Urform that lived in the African jungle 6 to 8 million years ago. *There is absolutely no doubt whatsoever, unless ideological concerns are brought in*." And in this connection of "ideological concerns", I'm especially fond not only of **Richard Dawkins**' often quoted verdict that those who do not accept his lines of logic and evidences for gradual macroevolution (and let's please keep in mind that he virtually always speaks of macroevolution) are "ignorant, stupid or insane (or wicked, but I'd rather not consider that)", but also of his later qualifications of this assessment: "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." Moreover, according to Dawkins ("named world's top thinker in pol" 2013) "...history deniers who doubt the fact of evolution are ignorant to fology". Topping his formidably amusing ratings of his scientific critics – in the context of assigning them to a worst category than holocaust deniers – he, moreover, exploded in the following barrage of assertions (dwarfing the rhetoric of preachers like the late Billy Graham almost beyond recognition): "Evolution is a fact. Beyond reasonable doubt, beyond serious doubt, beyond sane, informed, intelligent doubt, beyond doubt evolution as a fact. The evidence for evolution is still of ardvarks and manatees, yet more distant cousins of chimpanes, somewhat ant of monkeys, more distant cousins still of ardvarks and manatees, yet more distant cousins of bananas and turnips... continue the litas a long as desired." Or: "The number of clues, the sheer weig

⁶⁷ Most evolutionary scientists have, in fact, never rigorously studied the books and articles by Douglas Axe, Günter Bechly, Michael J. Behe, David Berlinski, Tom Bethell, William A. Dembski, Michael Denton, Marcos Eberlin, Phillip E. Johnson, Matti Leisola, Wolf Ekkehard Lönnig, Casey Luskin, Stephen C. Meyer, J. P. Moreland et al. (eds.), Walter James ReMine, Paul Nelson, John C. Sanford, Siegfried Scherer, Granville Sewell, David W. Swift, James Tour, Jonathan Wells, and many others.

⁶⁹ https://en.wikipedia.org/wiki/Eurotrochilus (first retrieved by W.-E. L. 21 February 2024). See also, for example, https://www.spektrum.de/news/unerwarteterfund/719924 (2004). Gerald Mayr (2007): "*E. inexpectatus* is the earliest *long-beaked stem group hummingbird with hovering capabilities*,..."

https://link.springer.com/article/10.1007/s10336-006-0108-y And a somewhat critical summary here: http://www.si-

journal.de/index2.php?artikel=jg11/heft2/sij112-10.html (2004 last updated 2009).

In a rather well-documented article (2024) we are informed, among many other points, that "*extant hummingbirds are distinctly different than all other avians*" and:

"The discovery of *Eurotrochilus* fossils in **Germany**, **France**, and **Poland** was extremely important because today all 328⁷⁰ of the extant species of hummingbirds only occur in the New World but the fossils of **Eurotrochilus** suggest an Old World origin. *Extant hummingbirds are distinctly different than all other avians* because of their unique adaptions for hovering flight and nectarivory. Like extant hummingbirds, *Eurotrochilus* has these adaptions and are the only genus of stem group Trochilidae to do so."⁷¹

As for some notes on "description and paleobiology" of Eurotrochilus:

"Eurotrochilus specimens are some of the smallest fossil birds and are referred to the order Apodiformes due to their strongly abbreviated humeri and ulnae. They are most similar to another early Oligocene member of the stem-group Trochilidae, Jungornis. Both Eurotrochilus and Jungornis have morphological adaptations for sustained hovering flight, a characteristic of extant hummingbirds, including the Apodiform synapomorphy (abbreviated ulna and humerus) as well as pronounced distal protrusions on the humeral heads. These adaptions in Eurotrochilus are more pronounced though. Another difference is that Eurotrochilus have elongated beaks (unknown in Jungornis), which is evidence of nectarivory, the ability to consume nectar from flowers. Eurotrochilus are believed to be the first members of stem group Trochilidae to be able to perform nectarivory."

After some detailed points on nectarivory adaptations (skull and beak ca. 34 mm, beaks of *Eurotrochilus* greatly elongated, indication of rhynchokinesis/ability to flex the upper beak, long nasal openings and large hyoid bones "thought to support a long protractile tongue, which extant hummingbirds use to lap up nectar", so that "all of these adaptations *made it possible for Eurotrochilus to consume nectar from ornithophilous flowers*, its main source of nutrients, and to pollinate these flowers as well") we read concerning hovering flight adaptions:

"Hummingbirds have specific morphological adaptations that enable them to **fly forwards**, **backwards**, **sideways as well as hover for extended periods of time**. *Hovering flight specifically is supported in Eurotrochilus by abbreviated ulnae and humeri*⁷² and developed humeral protrusions. ... While Jungornis and Eurotrochilus both have abbreviated ulnas, the extreme abbreviation in Eurotrochilus supports monophyly of the clade that includes only Eurotrochilus and crown-group Trochilidae. Another synapomorphy of Eurotrochilus and crown-group Trochilidae includes the presence of deep fossae, or depressions, on the caudal surface of the proximal end of the ulnae."

And on "more primitive features":

"Despite the similarities between the two, crown group Trochilidae has a more derived morphology than *Eurotrochilus*, showing *Eurotrochilus* to be a stem group representative. These more primitive morphologies in *Eurotrochilus* include the bones of the hand (*carpometacarpus and distal phalanges*) being longer than the ulna, the *carpometacarpus lacking a dentiform process*, and the *presence of a small intermetacarpal process*."

Apart from the fact that I have already dealt with the term "primitive" analytically in some detail elsewhere (http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf pp. 267/269, 286-291, I would like to invite the reader to apply the principles of this analysis also on the statement just quoted above), one may ask the question whether there is not any variation in these anatomical features in the "approximately 366 species and 113 genera"⁷³ of the extant humming birds, – variation that would approach the "primitive" anatomical features of *Eurotrochilus*.

⁷⁰ Numbers of species vary in different articles and papers.

⁷¹ Here and the following quotations: https://en.wikipedia.org/wiki/Eurotrochilus

Regarding the statement that "Ecological competition with long-tongued bees for ornithophilous flowers is a suggested explanation for the extinction of *Eurotrochilus* and modern hummingbirds in Europe" I would refer the reader to PHYS ORG of 16 July 2014: For bees and flowers, tongue size matters, "Long-tongued bees are often specialists, favoring a few deep-throated flower species. In the bumblebee-sparse southern tip of Argentina, for example, *Bombus dahlbomii*, the native long-tongued giant of Patagonia, *has lost ground to a new bumblebee from Europe, the short-tongued generalist Bombus terrestris*, imported to help pollinate tomatoes." https://phys.org/news/2014-07-bees-tongue-size.html

⁷² "Most skeletal elements are preserved, and *Eurotrochilus* is well-characterised as an apodiform bird by its extremely abbreviated humerus and ulna which hummingbirds share with their closest relatives, the swifts. **There are no other, extinct or extant birds, in which these bones are equally shortened**." Gerald Mayr (2005, p. 14): Fossil hummingbirds in the Old World. *Biologist* **52**: 12-16. (Also interesting: p. 108: Although *Eurotrochilus* is a *'modern-type' hummingbirds and probably would have looked very similar to modern hummingbirds when seen alive*, it is not closely related to any particular modern hummingbird species." ⁷³ https://en.wikipedia.org/wiki/List_of_hummingbirds (retrieved 24 February 2024)

So, what do we know about the origin and evolution of the hummingbirds? Based on the facts known – not on the grounds of Neo-Darwinian speculations – can one honestly claim that they evolved "from other members of Apodiformes, the insectivorous swifts (family Apodidae) and treeswifts (family Hemiprocnidae)" in "a gradual process as a matter of fact" by "mutations with slight or even invisible effects on the phenotype", or in Darwin's formulations, by selection of "infinitesimally small changes", "infinitesimally slight variations" and "slow degrees", "steps not greater than those separating fine varieties", "insensibly fine steps" and "insensibly fine gradations" etc.? The reader will give the answer.

One might, of course, argue that the fossil record is – as expected for this family – very imperfect. Nevertheless, given the assumption of continuous evolution, I find it dramatically unexpected that now seven fossils of "*modern type hummingbirds*" (G. Mayr) have been found in Rupelian strata, dated to be 33.9 - 28.1 million years old. "The average lifespan of a ruby-throated hummingbird is estimated to be 3–5 years, with most deaths occurring in yearlings, although one banded ruby-throated hummingbird lived for 9 years and 2 months. Bee hummingbirds live 7–10 years."⁷⁴ So a *constancy* of key morphological characteristics for more than *2.8 million generations*.

Eurotrochilus is also "inexpectatus" from an evolutionary point of view.

In this context it appears to be also rather revealing that the Late/Upper Pleistocene – Holocene fossils (0.126 - 0.0) from the Bahamas belong to *Chlorostilbon ricordi*⁷⁵– a modern/extant hummingbird species⁷⁶, likewise also *Anthracothorax dominicus*⁷⁷– an extant species from the Dominican Republic.

So, what do we really know about the postulated evolution of the Trochilidae?

Well, Jillian Mock's⁷⁸ answer of (2018) is still fully up-to-date: "**The Origins of Hummingbirds Are Still a Major Mystery**":

"Since then [Gerald Mayr's first description of *Eurotrochilus inexpectatus* in 2004] at least six more hummingbird fossils have popped up in **Germany**, **Poland**, **and France**. The similarity between these fossils and New World hummingbirds could be an example of convergent evolution—when two species are not closely related yet develop similar traits over time by adapting to similar environments—*but McGuire and Mayr both believe the family probably originated in Eurasia and somehow migrated to the Eastern Hemisphere*. "It is still theoretically possible that those fossil hummingbirds are not really hummingbirds but another bird group," McGuire says. *But after closely comparing the morphology of the fossils to modern hummingbirds, he thinks convergent evolution is* "*unlikely*" *in this case*⁷⁹.

"That still leaves a **gaping hole in hummingbird history**, however. Modern hummingbirds evolved in the Americas around 22 million years ago, *according to McGuire's estimates*, but we don't have any fossils from the West that are older than 10,000 years ago⁸⁰. "We basically have no fossil material we can use" in the New World to figure out how to connect the dots, says McGuire.⁸¹

Concerning some basic statements on the fossil record, which are also relevant for the hummingbirds, I would like to kindly remind my readers of the following expositions given in http://www.weloennig.de/Hippo.pdf pp. 36/37:

⁷⁴ https://en.wikipedia.org/wiki/Hummingbird (retrieved 25 February 2024)

 ⁷⁵ https://en.wikipedia.org/wiki/Cuban_emerald
 ⁷⁶ Apart from some Trochilidae indet. (See Table above)

⁷⁷ https://en.wikipedia.org/wiki/Hispaniolan_mango (retrieved also 25 February 2024)

⁷⁸ Freelance science journalist https://twitter.com/jillianmock?lang=de (articles in Scientific American and Audubon, Time and others) https://jillianmock.com/
⁷⁹ Not only in this case. See the improbability by mutations and selection also, for instance, in the Thylacine, the *Tasmanian wolf* (German: Beutelwolf):

http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf pp. 217-223 and *dinosaurs* http://www.weloennig.de/SauropodDinosaur.pdf pp. 1, 11, 33/34.

 ⁸⁰ Well, some appear to be older- see Table above (Late Pleistocene: "It is currently defined as the time between c. 129,000 and c. 11,700 years ago." (Wikipedia and others)
 ⁸¹ https://www.audubon.org/news/the-origins-hummingbirds-are-still-major-mystery. See also (2021?) https://wildlatitudes.com/hummingbird-evolution-50-million-years-and-still-buzzing/ by evolutionary biologist (presupposing Neo-Darwinism and imagining an evolutionary story accordingly) Ivan C. Phillipsen https://www.scienceofbirds.com/about and his publications https://scholar.google.com/citations?user=y-60i3sAAAAJ&hl=de

If [it is] argued that the reason for this situation would be the imperfection of the fossil record, I would answer with two statements of the paleontologist Oskar Kuhn – statements, which have time and again been corroborated during the last more than 50 years⁸²:

"The prejudice that the phylogenetic history of life could only be an accumulation of the smallest variational steps and that a more complete knowledge of the paleontological documents would prove [the assumed] gradual evolution, is deeply rooted and widely accepted. But the paleontological facts have long spoken against this prejudice! Especially German paleontologists such as 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*".⁸³

So even if we had a much more perfect fossil record of the hippos [and hummingbirds], most probably we would still have the same situation: Abrupt appearance of new forms being constant over enormous periods of time – as has been shown in detail, for example, for the *Origin and Evolution of the Rhinos* (Family Rhinocerotidae)⁸⁴, the elephants: *Elephant Evolution: What Do We Really Know*?⁸⁵, and the giraffes⁸⁶. And as for the usually evolutionary practice – including cladistics with its special methods⁸⁷ – being applied worldwide to draw phylogenetic inferences:

"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 repeatedly pointed out the lack of logic in the above thought process. The same idea, according to him, was used interchangeably as assertion and as evidence. However, similarity can also be the result of a plan, and ...morphologists such as Louis Agassiz, one of the greatest morphologists that ever lived, attributed the similarity of forms of organisms to a creation plan, not to evolution."⁸⁸*

Kuhn commented in 1965, pp. 8/9 on the origin of birds:

"Whether a running, bipedal proavis (Nobsca) formed the transition, or a parachute animal, is unclear. **The birds also emerged explosively** and so the question is not very topical anyway."

Roughly 50 years later, in 2024, paleontologist Günter Bechly stated in his excellent article about "The Big Bang of Tertiary Birds and a Phylogenetic

⁸² To scientifically substantiate this statement, I would like to start with the book by Stephen C. Meyer (2013): Darwin's Doubt (https://www.amazon.de/Darwins-Doubt-Explosive-Origin-Intelligent/dp/0062071483). Also available on the internet.

⁽see also, for example, D. Klinghoffer et al. (2015): Debating Darwin's Doubt https://discoveryinstitutepress.com/book/debating-darwins-doubt/ and D. Coppedge (2023): https://evolutionnews.org/2023/08/in-resolving-darwins-doubt-these-cambrian-fossils-are-no-help/) and especially the series of excellent/detailed articles by paleontologist Günter Bechly up to the present: https://evolutionnews.org/author/gbechly/page/37/ (at present – 26 February 2024 – 37 articles). This just for a start. Hundreds of further articles and papers could be referred to.

⁸³ See, for example, Lönnig: http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf

⁸⁴ http://www.weloennig.de/Rhinoceros.pdf

⁸⁵ http://www.weloennig.de/ElephantEvolution.pdf

⁸⁶ Again http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf – perhaps also http://www.weloennig.de/ExplosiveOrigins.pdf (2018)

⁸⁷ Although it is regularly stated that "the cladistic method does not identify fossil species as actual ancestors of a clade", the method presupposes the overall theory of evolution based on similarities and differences. And as we have seen above for the hippos, *de facto*, there is constant talk of possible ancestral relationships and the implicit search for real evolutionary ancestors. "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" (http://www.weloennig.de/ElephantEvolution.pdf)

[&]quot;Cladistics, either generally or in specific applications, has been criticized from its beginnings. Decisions as to whether particular character states are **homologous**, a precondition of their being synapomorphies, have been challenged as **involving circular reasoning and subjective judgements**.[33] Of course, the potential unreliability of evidence is a problem for any systematic method, or for that matter, for any empirical scientific endeavor at all.[34][35] Transformed cladistics arose in the late 1970s [36] in an attempt to resolve some of these problems by removing a priori assumptions about phylogeny from cladistic analysis, but it has remained unpopular.[37] https://en.wikipedia.org/wiki/Cladistics (Retrieved 13 November 2023).

It is transformed cladistics, which transcends the questions of phylogenetics: Recall please from the **Elephant article**: "As evolutionary biologist Gareth J. Nelson has formulated in his renowned paper of 1969 (and further elaborated 2005 and 2014) ... [that] "It is a mistake to believe even that <u>one fossil species or fossil "group"</u> 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' usually shows them to be too specialized to have been direct ancestors of anything else." 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." See more in the article already mentioned above with references: http://www.weloennig.de/ElephantEvolution.pdf (pp. 22-27) ⁸⁸ *Cf.* again http://www.weloennig.de/Hippo.pdf p. 36

Mess^{"89} that, apart from some rare extant forms appearing in the Late Cretaceous ("only the chicken and duck clade") that

"all the other groups of modern birds (Neoaves) appeared suddenly and with great diversity in the Lower Tertiary (today called Paleogene). Indeed, *modern crown group birds appear and diversify so abruptly that it has been called a "Big Bang of Tertiary birds" by some paleo-ornithologists* (Feduccia 1995, 2003a, 2014, Ksepka et al. 2017). Some of their colleagues did not like such an explosive view for obvious reasons (e.g. Dyke 2003, van Tuinen et al. 2003), but Alan Feduccia addressed and rebutted all critics (Feduccia 2003b), and emphasized that "a *rapid, explosive Tertiary radiation best explains why resolving phylogenetic relationships of modern orders remains intractable.*"

Here I can only refer my readers to Bechly's further superb expositions on the topics of *Rocks vs Clocks*, *Phylogenomics vs Clocks*, *A New Study* [of 2024], *Conflicting Trees*, *DNA-DNA-Hybridization*, *Phylogenomics*, *Collapsing Trees*, *Explaining Away Conflicting Evidence*, and *Abrupt Origins*.⁹⁰

Getting back to our hummingbirds – how can we integrate them into the overall picture presented here from Kuhn (1965) to Bechly (2024)?

On "Abrupt Origins" Bechly's main inference is this:

"The most important take home message from this article is this: in spite of the new study by Wu et al. (2024), there is overwhelming evidence, recognized by the vast majority of mainstream experts, that there was an explosive diversification of modern birds (Neoaves) in the Lower Tertiary (Paleogene). There was an abrupt origin, a burst of biological creativity with a genuine Big Bang of modern birds, which is best explained by an infusion of **new** information from an intelligent agent outside the system."

Above, concerning *Lophornis gouldii*, I invited the reader to "compare please the Neo-Darwinian hypothesis of the brutal "evolution by creeps", Gould) with the intelligent design explanation ("The theory of intelligent design holds that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection") just for the "long dark rufous feathers on its crown form a crest" and "long white feathers with shiny green dots make tufts that fan out and back on the cheeks".

In my view *this is brilliant, ingenious artwork*⁹¹, not the work of an endless number of infinitesimally small coincidences haphazardly chained together by the "truly hideous process" of natural selection, being "rife with happenstance, contingency, incredible waste, death, pain and horror", "the blindest, and most

⁸⁹ https://evolutionnews.org/2024/02/fossil-friday-the-big-bang-of-tertiary-birds-and-a-phylogenetic-mess/

⁹⁰ See also some points by W.-E. L. in http://www.weloennig.de/Feduccia2020.pdf pp. 22-24 "...in the beginnings of the Tertiary, the avifauna appears to have been even richer and more comprehensive than it is today!"

⁹¹ This, of course, leads to the question on the identity of that ingenious artist. See, or example, the book by Stephen C. Meyer on The Return of the God Hypothesis (2021). "The New York Times bestselling author of Darwin's Doubt, Stephen Meyer, presents groundbreaking scientific evidence of the existence of God, based on breakthroughs in physics, cosmology, and biology. Beginning in the late 19th century, many intellectuals began to insist that scientific knowledge conflicts with traditional theistic belief—that science and belief in God are "at war." Philosopher of science Stephen Meyer challenges this view by examining three scientific discoveries with decidedly theistic implications. Building on the case for the intelligent design of life that he developed in Signature in the Cell and Darwin's Doubt, Meyer demonstrates how discoveries in cosmology and physics coupled with those in biology help to establish the identity of the designing intelligence behind life and the universe. Meyer argues that theism—with its affirmation of a transcendent, intelligent and active creator—best explains the evidence we have concerning biological and cosmological origins. Previously Meyer refrained from attempting to answer questions about "who" might have designed life. Now he provides an evidence-based answer to perhaps the ultimate mystery of the universe. In so doing, he reveals a stunning conclusion: the data support not just the existence of a personal God."

Comment by W.-E. L at Amazon: 5.0 out of 5 stars Convincing historical and scientific answers on the origin of the universe and life.

Reviewed in Germany on 22 June 2021: After receiving the book from the publisher and having bought the Audible and Kindle editions from Amazon, this is (after carefully checking its contents) my endorsement: The author carefully discusses the basic questions once addressed also in Gaugin's famous painting: "Where Do We Come From? What Are We? Where Are We Going?" The "Answer of Modern Science": "We Come From Nothing. We Are Nothing. We Are Going To Nothing. No Reason Behind It All. However, Did Nothing Really Make Everything For No Reason? - Meyer tackles these questions systematically, rigorously providing an enormous amount of authentic historical, physical and biological facts rationally denying this "answer of modern science", pointing instead to intelligent design for our basic questions. And an intelligent designer who has generated more than two trillion galaxies consisting of billions of stars each and life in all its overwhelming complexities on earth - does He not deserve the title of GOD? Check please this book critically and draw your own conclusions! As for one of the most often raised objections in open discussions with me against the answer of intelligent design (ID) given by Meyer in this book (and by many further authors), namely that accepting this theory also means accepting the dogmas of 1700 years of church history, **I would answer with Isaac Newton that this is not necessary**. https://www.amazon.de/~/en/Stephen-C-Meyer/dp/0062071505

cruel way of evolving new species", by "primeval stupidity and original brutality".

Recall please: "*Extant hummingbirds are distinctly different than all other avians*." Moreover, the most distinguishing characteristics⁹² of the family Trochilidae have been delt with in detail on many internet sites, articles and books – to name just a few here:

- The already extensively quoted and discussed Wikipedia article with many excellent points and some weak ones: https://en.wikipedia.org/wiki/Hummingbird (last edited on 19 February 2024) with 233 references up to 2024.
- 2016/2024 by University of Illinois Board of Trustees: https://publish.illinois.edu/leno2/⁹⁴.
- Smithonian's National Zoo & Conservation Biology Institute (2024): https://nationalzoo.si.edu/migratory-birds/hummingbirds,
- 4) Britannica https://www.britannica.com/animal/hummingbird (updated 20 February
 - 2024), Hummingbird Central

5)

- https://www.hummingbirdcentral.com/2024),
- 6) San Diego Zoo https://animals.sandiegozoo.org/animals/hummingbird (2024),
- 7) Encyclopedia.com (2019) Oxford

https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/hummingbirds

For the books, see, for example, Amazon:

- 8) Glenn Bartley et al. (2022): Hummingbirds: A Celebration of Nature's Jewels (Wildguides, 27),
- 9) John Shewey (2021): The Hummingbird Handbook: Everything You Need to Know about These Fascinating Birds.
- 10) Michael Fogden et al. (2024): Hummingbirds: A Life-size Guide to Every Species.
- 11) Francis Rivendell (2022): The Hummingbird Bible: [3 in 1] The Complete Practical Guide to Discover Hummingbirds and Learn How to Attract, Identify, Feed and Protect These Captivating Creatures.
- 12) Joel and Laura Oppenheimer et al. (2018): The Family of Hummingbirds: The Complete Prints of John Gould.
- 13) Carwford H. Greenewalt (1990): Hummingbirds.

Check also the many videos offered at YouTube.

- 14) https://www.youtube.com/watch?v=EQZ_BYjfIy8
- 15) https://www.youtube.com/watch?v=gaUhxQtNOwM
- https://www.youtube.com/playlist?list=PLJvenK5JPZT7mQy3af-0ettKVkpSXfswP (16 videos, as of 28 February 2024)

Most of these articles and books as well as the videos are discussing the origin of the hummingbirds from a Neo-Darwinian point of view. Concerning an introduction to (and more on) the theory of intelligent design, see, for example, William A. Dembski and Winston Ewert (2023): *The Design Inference. Eliminating Chance through Small Probabilities*⁹⁵ as well as the articles, books and videos by the authors already referred to above⁹⁶.

So, I would like to make the following predictions about the hummingbirds based on what has been said so far: Apart from the facts presented above, further fossils will also confirm the place of the hummingbirds in the overall picture on the origin of birds generally characterized by abrupt appearance, constancy of

95 https://www.discovery.org/b/the-design-inference/ (Second Edition)

⁹²To discuss all the differences in detail in connection with Neo-Darwinian problems would require a work of at least, let's say, 500 pages or more.

⁹⁴ One of the many interesting points: "Hummingbirds contain special cells in their feathers that act like prisms when sunlight hits. The sunlight is split into wavelengths, which are reflected back giving iridescent colors. Some hummingbirds use these bright colors as a territorial warning. For example, the head of a hummingbird may be brown and dull from an indirect angle. If the hummingbird were to fly at an enemy head on, it would display a bright color as a way to intimidate the other bird. https://publish.illinois.edu/leno2/physical-characteristics/ (2016/2024)

⁹⁶ To repeat saving the reader search work: The articles and books by Douglas Axe, Günter Bechly, Michael J. Behe, David Berlinski, Tom Bethell, William A. Dembski, Michael Denton, Marcos Eberlin, Phillip E. Johnson, Matti Leisola, Wolf Ekkehard Lönnig, Casey Luskin, Stephen C. Meyer, J. P. Moreland et al. (eds.), Walter James ReMine, Paul Nelson, John C. Sanford, Siegfried Scherer, Granville Sewell, David W. Swift, James Tour, Jonathan Wells, and many others. See also https://evolutionnews.org/ on intelligent design

forms and ingenious design. To repeat: An *absolutely ingenious artist was at work here*, not the "truly hideous sum total of misery" of natural selection, i.e. by "the blindest, and most cruel way of evolving new species", not by "primeval stupidity and original brutality" (Urdummheit und Urbrutalität), not by a "gradual process as a matter of fact" (i.e. "infinitesimally small changes" etc).

Instead: "There are so many bizarre mating customs among birds that one could write a book about it. There are *aesthetic orgies*, in view of which only the most dusty academic could arrive at the idea that everything in nature is about survival and maximizing reproduction. The motto is not only »make love, not war«, but also »make art, not sex«" (see R. Eichelbeck, as quoted above).

For a final example in the present article to additionally validate this view, let's have a look at the hummingbird *Loddigesia mirabilis*:



Male hummingbirds in slightly differentpositions:

Above left: Marvelous Spatuletail (Loddigesia mirabilis). Author: thibaudaronson (2021).

https://commons.wikimedia.org/wiki/File:Loddigesia_mirabilis_114707771.jpg

Above on the righthand side: https://www.maxwaugh.com/wp-content/uploads/2023/07/spatuletailmarvelous0112peru49.jpg

Max Wau's comment: "I spent the better part of three days in a lek just to obtain a few pictures (which I'm still proud of... I don't see many clean images of this species even now)." *Cf.* also https://www.hummingbirdsociety.org/ His bio: https://www.maxwaugh.com/bio/ Below left: (Again) Marvelous Spatuletail (*Loddigesia mirabilis*) Author: thibaudaronson (2021). Image brightened to show tail feathers.

https://en.wikipedia.org/wiki/Marvelous_spatuletail

Below right: Excerpt from film by Walter Mancilla Huaman (2014) (See footnote)

See Victor Bustinza: https://www.peruaves.org/trochilidae/marvelous-spatuletail-loddigesia-mirabilis/ for different stages of development and phenotype of the females.

See also on the next page *Loddigesia mirabilis* by John Gould 1861 and the videos/films by David Attenborough (BBC 2018?)⁹⁷ as well as Carole Turek and coworkers (2018)⁹⁸, Walter Mancilla Huaman (2014)⁹⁹ and Greg R. Homel (2008)¹⁰⁰.

100 https://www.youtube.com/watch?v=Df8jhng3xgQ

⁹⁷ https://www.hummingbirdspot.com/top-20

⁹⁸ https://www.hummingbirdspot.com/day-6-7-8-huembo-reserve (Photographs and film)

⁹⁹ https://www.youtube.com/watch?v=VeNdxB0eb6M (all videos retrieved 29 February 2024; leap year)

Part of the text for the video https://www.hummingbirdspot.com/top-20 by David Attenborough reads as follows:

"The Marvelous Spatuletail male is a stunning hummingbird. He is white, green and bronze with purple crest feathers and a turquoise gorget. He has a whitish breast with a black line down the middle. But *the stunning tail feathers are unique in the hummingbird world*. He has only four tail feathers, and the two outermost feathers end in large flat violet-blue discs. When trying to attract a mate, he must hold these discs above his head and dance for the female while making a snapping sound with his beak. This act is so physically exhausting that he can only keep it up for seconds before he must rest. The female has a bronze/green head and lacks the black line on the underside. She has a shorter tail with no discs. And *she is not easily impressed*."



Loddigesia mirabilis https://de.m.wikipedia.org/wiki/Datei:Loddigesia_mirabilis_%2B_Aechmea_mucroniflora_-_Gould_Troch._pl._161.jpg

Now let's apply the Neo-Darwinian theory to the origin of these extraordinary tail-feathers and the respective behavior of the male and female birds.

Recall please that virtually the following answer given by Darwin – already cited *ad nauseam* above – has also been presented by Neo-Darwinism today (see Mayr, Dawkins and others):

Since this key point of the theory – gradual evolution – , its bottom line, core and essence, even "the same yesterday, and today and forever" – gradualism in combination with omnipotent natural selection – can hardly be overemphasized, I would like to continue to point out that Darwin correspondingly imagined the origin of species (and, in fact, of all life forms) by selection 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" (All emphasis added).

In the 1st edition of Darwin's Origin (1859) we find his assertion that "Natura non facit saltum" ("nature doesn't jump") eight times and in the 6th edition (1872) twelve times, so even four times more. Darwin comments inter alia (1872, p. 166): "On the theory of natural selection we can clearly understand the full meaning of that old canon in natural history, "Natura non facit saltum." This canon, if we look to the present inhabitants alone of the world, is not strictly correct; but if we include all those of past times, whether known or unknown, it must on this theory be strictly true."

Now imagine female birds "not easily impressed" for many thousands of generations breeding males with either invisible elongations of two special tail feathers (why just these two or why not some others or more?) or individuals displaying the two tail feathers especially chosen always being a tiny fraction – say a hundredth of a millimeter – longer than that of all the other males¹⁰¹ (for "evolution not only is a gradual process as a matter of fact; it has to be gradual if it is to do any explanatory work") – and (apart from the fact that a mutation that is 1 percent better in fitness than the standard allele in the population will be lost 98 percent of the time by genetic drift) regularly *this one male will finally substitute all the males in the respective populations*?

Considering also that sexual selection "in most cases stands in definite opposition to natural selection"¹⁰² and that we have to assume that for the female there occurred most probably not only one "highly unusual mutation for which there is not the slightest evidence" but several of them so that she has developed **a special preference** for the especially elongated and colored "two outermost feathers, which end in *large flat violet-blue discs*", and for the male accordingly thousands of (likewise unknown) mutations to evolve these feathers – not to mention sexual selection for all the additional features distinguishing the male from the female ("he is white, green and bronze with purple crest feathers and a turquoise gorget" etc.¹⁰³) – we may perhaps tactfully ask whether this quasi-religious faith has really anything to do with reality.

¹⁰¹ The topic of *modifications in this context not yet included*...: "Moreover, the effects of modifications, which are nonheritable by definition, may be much more powerful [generating quantitative and qualitative phenotypic variations] than the [week] effects of mutations [according to the "Modern Synthesis"]..." http://www.weloennig.de/NaturalSelection.html – ...nor the *Law of Recurrent Variation* implying limits as to, for example, the generation of entirely new functional synorganized forms and species: http://www.weloennig.de/ShortVersionofMutationsLawof_2006.pdfhttp://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf – Concerning "say a hundredth of a millimeter", see some calculations by evolutionary biologists http://www.amazon.de/Evolution-Long-Necked-Giraffe-Giraffa-camelopardalis/dp/3869914718/ref=pd_sim_sbs_b_2 p. 129 for a "*microevolutionary scenario*" ("between 0.72 and 1.19 μm per generation", applying such data on *Loddigesia mirabilis*, we may similarly ask for this species: Are there really decisive selective advantages for the survival of **spatuletail** populations of *about 1 millionth of 1 meter or 1 thousandth of 1 mm of the male's two tail feathers longer* in intermittend generations?) In contrast, one may contemplate Johann Wolfgang von Goethe's following verdict: "So schauet mit bescheidenem Blick der ewigen Weberin Meisterstück, wie ein Tritt tausend Fäden regt, die Schifflein hinüber, herüber schießen, ein Schlag tausend Verbindungen schlägt. Das hat sie nicht zusammengebettelt, sie hat's von Ewigkeit angezettelt, damit der ewige Meistermann getrost den Einschlag werfen kann."

¹⁰²Attenborough's comment at https://www.hummingbirdspot.com/top-20: "...This female hummingbird hovers with precision in her quest for nectar. A wing and tale design allow her to fly in any direction. But the male has a real problem flying. And this is why: He is way down with two superlong tail feathers, tipped with cumbersome discs. This is the marvelous spatuletail hummingbird and these are his flags with which to seduce a mate. Waving them back and forth takes a lot of effort, even from the comfort of his perch. But to win her heart he is got to go up a gair. He must show her how well he can fly, but it's exhausting work. It's so demanding he can only stay airborne for a matter of seconds before he needs a rest. He is struggling to impress her [through?] one last try. The extreme effort and energy needed to hover means hummingbirds can only fly in short sharp bursts."
¹⁰³ One could of course argue that these features were not formed from scratch since so many other hummingbird species display similar structures and colors.

¹⁰³ One could of course argue that these features were not formed from scratch since so many other hummingbird species display similar structures and colors Nonetheless, it is likely that here, too, upon careful examination some unique structures could be found in the males of *Loddigesia* not occurring anywhere else.

And what about behavior? "When trying to attract a mate, he [the male] must hold these discs above his head and dance for the female while making a snapping sound with his beak." Instinctive behavior by further suitable accidental, haphazard, random mutations?

As has been emphasized, the alternative is that *an absolutely ingenious artist* was at work here, transcending all human abilities, ideas and power.

Supplement (18 Sept. 2024)

Comment of a Biology Teacher

"I would like to thank you very much for this highly interesting essay. It is quite astonishing that so many people still refuse to accept the idea of an intelligent creator. It takes a lot more faith to believe that a plant and a hummingbird, whose calyx and beak shapes fit together perfectly, came into being by chance and completely independently of each other – over such a long period of time and in very small steps. If you then take into account genetic drift and targeted selection by the females, the idea of a random development seems quite absurd. The fossil finds you described, taking into account the short lifespan of hummingbirds, also speak clearly against the Darwinian theory.

I also found the thought-provoking impulse regarding the colorful birds particularly interesting, as their conspicuousness should have caused them to disappear from the gene pool, as they are quickly eaten.

It makes you wonder how you can talk about scientific work if you only allow a theory that seems to be less and less worthy of protection.

I hope that your very well thought-out essay will make some people think.

I wish you all the best for the future!"

Best regards

CD (Initials changed)¹⁰⁴

Ich wünsche Ihnen weiterhin alles Gute!

¹⁰⁴Mail 16 April 2024. (Tranlated with DeepL)

Original German Text: "Ich möchte mich herzlich für die hochinteressante Abhandlung bedanken. Es ist doch sehr erstaunlich, dass sich immer noch so viele Menschen der Idee eines intelligenten Schöpfers verweigern. Dabei gehört viel mehr Glaube dazu, daran zu glauben, dass zufällig und völlig unabhängig voneinander eine Pflanze und ein Kolibri entstanden sind, deren Kelch- und Schnabelformen perfekt zueinander passen - noch dazu über einen so langen Zeitraum und in ganz kleinen Schritten. Berücksichtigt man dann noch die genetische Drift bzw. die gezielte Auswahl durch die Weibchen scheint die Vorstellung einer zufälligen Entwicklung doch recht absurd. Die von Ihnen beschriebenen Fossilienfunde sprechen, unter Berücksichtigung der kurzen Lebensspanne der Kolibiris, auch deutlich gegen die darwinistische Theorie.

Besonders interessant fand ich auch den Gedankenanstoß bzgl. der farbenprächtigen Vögel, deren Auffälligkeit eigentlich dafür hätte sorgen müssen, dass sie aus dem Genpool verschwinden, da sie schnell gefressen werden.

Da fragt man sich doch, wie man vom wissenschaftlichen Arbeiten sprechen kann, wenn man nur eine Theorie zulässt, die noch dazu immer weniger schützenswert scheint.

Ich hoffe, Ihre wirklich sehr durchdachte Abhandlung regt den ein oder anderen zum Nachdenken an.



Amazilia amazilia (Lesson & Garnot, 1827) *Subspecies A. a. dumerilii* (Lesson, RP, 1832) – west Ecuador and northwest Peru *Cf.* for example photo of Lessonamazilie at https://www.zoo-wuppertal.net/4-tiere/v-seglervoegel-kolibrislessonamazilie.htm and https://en.wikipedia.org/wiki/Amazilia_hummingbird (both retrieved 14 September 2024)

Photo: W.-E.L. (Weltvogelpark Walsrode 7 September 2024) Photographed through the closed-meshed/fine-meshed grid of the aviary

Description according to Wikipedia (14 Sept. 2024): "The amazilia hummingbird is 9 to 11 cm (3.5 to 4.3 in) long. Males weigh 5 to 6.5 g (0.18 to 0.23 oz) and females 4.5 to 5.5 g (0.16 to 0.19 oz). Both sexes of all subspecies have a straight, medium length, pinkish-red bill with a black tip. Adult males of the nominate subspecies *A. a. amazilia* have golden-green upperparts with rufous uppertail coverts. Their tail is also mostly rufous, with some bronze-green on the outer feathers. They have a glittering golden- to turquoise-green throat and a rufous lower breast and belly. *Adult females have almost the same plumage* [in that case/that species], with the addition of some white on the chin and throat and a paler rufous belly. Juveniles resemble adult females with the addition of browish edges on their upperparts' feathers."¹⁰⁵

¹⁰⁵ Again https://en.wikipedia.org/wiki/Amazilia_hummingbird



Left: Male of *Chrysolampis mosquitus* (Linnaeus, 1758) Both photos: W.-E.L. (Weltvogelpark Walsrode 7 September 2024)

Again: Photographed through the closed-meshed/fine-meshed grid of the aviary Cf. Photo at https://commons.wikimedia.org/wiki/File:Chrysolampis_mosquitus_-_Tiergarten_Sch%C3%B6nbrunn_4.jpg Appears to display strong variation, see: https://birdfinding.info/ruby-topaz-hummingbird/ and https://commons.wikimedia.org/wiki/File:Chrysolampis_mosquitus_328875491.jpg?uselang=de (retrieved 18 Sept. 2024)

Film: https://www.youtube.com/watch?v=1waDP-syaPI

Right: Female of Topaza pella (Linnaeus, 1758)

"Large, distinctive hummingbird. Superb male is mostly red and essentially unmistakable; female best told by large size and mostly green plumage with orange outer tail feathers. Found in lowland forest, usually along blackwater creeks in forests with sandy soils. Nests on low vegetation overhanging water. Very noisy and aggressive in territorial defense; loud, smacking calls are often heard before the birds are seen." *Cf.* https://ebird.org/species/critop1?siteLanguage=de For photos of the strongly different male. see:

https://de.wikipedia.org/wiki/Datei:Crimson_Topaz_(Topaza_pella).jpg (all retrieved 18 Sept. 2024)

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