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Are Darwin's Finches¹
“a particularly compelling example of speciation”
as well as “*evolution in action*” or what else?
A brief note on the question whether macroevolution
is happening on the Galápagos Islands

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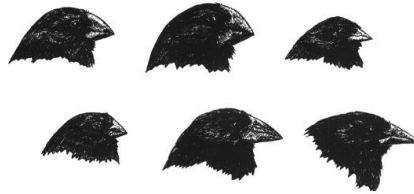
¹ The generally used term “Darwin's Finches” is a paradigm of a misnomer. See: Frank J. Sulloway (1982): Darwin and His Finches: The Evolution of a Legend. Journal of the History of Biology 15: 1-53. In contrast, the more rarely used but definitely apt term “Galapagos finches” is correct as, for example, the Hawaiian honeycreepers.

The National Academy of Sciences and the Galapagos Finches

Twenty-one years ago the *The National Academy of Sciences*² published the second edition of a book called “*Science and Creationism*”³. This and the following revised editions of 2008 and 2017⁴ now called “*Science, Evolution and Creationism*”⁵ are widely accepted as an up-to-date guide providing excellent information on the modern theory of evolution defending it as the absolutely true and only scientific and realistic answer on the origin of species not only for the altogether “76 million students enrolled in U.S. schools”⁶ in 2020 but also thought to provide valuable information on the topic for the public of the English speaking world in general⁷.

In the second edition the Galápagos finches (= Darwin’s Finches) were addressed as follows (1999, pp. 10/11):

“*A particularly compelling example of speciation* involves the **13 species** of finches studied by Darwin on the Galápagos Islands, now known as Darwin’s finches. The ancestors of these finches appear to have immigrated from the South American mainland to the Galápagos. Today **the different species** of finches on the island have distinct habitats, diets, and behaviors, **but the mechanisms involved in speciation continue to operate**. A research group led by Peter and Rosemary Grant of Princeton University has shown that a single year of drought on the islands can drive evolutionary changes in the finches. Drought diminishes supplies of easily cracked nuts but permits the survival of plants that produce larger, tougher nuts. Droughts thus favor birds with strong, wide beaks that can break these tougher seeds, producing populations of birds with these traits. The Grants have estimated that if droughts occur about once every 10 years on the islands, **a new species of finch might arise in only about 200 years.**”



And this was the accompanying figure to convince the students *ad oculus* with the ensuing note: “The different species of finches on the Galápagos Islands, now known as Darwin’s finches, have different-sized beaks that have evolved to take advantage of distinct food sources.”⁸ (Darwin referred to them 10 years after his voyage on the *Beagle* “after the London ornithologist Gould had explained it to him”.)

Also, let us emphasize especially that – as quoted above – “The Grants have estimated that if droughts occur about once every 10 years on the islands, a new species of finch might arise in only about 200 years.”

Hall and Hallgrímsson comment on this example (2014, p. 411) “By documenting *evolution in action* in natural populations, the work of the Grants has made *profound contributions to our understanding of the evolutionary process.*”⁹

Or in the words of Cressey in a *Nature* article of 2009: “Darwin’s finches” were “tracked to reveal *evolution in action*”.¹⁰ See also “Source: Uppsala University” (2016): “*Evolution in action* detected in Darwin’s finches.”¹¹ Or Sangeet Lamichhaney of Harvard University (2020): “The results indicated that diversity in *HMGA2* gene allowed for a rapid evolution of smaller beak size in medium ground finch,

² “The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters.”

“Attractive in presentation and authoritative in content, *Science and Creationism* will be useful to anyone concerned about America’s scientific literacy: education policymakers, school boards and administrators, curriculum designers, librarians, teachers, parents, and students.”

<https://www.ncbi.nlm.nih.gov/books/NBK230204/>

³ <https://www.ncbi.nlm.nih.gov/books/NBK230201/> Already in its title confusing Creationism with the intelligent-design-theory. For a longer review of the 1999 edition see <http://www.ideacenter.org/contentmgr/showdetails.php/id/1131> See also Behe; https://evolutionnews.org/2016/10/philosophical_o/

⁴ National Academies Press (17. November 2017) According to

https://www.amazon.de/s?k=Science+and+Creationism%3A+A+View+from+the+National+Academy+of+Sciences&__mk_de_DE=%C3%85M%C3%85C5%BD%C3%95%C3%91&ref=nb_sb_noss (retrieved 26 August 2020). Same date (17 November 2017) at Amazon.com

⁵ <http://www.tulane.edu/~bfleury/tssp/Science,%20Evolution,%20and%20Creationism.pdf>

⁶ December 2018: <https://www.census.gov/newsroom/press-releases/2018/school-enrollment.html>

⁷ <https://www.nationalacademies.org/evolution/resources> <https://ncse.ngo/review-science-evolution-and-creationism>

⁸ <https://www.nap.edu/read/6024/chapter/1#vii> (all chapters available). <https://www.ncbi.nlm.nih.gov/books/NBK230201/figure/mmm00010/?report=objectonly>

⁹ <https://www.ncbi.nlm.nih.gov/books/NBK230201/figure/mmm00010/?report=objectonly>

¹⁰ B. K. Halland B. Hallgrímsson (2014): Strickberger’s *Evolution*. Fifth Edition. Jones & Bartlett Learning. Burlington.

¹¹ <https://www.nature.com/articles/news.2009.1089>

“Whereas Darwin thought that a new species would take a considerable amount of time to appear, Keller says that this paper “shows how rapidly reproductive isolation can develop”. The Grant’s aren’t yet ready to call 5110’s lineage a new species, a term fraught with difficulty for evolutionary biologists. “There is no non-arbitrary answer to the question of how many generations should elapse before we declare the reproductively isolated lineage to be a new species,” they say. “For the present it is functioning as a [separate] species because its members are breeding only with each other.”

¹¹ <https://www.sciencedaily.com/releases/2016/04/160421145759.htm>. Sangeet Lamichhaney, Fan Han, Jonas Berglund, Chao Wang, Markus Sällman Almén, Matthew T. Webster, B. Rosemary Grant, Peter R. Grant, Leif Andersson. A beak size locus in Darwin’s finches facilitated character displacement during a drought. *Science*, 2016 DOI: 10.1126/science.aad8786

thereby providing an evidence of a gene behind ‘*evolution in action*’ recorded in real time.”¹² For more such examples, google please *Galápagos finches "Evolution in action"*.

**This “particularly compelling example of speciation”
and of “evolution in action” now completely deleted**

To my utter surprise, however, in the next edition of the book (2008/2017), now called “*Science, Evolution and Creationism*” this “*particularly compelling example of speciation*” published by the same *National Academy of Sciences*, these *profound contributions* of the Grants to our understanding of the *evolutionary process*, this example of *evolution in action* has now been completely deleted!

But why could the authors – by this example (among others) having defended science in general and the modern evolutionary theory in particular – suddenly have deleted it? Some of the following points mostly later published have also been known before (several points even years before 2008) (see, for example, Lönning 1993, pp. 196/197¹³; Jonathan Wells 2000, pp. 159-176):

Commentary at *EVOLUTION NEWS AND VIEWS* (2017) on the often limitless evolutionary extrapolation from the variation in the Geospizinae (the subfamily to which the Galápagos finches belong) to the origin of species and higher systematic categories in general (<https://evolutionnews.org/2017/05/darwins-finches-an-icon-gets-retouched/>):

“... **The birds hybridize. *No origin of species has occurred.* The varieties of finches are “trapped in an unpredictable cycle of Sisyphian evolution,” according to McKay and Zink,** quoted by Jonathan Wells in his new book *Zombie Science* (pp. 69-70).”

Concerning hybridization in the Galápagos finches, see also *Science* 2018: Rapid hybrid speciation in Darwin’s finches: <https://science.sciencemag.org/content/359/6372/224> Report. The text cited from *EVOLUTION NEWS AND VIEWS* goes on to say:

“This means that, like the old king Sisyphus of Greek mythology, condemned by the gods to roll a stone up a hill that always escapes and rolls back down, requiring him to repeat the cycle forever, **Darwin’s finches are going nowhere.**

So, here’s what we know in 2017 about Darwin’s finches, one of Jonathan Wells’ original ten Icons of Evolution.

Some finches wound up on the Galápagos Islands sometime.
Darwin captured some on his visit, but never used them to promote his theory.
The finches can freely hybridize.
The only major difference between them is the size and shape of the beak.
When the weather is dry, bigger-beaked birds do better.
When the rain returns, smaller-beaked birds return to previous levels.
No speciation has occurred. (This is called “adaptive radiation.”)
There exists a nebulous idea called “fitness,” measured by number of offspring.
Fitness changes from year to year, as circumstances change.
Varieties of finches exchange places as “fittest” from year to year.
The first arriver gets priority, unless a fitter bird arrives later.
Nobody can know in advance what bird will stay the fittest for how long.
The NSF will let you use bacteria as a proxy for birds.

Yes, “Adaptive radiation is an important evolutionary process,” just like the paper begins. Thanks for the money, NSF!

In *Zombie Science*, Wells points out that in a 1999 pro-evolution booklet for schools, **the U.S. National Academy of Sciences called Darwin’s finches “a particularly compelling example of speciation.”** He also points out that after 17 years since he exposed the flaws in this evolutionary icon, the “zombie” keeps coming back from the dead, reviving and stalking in biology textbooks. Here, the zombie makes another appearance: research that goes nowhere, proves nothing, and yet pretends that Darwin’s finches, despite “some important caveats,” provide insight into the origin of species.

It’s hard to kill a zombie when the federal government funds its handlers.”

See also Jonathan Wells (2016) at https://evolutionnews.org/2016/04/post_44/:

¹²<https://scholar.harvard.edu/sangeet/adaptive-evolution-darwins-finches>

¹³ <http://www.weloennig.de/AesIV3.html>

“Average beak size increased slightly during one drought, **only to return to normal after the rains return**. Then average beak size decreased slightly during another drought. A region of DNA is correlated with beak size. And somehow that tells us how finches evolved in the first place?

As Winston Churchill might say, “Never in the field of science was so much based by so many on so little.”

And a podcast: Wells in https://evolutionnews.org/2016/05/galapagos_finch/

Further points by Jonathan Wells in his book *Zombie Science* 2017, pp. 67-71.

“Sisyphean evolution of Darwin's finches”

The evolutionary biologists Bailey McKay (Chapman Fellow at the American Museum of Natural History) and Robert Zink (Bell Museum at the University of Minnesota) opposed the general extrapolation to macroevolution in their article “*Sisyphean evolution of Darwin's finches*” (*Biological Reviews* **90**: 689-698; 2014), for which they were also awarded the Katma Award. About the award ceremony we read for example:

“They [McKay and Zink] present a detailed morphological analysis to complement previous genetic analyses of the six putative species of ground finch in the genus *Geospiza* that form the Darwin's Finch complex, and report that *there is insufficient genetic and morphological divergence among populations to support species-level taxonomic ranks for these finch populations*. Instead, in opposition to deep-rooted conventional thinking by evolutionary biologists, McKay and Zink propose that populations of Darwin's finches are “transient morph” that have diverged in bill size and body size under strong selection for ability to use local seed resources, *but that shifting adaptive landscapes and gene flow among islands constantly erode morphological and genetic differences among populations and thwart speciation*. McKay and Zink call this process of formation and dissolution of locally adapted populations “Sisyphean evolution” after the Greek king Sisyphus who was condemned to roll a boulder toward the top of a hill only to have it inevitably slide back to where it began. McKay and Zink make a strong case that there is only one species of ground finch, and that rather than unveiling the process of speciation, the Darwin's Finch case study shows that local adaptation and morphological divergence under the influence of natural selection are not sufficient to initiate speciation.”¹⁴

The authors themselves note in their contribution (among other things) (2014, p. 689):

“We argue that *instead of providing an icon of insular speciation and adaptive radiation, which is featured in nearly every textbook on evolutionary biology, Darwin's ground finch represents a potentially more interesting phenomenon, one of transient morphs trapped in an unpredictable cycle of Sisyphean evolution*. Instead of revealing details of the origin of species, the mechanisms underlying the transient occurrence of ecomorphs provide one of the best illustrations of the antagonistic effects of natural selection¹⁵ and introgression.” (<https://onlinelibrary.wiley.com/doi/abs/10.1111/brv.12127>)

As for genetics, see Michael J. Behe (2019):

“Standing variation consists of the mutant genes that are already present in a population and can be called upon by natural selection to help a species adapt to changed environmental circumstances, obviating the need for a new mutation. For example, the most highly selected mutant gene associated with thick- versus thin-beaked Galápagos finches did not first arise when Peter and Rosemary Grant were studying the finches in the 1970s. It actually arose about a million years ago and has been present in the group ever since.”

...“For example, that mutant protein that is most strongly associated with thin- versus thick-beak genes in Darwin's finches, *ALXI*, has only two changed amino acid residues out of 326 compared to the wild type protein. Both of those are predicted by computer analysis to be *damaging to the protein's function*. Yet, apparently no better solution to the task of changing finch beak shape has come along in a million years, even though an enormous number of mutations would be expected to occur in the bird population during that time.

Why not? Well, consider that an army platoon that takes an unoccupied hill has a much easier task than an opposing force that later wants to displace them. *Similarly, a likely big factor in finch evolution is that the quick and dirty mutations have already been established*. So, in order to supplant them a new mutation would have to be better right away than the fixed ones. That is, its selection coefficient compared to mutation-free *ALXI* would have to be greater than the damaging ones. There is no known correlation,

¹⁴ <https://academic.oup.com/condor/article/118/1/209/5153217>

¹⁵ Strangely enough, the authors themselves try to explain even this example of “Sisyphean evolution” by natural selection. See for relativization of the selection z. B. Lönning <http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf>. Anyway, in this example, too, natural selection is by no means as strict as it is repeatedly claimed:

“*The connection between beak shapes and feeding ecology in birds was much weaker and more complex than we expected* and that while there is definitely a relationship there, many species with similarly shaped beaks forage in entirely different ways and on entirely different kinds of food.” <http://www.bristol.ac.uk/news/2019/january/adaptation-of-bird-beaks-.html> “The observation that Galapagos finch species possessed different beak shapes to obtain different foods was central to the theory of evolution by natural selection, and it has been assumed that this form-function relationship holds true across all species of bird.”

“However, a new study published in the journal *Evolution* suggests the beaks of birds are not as adapted to the food types they feed on as it is generally believed.” Behe: “Truth is, birds use their beaks for many functions besides just picking food — essentially, everything. Linking beak shape solely to feeding behavior is simplistic. How could such a myth survive for so long? Answer: by assumption, without empirical rigor.” <https://evolutionnews.org/2019/02/a-theory-in-crisis-darwinian-anomalies-accumulate/>

however, between the strength of the selection coefficient and whether a mutation is constructive or degradative. Thus, we have no reason to think standing variation would be supplanted.”¹⁶

Concerning the following information, see <https://www.ebi.ac.uk/interpro/protein/UniProt/PODMV5/>:

“Variations in *ALX1* may play a key role in beak morphology. Two haplotypes¹⁷ for this gene are observed within the different species of finches. *The B haplotype is almost exclusively found in individuals with a blunt beak while the P haplotype is neatly associated with individuals having a peaked beak.* There are 335 fixed differences aggregated in the vicinity of the gene between B and P haplotypes **including 2 missense mutations at positions 112 and 211.** In the **medium ground finch, *Geospiza fortis*** which exhibits high intraspecies variation in beak shape, both haplotypes have been reported but a significant association with beak shape has also been observed.”

These scientific data are followed by the myth: “Finch beak morphology observed on the Galapagos Islands was used by Charles Darwin to formulate his theory of evolution.” See J. Wells against this nonsense! (*Zombie Science* 2017, p. 67): “Although the Galápagos finches had little impact on Darwin’s thinking [he doesn’t even mention them in *The Origin of Species*], biologists who studied them a century later called them “Darwin’s finches”¹⁸ and **invented the myth that Darwin had correlated differences in the finches’ beaks with different food sources (he hadn’t).** According to the myth, Darwin was inspired by the finches to formulate his theory of evolution, though **according to historian of science Frank Sulloway “nothing could be further from the truth.”**

(Siehe dazu weitere Details und Autoren bei mir schon 2002: <http://www.weloennig.de/NeoB.Ana2.html>)



Left: <http://www.mynewsdesk.com/uk/uu/images/figure-1-the-medium-ground-finch-geospiza-fortis-551258> (© Peter R. Grant)
Right: <https://www.hbw.com/species/medium-ground-finch-geospiza-fortis> (Charles Darwin Foundation)
Furthermore, male and female seem to be clearly different from each other: https://en.wikipedia.org/wiki/Medium_ground_finch

Thus, may the Galápagos Finches even be called “a paradigm of the limits of natural selection”?

My answer: The “Darwin” finches could also be seen as a prime example of the limits of natural selection by the “2 missense mutations at positions 112 and 211” (“Sisyphean evolution” according to McKay and Zink instead of a “particularly convincing example for speciation” according to NAS as cited above) or rather of “the iconic birds whose facial variations have become a classic example of Charles Darwin’s theory of natural selection” (Rogers in *Nature* 2016)¹⁹.

¹⁶ <https://evolutionnews.org/2019/03/response-to-my-lehigh-colleagues-part-2/> Siehe weiter <https://evolutionnews.org/2018/12/2-of-our-top-stories-of-2018-behes-darwin-devolves-topples-foundational-claim-of-evolution/>

As for the many functions of the *ALX1* gene, see <https://en.wikipedia.org/wiki/ALX1> und <https://www.genecards.org/cgi-bin/carddisp.pl?gene=ALX1> <https://www.uniprot.org/uniprot/PODMV5>

Some points from the original article (abstract): “We find extensive evidence for *interspecific gene flow throughout the radiation.* Hybridization has given rise to species of mixed ancestry. A 240 kilobase haplotype encompassing the *ALX1* gene that encodes a transcription factor affecting craniofacial development *is strongly associated with beak shape diversity across Darwin’s finch species as well as within the medium ground finch (*Geospiza fortis*)*, a species that has undergone rapid evolution of beak shape in response to environmental changes. The *ALX1* haplotype has contributed to diversification of beak shapes among the Darwin’s finches and, thereby, to an expanded utilization of food resources.” <https://www.nature.com/articles/nature14181> (Siehe dazu Behe, wie oben zitiert: “...*ALX1*, has only two changed amino acid residues out of 326 compared to the wild type protein. Both of those are predicted by computer analysis to be *damaging to the protein’s function.*”

¹⁷ “A haplotype is a group of genes within an organism that was inherited together from a single parent. The word “haplotype” is derived from the word “haploid,” which describes cells with only one set of chromosomes, and from the word “genotype,” which refers to the genetic makeup of an organism. A haplotype can describe a pair of genes inherited together from one parent on one chromosome, or it can describe all of the genes on a chromosome that were inherited together from a single parent. This group of genes was inherited together because of genetic linkage, or the phenomenon by which genes that are close to each other on the same chromosome are often inherited together. In addition, the term “haplotype” can also refer to the inheritance of a cluster of single nucleotide polymorphisms (SNPs), which are variations at single positions in the DNA sequence among individuals.” <https://www.nature.com/scitable/definition/haplotype-haplotypes-142/> Weitere Punkte hier: <https://en.wikipedia.org/wiki/Haplotype>

The most simple but still imperfect definition: “Haplotype: a set of genetic determinants located on a single chromosome.”

¹⁸ “...the oft-heard phrase “Darwin’s finches” was first coined by **Percy Lowe in 1936** and later popularized by **David Lack in 1947** with his treatise titled *Darwin’s Finches*” (molecular geneticist Jeffrey Tomkins at <https://www.icr.org/article/8338>).

¹⁹ <https://www.nature.com/news/evolution-of-darwin-s-finches-tracked-at-genetic-level-1.19795>

Also beyond natural selection: Forty-five million single nucleotide polymorphisms (SNPs)

In addition, there is another phenomenon at the DNA level, at which natural selection virtually fails completely. The authors Lamichhaney et al. report (2015, p. 371): *Stringent variant calling revealed approximately 45 million variable sites [SNPs] within or between populations.*²⁰

What are the SNPs (*Single Nucleotide Polymorphisms*)?

“A single-nucleotide polymorphism (SNP; /snp/; plural /snps/) is a substitution of a single nucleotide at a specific position in the genome, that is present in a sufficiently large fraction of the population (e.g. 1% or more).[1]

For example, at a specific base position in the human genome, the C nucleotide may appear in most individuals, but in a minority of individuals, the position is occupied by an A. This means that there is a SNP at this specific position, and the two possible nucleotide variations – C or A – are said to be the alleles for this specific position.”²¹

In my book on the relevance of dog breeds for the theory of macroevolution, I noted the following about the SNPs (see <http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf> pp. 150-153) - text now for the Galapagos finches adapted:

Regarding the “*approximately 45 million variable sites* [SNPs] within or between populations” in the Galapagos finches alone, the following can be said about the selection question:

The synthetic theory of evolution (= neo-Darwinism), which dogmatically postulated *that all biological changes be controlled and directed by natural selection* (including, of course, the molecular genetic level) has been clearly refuted in two important molecular points: (1) The number of SNPs (single nucleotide polymorphisms) with approximately *45 million* in the Galapagos finches exceed anything that could be imagined in pre-molecular times and even up to a few years ago in terms of variation: For there is no natural selection, however strict, that could even come close to controlling this formerly totally unexpected overwhelmingly enormous amount of variation. (2) The same applies to the CNPs, which may number in the thousands, but for which I do not yet have an exact number.

Additional points here: <https://genome.cshlp.org/content/early/2017/04/25/gr.212522.116.full.pdf> (2017, p. 1):

“We find that two of the most pronounced genomic islands contain the *ALX1* and *HMG2* loci, which are associated with variation in beak shape and size, respectively, suggesting that they are involved in ecological adaptation.”

And here *Science* (2016, p. 470): <https://www.ncbi.nlm.nih.gov/pubmed/27102486>:

“Genotypes associated with large beak size were at a strong selective disadvantage in medium ground finches (selection coefficient $s = 0.59$).”

See also *Nature* (2016): <https://www.nature.com/news/evolution-of-darwin-s-finches-tracked-at-genetic-level-1.19795>.

Well, “a strong selective disadvantage” may be at odds with the idea of slow and smooth evolution as generally postulated by the synthetic theory – as I have repeatedly emphasized (see also below).

Other revealing points in this context (as commented by Nala Rogers):

“By analysing DNA from medium ground finches that lived around the time of the drought, the researchers found that the **large-beak *HMG2* variant** was more common in birds that starved to death,

²⁰ Sangeet Lamichhaney, Jonas Berglund, Markus Sällman Almén, Khurram Maqbool, Manfred Grabherr, Alvaro Martinez-Barrio, Marta Promerová, Carl-Johan Rubin, Chao Wang, Neda Zamani, B. Rosemary Grant, Peter R. Grant, Matthew T. Webster & Leif Andersson (2015): Evolution of Darwin’s finches and their beaks revealed by genome sequencing. *Nature* **518**:371-375. In this paper I could not find the differentiation between the numbers of SNPs und CNVs (the possibly thousands of CNVs may have been included there).

²¹ https://en.wikipedia.org/wiki/Single-nucleotide_polymorphism; see also <https://de.wikipedia.org/wiki/Einzelnukleotid-Polymorphismus>

while the **small-beak variant** was more common in birds that survived. This genetic shift is likely responsible for some of the reduction in beak size, the researchers say.”

An exceptionally strong natural-selection event?

“It was an *exceptionally strong natural-selection event*,” said Peter Grant, adding that because Daphne Major is in an entirely natural state the occurrence was completely unaffected by humans.”²²

An “exceptionally strong natural-selection event” was not expected by Darwin and the neo-Darwinians alike. Rather, the following:

Darwin 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” (emphasis added). Virtually the same answer is presented by neo-Darwinism today.

(Dokumentation z. B. http://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf pp. 2 und 3)

“The smaller beak-associated haplotype dominated amongst medium ground finches that survived the drought, turning up *in some 61 percent of 37 surviving birds*. But it is less common in a set of 34 medium ground finches that perished in the period of lower food availability, turning up in *just one-third of those birds*.”²³

As for this “exceptionally strong natural-selection event”, this is by no means an all-or-nothing selection (as sometimes the impression is given). Rather, the alleles are retained.

So, this “evolution” does not go along “infinitesimally small changes”, “infinitesimally slight variations” and “slow degrees” and “steps not greater than those separating fine varieties”, “insensibly fine steps” and “insensibly fine gradations”, but (to rephrase Darwin) *'is taking a leap, instead of advancing by the shortest and slowest steps'*.

“HMGA2 that affects beak size and ALX1 that controls beak shape. HMGA2*L and HMGA2*S promote the development of large and small beaks, respectively, while ALX1*P and ALX1*B are associated with the development of pointed and blunt beaks, respectively.”²⁴

“But that [selection] *doesn't mean that the HMGA2 variation for larger beaks in the medium ground finches has gone extinct*, Andersson says. *There are still individuals with that version of the gene and larger beaks*. And, as natural selection dictates, different ecological pressures may lead to a resurgence of that variant, too. “As long as both variants are present in the medium ground finch, they may respond to what is available, so to speak,” Andersson says. It will depend on which birds can forage for food and reproduce most effectively.”²⁵

The morphological/anatomical effects of the alleles on beak formation are thus briefly yet clearly outlined. For (other) pleiotropic effects see please the original papers.

This “Sisyphean evolution of Darwin's finches”, which can – for the reasons given above – be extrapolated to all the so-called genera and species of these birds, is definitely not an example of “a particularly compelling example of speciation, of “evolution in action”, of “an iconic model for studies of speciation and adaptive evolution” (Lamichhaney et al. in *Nature* 2015²⁶).

Some contradictions solved

It may perhaps sound a bit confusing and contradicting when we read, “that after a year of drought the finches with slightly larger beaks survived earlier than those with smaller beaks” and also: “When the weather is dry, bigger-beaked birds do better. When the rain returns,

²² <https://www.princeton.edu/news/2016/04/21/gene-behind-evolution-action-darwins-finches-identified>

²³ <https://www.genomeweb.com/sequencing-technology/galapagos-finch-beak-size-locus-identified-resequencing#.Xi7qCCMxn-g>

²⁴ <https://www.uu.se/en/news-media/press-releases/press-release/?id=3208&typ=pm>

²⁵ <https://www.csmonitor.com/Science/2016/0422/Darwin-s-finches-are-pecking-their-way-through-evolution>

²⁶ <https://pubmed.ncbi.nlm.nih.gov/25686609/>

smaller-beaked birds return to previous levels” etc. and that during the time of the drought: “...the researchers found that the large-beak *HMG2* variant was more common in birds that starved to death, *while the small-beak variant was more common in birds that survived.*”

The solution to the riddle:

First phase:

“*During the rainy season of 1977 only 24 millimeters of rain fell.* Two of the main finch species were hit exceptionally hard and many of them died. The lack of rain caused major food sources to become scarce, causing the need to find alternative food sources. The smaller, softer seeds ran out, leaving only the larger, tougher seeds. The finch species with smaller beaks struggled to find alternate seeds to eat. The following two years suggested that natural selection could happen very rapidly. *Because the smaller finch species could not eat the large seeds, they died off. Finches with larger beaks were able to eat the seeds and reproduce.* The population in the years following the drought in 1977 had “measurably larger” beaks than had the previous birds.”

Second phase:

“*Over the course of 1982–1983, El Niño brought a steady eight months of rain.* In a normal rainy season Daphne Major usually gets two months of rain. The excessive rain brought a *turnover in the types of vegetation growing on the island. The seeds shifted from large, hard to crack seeds to many different types of small, softer seeds.* This gave *birds with smaller beaks an advantage when another drought hit the following year.* Small-beaked finch could eat all of the small seeds faster than the larger beaked birds could get to them.”

Third phase:

“In 2003, a drought similar in severity to the 1977 drought occurred on the island.”

Now you would actually expect that the events that happened in 1977 would be repeated, namely:

“Because the smaller finch species could not eat the large seeds, they died off. Finches with larger beaks were able to eat the seeds and reproduce. The population in the years following the drought in 1977 had “measurably larger” beaks than had the previous birds.)

But far from it. Instead, the following was observed:

“Following the drought, the *medium ground finch population had a decline in average beak size, in contrast to the increase in size found following the 1977 drought.*”

Why? The following selectionist explanation is still uncertain (note the repeated use of the subjunctive):

“...in the time between the droughts (beginning in late 1982), the large ground finch (*Geospiza magnirostris*) had established a breeding population on the island. This species has diet overlap with the medium ground finch (*G. fortis*), so they are **potential competitors**. The 2003 drought and resulting decrease in food supply **may** have increased these species' competition with each other, particularly for the larger seeds in the medium ground finches' diet. This was **hypothesized** to be due to the presence of the large ground finch; the smaller-beaked individuals of the medium ground finch **may** have been able to survive better due to a lack of competition over large seeds with the large ground finch.”

So, the situation concerning natural selection is not as simple as usually presented in the textbooks or in the later deleted comment of the *The National Academy of Sciences*. Rather, there are obviously important open questions yet to be solved, including the possible (not even mentioned above) effects of hybridization between *Geospiza magnirostris* and *G. fortis*.

Nevertheless, even if the competition hypothesis between these two species were true, it would change the “Sisyphean evolution of Darwin's finches” only regarding its length and the number of its steps to fulfill its Sisyphean cycle.

The more extensive but misleading claim of the Grants that “selection oscillates in a direction”²⁷. Even if this so far doubtful assertion were true, it would ultimately be irrelevant for the origin of primary species and higher systematic categories: *A sieve (natural selection) cannot create new grains.*

²⁷ Cf. https://en.wikipedia.org/wiki/Peter_and_Rosemary_Grant

Island evolution of species: Typogenesis, Typostasis or Typolysis?²⁸

The following is the English version of some especially relevant and up-to-date points from a discussion²⁹ with Professor Dr. Reinhard W. Kaplan 1991. He was the director of the Institute of Microbiology (Lehrstuhl für Mikrobiologie) at the Johann Wolfgang von Goethe Universität, Frankfurt am Main³⁰. He did not continue the discussion.

Headline:

GALAPAGOS AS AN EVOLUTIONARY MODEL

Prof. K.

“Evolution on an isolated island like the Galapagos, ...”

W.-E. L.

The “evolution” on the Galapagos Islands is one of the best examples against the model favored by Prof. K. Because starting from the “isolated island”, the new founder populations should grow rapidly, continuously add beneficial hereditary changes, quickly displace their original populations and thereby become large populations themselves. It is now just one of the more recent significant biological discoveries that *island populations do not meet the criteria* (which are decisive for the question of the correctness of neo-Darwinism) – *displacement of the original populations and expansion into large populations*. In this context I refer to the excellent monograph by J.A. Drake et al. (1989) *Biological Invasions* (Wiley, Chichester, New York).

Would it really occur to anyone that the Galapagos finches might conquer mainland South America, displace populations there and, if transferred to southern Europe and Africa, could spread in the same way as e.g. the European house sparrows in North America?

It is exactly the other way around: the island populations must be protected from invasion by widespread continental species! Braun reports (1989, p. 86) empirically derived rules for this question, for example: *“Isolated environments with a low diversity of native species tend to be differentially susceptible to invasion.”* *“...species that are successful invaders tend to be native to continents and to extensive, non-isolated habitats within continents”* (p. 92). *“The fact that there are almost no good examples of successful invaders of continents that have come from small islands and other depauperate faunas ... suggests that biotic resistance from diverse native species can be effective in repelling invaders”* (p. 96).

Macdonald et al. 1989, p. 234: *“Although only a small percentage of the world's land and freshwater avifauna occurs on oceanic islands ‘93% of the 93 species and 83 subspecies of birds that have become extinct since 1 600 AD have been island forms’* (King, 1985).”

(P. 235:) *“Honegger (1981) lists two amphibians and 28 reptile taxa known to have become extinct since 1 600 AD. The reptiles were all island forms and introduced species are implicated in the extinction of at least eight of them and one of the two amphibians.”*

“Loope et al. 1989, p. 272: *“The rigor of natural selection in such an evolving insular system may be relaxed by a large number of bottle necks (founder events) many groups have*

²⁸ <https://de.wikipedia.org/wiki/Typostrophienlehre>

<https://www.biologie-seite.de/Biologie/Typostrophienlehre>

²⁹ <http://www.weloennig.de/NeoB.Ana2.html>

³⁰ https://de.wikipedia.org/wiki/Reinhard_Walter_Kaplan

undergone in island hopping. ... in many instances (*the island forms*) *may not be so well adapted as the 'general purpose genotypes' of invasive introduced species.*"

Pimm 1989, p. 355: "Species with larger ranges were more likely to be successful than species with smaller ranges. ... Many introductions will succeed only if their numbers can increase quickly, beyond the small population size where extinction is likely. "(The same author a few pages earlier p. 352:) "The chance of extinction rapidly increases as population sizes decrease. *Even in a perfectly constant environment, small populations face risk of extinction from demographic accidents* – the chance fluctuations of deaths and births, and consequent changes of numbers and sex ratios. "Another risk of becoming extinct is a low rate of population growth."

The latter observations are particularly informative for the question of the evolution of species in small populations in 100,000 to 10,000,000 years (see Prof. K. above in the link given). The postulated (macro-)evolution is unlikely for demographic and genetic reasons and can therefore not be accepted as a general rule for the origin of species.

Other authors have come to similar conclusions. Wills (1990, p. 398) discusses the problem in connection with "mitochondrial Eva" and an average population size of 5,000 women: "Such small sizes would have to be maintained for thousands of years *with an attendant risk of extinction*:" And he makes the following comparison: "The risk posed to the survival of the population in (this) ... case is *equivalent to the risk of crossing the Niagara Falls on a tightrope.*" (Emphasis added here as in the preceding and following paragraphs except can.)

Rabb and Lacy write 1990, p. 612 on the topic of Endangered Species Biology: "Genetic homogeneity can imperil a species, but such inbreeding occurs as a consequence of population decline and fragmentation. It is just one of several interacting factors that come into play when a population becomes so small that its fate is determined more by randomness than by fitness. ... Once populations are reduced and isolated, deleterious genetic and demographic factors ensue that serve to weaken further the survival of the species. The smaller populations also become progressively more vulnerable to environmental catastrophes. Even with amelioration of environmental circumstances, for example, provision of security in protected areas or zoological parks a species may go too far down the so-called "extinction vortex" of multiple causes to be recoverable. "

Small populations over large numbers of generations with many recessive mutations are therefore *an extremely unfavorable starting point for explaining the sudden appearance of Cambrian and other life forms and the fact that the temporal maxima of the construction plans and higher systematic categories occur before the lower ones!*

With populations of approximately 10,000 individuals (see above: 5,000 women) and 1 million generations, 10 billion individuals would have been necessary for speciation - was there really no chance of fossilization? The geologists Bennison and Wright, following the work of Shaw, *calculate an average of 1 fossil per 1 million individuals!* Even Galapagos finches have been found in fossil form! (See Grant 1984). And what about foraminifera, corals, brachiopods, cephalopods, etc., which are so well documented?

Prof. K.

"... Galapagos, where Darwin received inspiration for his theory."

W.-E. L.

According to several historians of science, this is a myth. Darwin was only made aware of the differences in [e.g.] *Mimus* species by ornithologist J. Gould after his return to England. "In retrospect, he [Darwin] was astonished at what he saw there" (Berry 1984, p.1).

The following quotation from Sullivay's paper (1982, pp. 57/58) on *The Beagle collections of Darwin's finches (Geospizinae)*³¹ and comment are an addition made 23 September 2020 (for the footnote numbers see the original text):

"The celebrated ornithologist John Gould, who was closely associated with the Zoological Society, lost no time in examining and naming the unusual finches that Darwin had brought back from the Galapagos Islands. At the very next meeting of the society (10 January), Gould described these birds as twelve new species, which he placed in one genus and two closely allied subgenera (*Geospiza*, *Cactornis*, and *Camarhynchus*). Moreover, he astutely realized the basic peculiarity of these finches, namely, that 'the **bill appears to form only a secondary character**'. Soon afterwards Gould recognized *Certhidea olivacea*, the Warbler Finch, as a thirteenth species of the group, belonging to yet another genus¹⁶.

Darwin, who was at this time residing in Cambridge, did not learn of the details of Gould's analysis until he moved to London in early March of 1837 in order to have closer contact with the specialists working on his collections. Gould's findings, communicated to Darwin during a meeting with the eminent ornithologist, **provided Darwin with a number of surprises**¹⁷. **While in the Galapagos, Darwin had been rather unclear about the precise relationship among the various finchlike species he had encountered there**. In particular, he had misidentified several finch species as the forms that they, through extensive evolutionary radiation, now appear to mimic. For example, he had considered the **Cactus Finch, *Cactornis scandens*, to be a member of the Icteridae (the family of the orioles and blackbirds); and he had classified the Warbler Finch, *Certhidea olivacea*, as a 'wren', or warbler**. It appears, moreover, that Darwin initially distinguished as separate species of finches only 6 of the eventual 13 forms that Gould named in early 1837. **Hence Darwin's finches only really became Darwin's finches after Gould rectified many of Darwin's earlier field misclassifications**, and thereby clarified the unity and complexity of the group¹⁸. More important still for Darwin's evolutionary thinking, Gould (1837d) declared that 3 of the 4 island forms of **Galapagos mockingbird brought to England by Darwin were distinct species**, a possibility that Darwin had already asserted 'would undermine the stability of Species'. For the Galapagos as a whole, Gould pronounced 25 of the 26 land birds as new and distinct forms found nowhere else in the world. **Darwin was frankly stunned**, not only by the realization that three separate species of mockingbirds indeed inhabited the different islands of the Galapagos, but also by the fact that most of these Galapagos species, even though new, were closely related to those found on the American continent¹⁹. His conversion to the theory of evolution, which took place shortly after his meeting with Gould in March of 1837, was a direct consequence of these two conclusions."

This "conversion" constitutes, in fact, an astonishing confusion and misunderstanding of the morphological species concept (cf. <http://www.weloennig.de/Artbegriff.html>) by Darwin as well as Sulloway with the Genesis kinds³².

Prof. K.

"This branching out (typogenesis) usually happens relatively quickly, as the pace of evolution is usually high during adjustment to new niches (ways of life)."

W.-E. L.

Typogenesis did not take place in the Galapagos! Even the formation of species in the finches is still doubtful: "Intersterility is not known in Darwin's finches. Intrageneric hybrids among ground finches are certainly both viable and fertile ... and probably the same is true for intergeneric hybrids between tree finches and warbler finches" (Grant 1986, p. 353). "... six species of *Geospizina* (finches) in the Galapagos Islands show a genetic distance from 0.004 to 0.065" (Nei 1987, p. 245). In humans, the differences are between 0.01 and 0.03. The small genetic distances of islanders are in clear contrast to the morphological differences that we also find in domestic animals. (These are further proofs that morphological and genetic distances need not be coupled with each other.)

"With domestic animals one normally refrains from establishing new systematic species and genera, – in nature, however, one creates numerous morphospecies and morphogenera, regardless of the genetic situation, which are often used uncritically as evidence of evolution."

In their summarizing study Loop et al. (1989, pp. 271/272) pointed to the general trend of little genetic distance between morphologically and ecologically strongly diverging (but closely related) island "species". In the Hawaiian *Tetramolopium* (Asteraceae), for example, Lowry

³¹ <http://darwin-online.org.uk/content/frameset?pageseq=1&itemID=A86&viewtype=text>

³² Addendum 8 October 2020: A source with a background in the Hebrew comments concerning "species": "...it should be noted that this term is not found in the Bible book of Genesis. There we find the term "kind," which is much broader in meaning. Often, what scientists choose to call the evolution of a new species is simply a matter of variation within a "kind," as the word is used in the Genesis account" (<https://wol.jw.org/en/wol/d/r1/lp-e/1102010233?q=frequently&p=par>).

and Crawford examined 19 populations of 7 "species": "The 'mean genetic identity for pairwise comparison...is 0.95, a very high value normally obtained for conspecific plant populations.'"

The *flightless Galapagos cormorants clearly illustrate the degeneration of structures*, a process that seems to occur rather quickly in small populations through inbreeding involving homozygous occurrence of numerous recessive alleles (already accumulated in previous larger populations).

What we detect *here is not typogenesis, but typolysis!* This also explains the low resistance of island populations to invaders and the high rate of extinction.

The comparison with domestic animals illustrates the situation in several aspects. In both groups we find: 1. Little genetic distance, but great morphological variability within the species (with dogs e.g. one could set up a new family with several genera and over 400 "species", something similar with the many races of pigeons, or of chickens, or horses etc.)³³. 2. Formation of numerous ecotypes. 3. Small populations and inbreeding as the starting point for "speciation". 4. Numerous recessive genes compared to the wild type. 5. Genetic drift; originally stricter selection conditions (for differential survival) are no longer applicable, but later there is also selection for certain phenotypes and ecotypes. 6. Low resistance compared to widespread wild populations. 7. Frequent degeneration and breakdown of structures; physiological compensation options. 8. *No formation of new primary species*.

Conclusion: No explanation of the paleontological findings (among others)!

Prof. K.

"If a niche has been occupied for a long time by a species that fully utilizes it, rich in individuals, progressive hereditary variants are rare for a long time, and evolution seems to stagnate (typostasis). If adverse environmental changes are not absorbed (buffered) by hereditary variants resistant to them, the population will die out."

W.-E. L.

Since the species with a large number of individuals, due to the recurrent mutations that occur regularly, must have a significantly greater allelic potential than a small population, it is questionable why the former may have unfavorable environmental conditions to which they cannot not adapt, while the individual poor population with low genetic potential (see above) should be capable of rapid evolution! As a rule, *the widespread species* with its much greater genetic potential should be able to adapt to the new conditions in many places at the same time through allele substitution and thus *should have better chances of survival than the small population with its few possibilities in the same situation* – which, as we have seen – is, in fact, the case.

Prof. K.

"According to the theory, the pace of evolution can vary from (geologically) fast to slow, depending on the circumstances (5)".

W.-E. L.

Since the term evolution implies the origin of all forms of life, it should be noted here that Prof. K.'s theory cannot explain the origin of the primary species or the higher systematic categories and Baupläne. According to the available findings, it is the pace of degeneration that can vary rapidly to slowly, depending on the circumstances (geologically) .

³³ See W.-E. Lönnig (2014): Unser Haushund – Eine Spitzmaus im Wolfspelz? <http://www.weloennig.de/Hunderassen.Bilder.Word97.pdf>

**Conclusion: No macroevolution
of the finches on the Galápagos Islands.**

In one sentence: Taking the facts and arguments presented above together, it appears to be clear that no macroevolution is happening in “Darwin’s finches” on the Galápagos Islands.

**The following text is an excerpt from Wolf-Ekkehard Lönnig’s book
ARTBEGRIFF, EVOLUTION UND SCHÖPFUNG (3. Auflage 1993)³⁴. Most of
the facts and arguments were already published in the first edition
of 1986 called ARTBEGRIFF UND EVOLUTION
and its revised edition of 1987**

After some examples of Mendelian populations and the refutation of some objections, the text was continued as follows:

From a genetic point of view, however, the situation in such cases is completely clear: These are Mendelian populations, and all recombinants of whatever differences in an actual or potential Mendel population belong to the same species.

With that in mind, let's take a look at the Galapagos finches. Up to 6 genera with a total of 14 species are currently described. If, however, the species is represented "as the sum total of similar individuals that can be crossed with each other" (Kämpfe and Günther 1980/1985, p. 56), the numbers of the genera and species should be greatly reduced: B. R. Grant and P. R. Grant e.g. report in 1982 that the thick-billed ground finch (*Geospiza magnirostris*) and the large cactus finch (*G. conirostris*) as well as the medium ground finch (*G. fortis*) and the small ground finch (*G. fuliginosa*) hybridize and on the Galapagos Islands Genovesa and Daphne and produce "viable offspring" (– a point which Lack 1940 had already made probable on the basis of his morphological studies of the Geospizinae; cf. also Mayr 1942).

P.R. Grant (1986, p. 353): "Intersterility is not known in Darwin's finches. Intrageneric hybrids among ground finches are certainly both viable and fertile (chapter 8), and probably the same is true for intergeneric hybrids between tree finches and warbler finches. "(Ecology and evolution of Darwin's finches. Princeton.)

Neil (1987, p. 245 in his book *Molecular Evolutionary Genetics* published in New York) emphasizes the short genetic distances within bird families: "... six species of *Geospiza* (finches) in the Galapagos Islands show a genetic distance ranging from 0.004 to 0.065." For the human races the values are between 0.01 and 0.03. And Curio reports on his studies on Darwin's finches, among others (1980, p. 344):

“Despite numerous differences, these species, which emerged on the individual islands in the course of a sufficiently long separation, are not so far apart from one another in terms of reproductive biology; this is proven by *the frequent mixtures between species and genera*. In addition, even the most pronounced insect-eaters among the Darwin's finches feed their young from the crop, as grain-eaters do, but not from the beak, as is usually the case with insect-eating families.”

If there are 'frequent mixtures' between species and genera, then the inference is that we are only dealing with one species here genetically (cf. also Goldschmidt, cited on p. 102).

In this context, I would like to remind the reader *of the great variability of the beak sizes and shapes of our domestic pigeons* (cf. p. 28) – differences that have occurred in many shapes in just a few centuries and which have partly been bred. Nobody has – because of the beak differences and the partly quite considerable anatomical and ethological differences in the domestic pigeon races – distinguished them as species. [In his 1987 article "Bill size

³⁴ <http://www.weloennig.de/Artbegriff.html>

polymorphism and intraspecific niche utilization in an *African finch*" (*Nature* **329**, 717-719), T. B. Smith points to another case of intraspecific beak variation: "*Differences in bill size between morphs exceed those reported for several sympatric species of Darwin's finches* believed to show character displacement, and like many co-occurring congeneric species the morphs differ in diet. ... Evidence that large- and small-billed forms can interbreed has also been reported" (p. 717)].

For further revealing points, see, for example, also Alberto A. Martínez (2011): *Science Secrets*. University of Pittsburgh Press, Pa. Chapter 5: *Darwin's Missing Frogs* (pp. 95-117).

In the following I have reproduced his notes (of p. 282) for Chapter 5 documenting in exact detail how far the legend about *Darwin and his Finches* was (and often still is) taken for granted – almost everywhere:

CHAPTER 5. DARWIN'S MISSING FROGS

1. Frank J. Sulloway, "Darwin and His Finches: The Evolution of a Legend," *Journal of the History of Biology* **15**, no. 1 (Spring 1982): 1–53.

2. For example, many students preparing for college admission exams have used study guides that included the statement: "It all began in the Galapagos, with these finches"—accompanied by a question asking to what "It" refers. The "correct answer" is: "(C) Darwin's theory of evolution." Sharon Weiner Green, Ira K. Wolf, eds., *Barron's How to Prepare for the SAT 2007*, 23rd ed. (New York: Barron's Educational Series, 2006), 582–83. Other examples: "What Darwin saw were thirteen distinct finch species, each closely resembling each other in most ways, yet each had a characteristic beak structure well suited to a particular (specialized) food source. . . . It was the finches that clinched it for Darwin," in Barry Boyce, *A Traveler's Guide to the Galapagos Islands* (Aptos, Calif., and Edison, N.J.: Galapagos Travel/Hunter Publishing, 2004), 15. "The finches were about the same size and all very similar in color. The only differences in the finches Darwin saw were their beaks and what kind of food they ate. There were finches that ate insects, seeds, plant matter, egg yolks and blood," in Liz Thompson, Michelle Gunter, Emily Powell, *Passing the Nevada 8th Grade CRT in Science* (Woodstock, Ga.: American Book Company, 2008), 194; also in Michelle Gunter, *Passing the ILEAP Science Test in Grade 7* (American Book Company, 2006), 132. "Later he saw in these finches the key to understanding the evolutionary process," in Michael Roberts, Michael Reiss, Grace Monger, *Advanced Biology* (Nelson: Delta Place, U.K., 2000), 724. Another biology textbook that remained unaware of Sulloway's findings is Peter H. Raven and George B. Johnson, *Biology*, 5th ed. (Boston: WCB/McGraw-Hill, 1999).

And the legend continues to be spread, for example, here (last updated 15 August 2020): "Darwin observed the Galapagos finches had a graded series of beak sizes and shapes and predicted these species were modified from one original mainland species."³⁵ – Well, i.e. only after Gould had explained it to him after Darwin had returned to England. Martinez comments (2011, p. 96):

"The popular myth that the Galápagos finches crucially inspired Darwin to think about evolution arose because in the *second edition* of his *Voyage of the Beagle* he added one sentence about finches: "Seeing this gradation and diversity in one small, intimately related group of birds, one might really fancy that from an original paucity of birds in this archipelago, one species had been taken and modified for different ends." But that brief comment was foreign to Darwin's travel books and thousands of research notes; there is no evidence that it represented his thoughts during his voyage in 1835. When he added that comment, in 1845, he had already believed in evolution for eight years. Yet the finches acquired fame partly because editions of his *Voyage* include an illustration of finches [by Gould] that, together with the

³⁵[https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3A_General_Biology_\(Boundless\)/18%3A_Evolution_and_the_Origin_of_Species/18.1%3A_Understanding_Evolution/18.1C%3A_The_Galapagos_Finches_and_Natural_Selection](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3A_General_Biology_(Boundless)/18%3A_Evolution_and_the_Origin_of_Species/18.1%3A_Understanding_Evolution/18.1C%3A_The_Galapagos_Finches_and_Natural_Selection)

quoted sentence, created the illusion that Darwin construed the finches as compelling evidence for evolution. Actually, Darwin's observations of finches were so scant that his thoughts on them were inconclusive guesswork – so much so that he did not refer to the Galápagos finches in his *Notebooks on transmutation* or use them as evidence for evolution in his *Origin of Species* of 1859.”

Supplement: Galápagos finches and the origin of birds

(14 and 15 October 2020)

Keeping in mind that the example of the Galápagos finches has been thought and intended to illustrate not only a “particularly compelling example of speciation” but also – by implication and extrapolation of their “evolution in action” – the mode of the origin of most if not all bird species, genera, families and orders alive or extinct, it is worthwhile to have a look at the fossil record of this fascinating group of organisms – Aves – and find out whether this record is in agreement with the neo-Darwinian theory of gradual evolution.

For the answer I'm quoting from my *Dialogue with an Evolutionary Geologist on Gradualism and Intelligent Design* <http://www.weloennig.de/ExplosiveOrigins.pdf> pp. 16 and 17 (see please also in this document the additional literature references for the following citation):

Bechly and Meyer, 2017, pp. 349/350: “The lineages of 95 percent of modern bird species also originated abruptly in during the Paleocene epoch or the Tertiary (or Paleogene) period as did most of the mammalian orders. Just like the placental mammalian radiation, the abrupt appearance of modern birds has been dated to a similarly narrow window of time from 65-55 mya. The recent genomic analysis by Richard Prum presented a comprehensive time-calibrated phylogeny of modern birds³⁶. This work suggests that only 4 bird lineages (ancestral species of Ratites, Galloanseres, Strisores, and the common ancestor of all remaining Neoaves) predated and survived the mass extinction event marking the Cretaceous-Tertiary (or Cretaceous-Paleogene) boundary. The most species-rich group Neoaves originated abruptly and diversified rapidly after this event³⁷. This **avian radiation, has been appropriately called the “explosive evolution of avian orders”³⁸, “avian explosion”³⁹, and even “Big bang for Tertiary birds”⁴⁰**. Moreover, no undisputed fossils of crown-group Neoaves have been found in sediments from the Cretaceous or older⁴¹, rendering dubious molecular studies placing the origin and diversification of modern avian orders prior to the Cretaceous/Tertiary boundary.”

ABC.: “I think that scientists are right about evolution because it's an evidence of nature that you can see,...” and “You can see the proof of evolution by real evidence... in the fossils, in the geological stratigraphy and its fossil records...” “I see those evidence clearly in the present and in the past both, like I said.”

Well, also the acclaimed German paleontologist Oskar Kuhn once commented that “The birds, too, emerged explosively...”⁴² and – as far as your student can understand – there is no real and clear evidence for a continuous evolution as an explanation for the “**explosive evolution of avian orders**”, “**avian explosion**”, and the “**big bang for Tertiary birds**”. Otherwise the evolutionary authors would have spoken of the *gradual* evolution of avian orders, the

³⁶ Richard O. Prum et al., “A comprehensive phylogeny of birds (Aves) using targeted next-generation DNA sequencing,” *Nature* 526 (2015): 569–573.

³⁷ Stephen L. Brusatte et al., “The Origin and Diversification of Birds,” *Current Biology* 25 (2015): R888–R898.

³⁸ Steven Poe and Alison L. Chubb, “Birds in a bush: five genes indicate explosive evolution of avian orders,” *Evolution* 58 (2004): 404–415.

³⁹ Gavin H. Thomas, “Evolution: An avian explosion,” *Nature* 526 (2015): 516–517.52

⁴⁰ Alan Feduccia, “‘Big bang’ for Tertiary birds?,” *Trends in Ecology and Evolution* 18 (2003): 172–176.

⁴¹ Gerald Mayr, “The origins of crown group birds: molecules and fossils,” *Palaeontology* 57 (2014): 231–242; Gerald Mayr, *Avian Evolution: The Fossil Record of Birds and its Paleobiological Significance* (Chichester: Wiley, 2016).

⁴² Oskar Kuhn. *Die Fossilen Vögel*. Verlag Oeben, Krailling bei München (1965).

continuous emergence of birds, and the very slow radiation by “infinitesimally small changes”, “infinitesimally slight variations” and “slow degrees and hence by “steps not greater than those separating fine varieties”, “insensibly fine steps” and “insensibly fine gradations” (Darwin, see please above).⁴³

Now, is there an alternative explanation to the dominant but doubtful theory of gradual evolution?

To make a long story short:

Especially in the context of our question of the origin of birds in general, why should it not be allowed – to mention several points – to infer

- (a) from the message to the messenger,
- (b) from the composition to the composer,
- (c) from the music to the musician,
- (d) from the work of art to the artist,
- (e) from the architecture to the architect,
- (f) from the laws to the legislators
- (g) and ultimately from intelligent design to the designer?

Particularly in contemporary biology paired with the following prohibitive categorical imperative/ban on thinking: “Even with the most complex and ingenious constructions in nature – as in birds –, never raise the question of intelligent design”?⁴⁴

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⁴³ As for the often asserted origin of birds from dinosaurs, see the discussion and links on pp. 60-62 of <http://www.weloennig.de/ExplosiveOrigins.pdf>

⁴⁴ See as a recent example the “Disclaimer” to the paper by Steinar Thorvaldsen and Ola Hössjer (2020): Using statistical methods to model the fine-tuning of molecular machines and systems <https://www.sciencedirect.com/science/article/pii/S0022519320302071> and the several intelligent comments on it at <https://evolutionnews.org/2020/>
Cf. for instance: <https://evolutionnews.org/2020/10/repentant-biology-journal-offers-a-weak-rebuttal-to-its-own-pro-id-fine-tuning-paper/>
<https://evolutionnews.org/2020/10/really-editors-claim-they-were-unaware-of-articles-intelligent-design-connections/>
Concerning the comment by Denise Kirschner, Mark Chaplain, and Akira Sasaki (the co-Chief Editors): “Moreover, the keywords “intelligent design” were added by the authors after the review process during the proofing stage and we were unaware of this action by the authors. **We have removed these from the online version of this paper.**” Well, the keyword “design” in its different forms (design, designed, designable, designability, Intelligent Design (ID), ID, design-inspired) still occurs **altogether 38 (thirty-eight!) times** including the well-known names of a series of intelligent design scientists (like Axe, Bechly and Meyer, Behe, Dembski, Ewert, Sanford and others **and their papers** discussing their basic arguments as well as those of their critics) even in the – **now by the co-Chief-Editors – corrected/rectified/ameliorated and patronized presently available paper** (see link above). Even so, **the design message of the paper is still as absolutely clear as it can be.** However, in my view it would have been wise of Steinar Thorvaldsen and Ola Hössjer not to have added the (for neo-Darwinians emotive and irritating) term “intelligent” (but how often?) to design “after the review process during the proof reading stage” (granted that this critique by the co-Chief Editors is correct*, this was a mistake, at least on the present totalitarian background of the synthetic theory in biology).

Nevertheless, considering the entire gist of the paper – design (and yes: intelligent design) – would it have been really too much to have expected from the peer reviewers and the editors **to also have had a brief look at the final version of the paper** by Thorvaldsen and Hössjer?

Regarding the comment in the Disclaimer: “The Journal of Theoretical Biology and its co-Chief Editors do not endorse in any way the ideology of nor reasoning behind the concept of intelligent design.” Now, could it not rather be the **materialist ideology** of the co-Chief-Editors (and those instigating them) to make such a fuss of the term “intelligent” added to design? And if the reasoning behind the concept of intelligent design is so totally wrong – why did the editors publish it? And why on earth should scientists not use “their addresses [which] are given on the paper as departments in bona fide universities”, i.e. in a paper passing the rigorous/strict/severe scientific peer review for publication, for example, for the *Journal of Theoretical Biology*?

*A further addendum 19 October 2020: The Journal Pre-proofs read:

“Using statistical methods to model the fine-tuning of molecular machines and systems
Steinar Thorvaldsen, Ola Hössjer PII: S0022-5193(20)30207-1 DOI: <https://doi.org/10.1016/j.jtbi.2020.110352> Reference: YJTBI 110352
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Please cite this article as: S. Thorvaldsen, O. Hössjer, Using statistical methods to model the fine-tuning of molecular machines and systems, Journal of Theoretical Biology (2020), doi: <https://doi.org/10.1016/j.jtbi.2020.110352>

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. **This version will undergo additional copyediting, typesetting and review before it is published in its final form**, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.”

https://www.researchgate.net/publication/341939847_Using_statistical_methods_to_model_the_fine-tuning_of_molecular_machines_and_systems (retrieved 19 October 2020)