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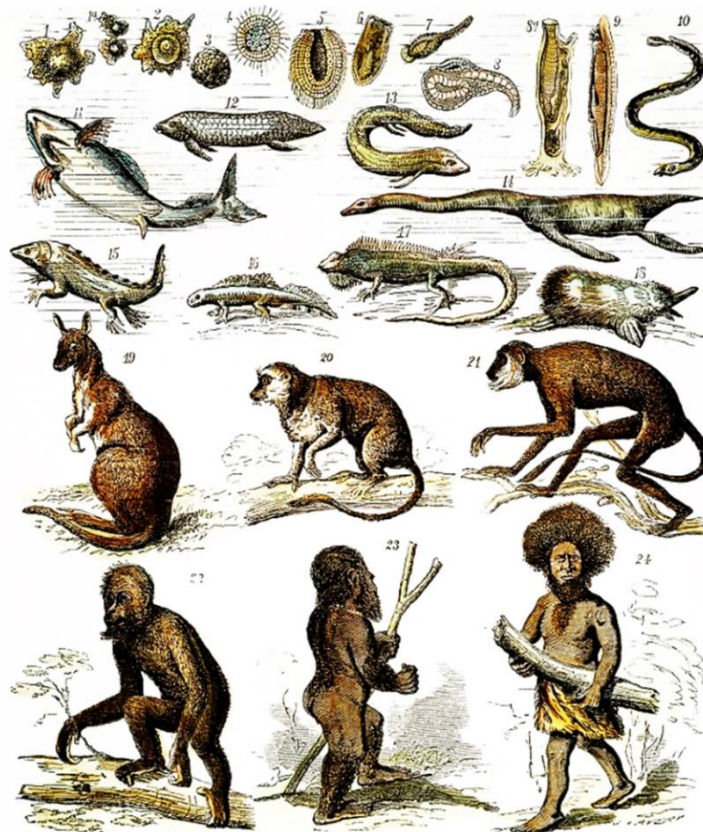
Wolf-Ekkehard Lönnig

Preliminary article 16/17 April 2026. Corrections 20/23 April 2026. (Note please that almost all highlighting in the typeface of the quotations by W.-E. L. except italics for genera and species names)
The AI citations have been regularly checked for their correctness. Questionable answers have mostly been critically discussed.

The Platypus (*Ornithorhynchus anatinus*) - an Ancestor of Humans?



1



2

“This image showcases ‘The Modern Theory of the Descent of Man’ as illustrated in an evolutionary chart created in 1876 [1871] by Ernst Haeckel, a prominent advocate of Darwinism in Germany. The chart visually depicts the evolution from protoplasm to Papuan, showing the development of life forms over time. This wood engraving provides a historical glimpse into the scientific understanding of evolution during the late 19th century.”³ (See No. 18 for the Platypus and No. 19 for the Kangaroo as ancestors of humans.)

¹ https://de.wikipedia.org/wiki/Datei:Duck_billed_platypus_schnabeltier.jpg (Source: The Wonderful Paleo Art of Heinrich Harder, ca. 1916)

² <https://www.amazon.de/Evolution-Chart-Modern-Descent-Protoplasm/dp/B07D672R4J>. Licensor - Granger Collection (wood engraving originally without color.)

<https://www.granger.com/0011258-evolution-chart-the-modern-theory-of-the-descent-of-man-evo-image.html>

³ <https://www.amazon.de/-/en/Evolution-Chart-Modern-Descent-Protoplasm/dp/B07D67LF4S> <https://www.granger.com/0011258-evolution-chart-the-modern-theory-of-the-descent-of-man-evo-image.html>

Abstract

First, I have shown an artwork by Heinrich Harder (ca. 1916) to answer the question how the platypus males and females look like, followed by Ernst Haeckel's chart (1871/1876) depicting the evolution from protoplasm to humans including the platypus and kangaroo as direct ancestors of mankind (Haeckel was the most important and most celebrated Darwinian of the 19th Century in the German speaking countries with translations and repercussions worldwide).

Second, a brief overview on the history and the extravagant combination of several of the mosaic features of the platypus is given quoting qualified biologists (from Cuvier 1817 over Darwin 1836 to Warren et al. 2008 as well as some scientific and popular sources up to the present – see the extensive footnotes on these points).

Third, AI provides access to an accurate summary on the present assessment of Haeckel's chart according to the current evolutionary view of his chart: Message: Today no evolutionary biologist follows Ernst Haeckel anymore on his “groundbreaking”, “highly influential” linear “ladder of progress”.

Fourth, the basics of the present Neo-Darwinian Theory of Evolution is repeated because often even excellent researchers are not fully aware of them.

Fifth, the main characteristics of the platypus are listed – “an egg-laying, semi-aquatic, milk-sweating, knuckle-walking, duck-billed, electro-recepting, stomach-lacking, prehensile-tailed, venomous-footed mammal with skin that glows under UV light” – and shown and discussed on the following pages.

Sixth, the bill is “the most remarkable organ for sensory perception found in the animal kingdom”. Also, the platypus “must be considered a highly evolved animal and not just a primitive transition between reptiles and mammals” (Ann Moyal 2010). Moreover, “**bill sensitivity**“ **is backed up by a large territory of the cortex** devoted to processing information from the bill” (Roger B. Mars 2026 referring to a paper of Lea Kubitzer 1998).

Seventh, the theory of gradual Evolution/Neo-Darwinism is applied in detail to the questions of the origin of the Platypus BILL/BEAK and CORTEX and shown to be inadequate.

Eighth, following this point, Neo-Darwinism is also applied to the origin of the platypus' vomeronasal organ and was equally found wanting as is true for the series of the altogether 15 of the animals's main characteristic structures and organs, which have been chosen for this article (webbed feet; eyes, ears and nostrils shut when swimming; thick waterproof fur; cheek pouches for storing food; wide flat tail; the spurs, which can produce ‘snake-like venom released from back claws of males’, including five putatively new toxins; lactation and lactation genes; sex determination; complex sex chromosomes; and biofluorescence).

Ninth, the multicomponent spur was given extended attention to because this organ is **without its functions during the first 9-12 months of the male platypus development**. Question: How could the extensive genetic code, the many genes for that multifunctional anatomical and physiological system (including the information for new polypeptides and enzymes) have arisen **independently of each** other by “infinitesimally small changes”, “infinitesimally slight variations”, “insensibly fine steps” and “insensibly fine gradations” for “natura non facit saltum” (Darwin) – each of the countless insensibly fine steps finally deciding over the life and death of the entire population wherever and whenever it occurred? Let's recall Ernst Mayr's doubtful assertions that “The smaller the effect of a mutation, the greater the probability that it will be advantageous.” [...] “...indeed there is no difference between mutations and the so-called small variations which Darwin and the naturalists had regarded as the principal material of evolution”. Now, population genetics has shown the exact opposite: Most mutations “with slight or even invisible effects on the phenotype” (also Mayr) are either neutral or slightly deleterious (see Tomoko Ohta 1973, John C. Sanford 2015, and many others). Main point: **How can natural selection select anything that has no function at all?**

Tenth, moreover the revision of the former outdated views on the monotremata, the order to which the platypus belongs, is summed up in the words of Jack Ashby (up to 2026) as follows: “...They [the Australian mammals] are considered fondly but not fairly. It is extremely common to see phrases such as ‘weird and wonderful’, ‘bizarre’, ‘strange’ and ‘peculiar’ being used. One illustrative example is a recent cover-story about platypuses in BBC Wildlife magazine which read, ‘Stranger things / Up close with nature's weirdest mammal’ (Vergnani, 2019). Elsewhere, The New York Times' coverage of a story relating to monotreme genomes described the platypus as ‘a Frankencreature’ (2021). Additionally, in a slightly different way, platypuses and echidnas – but also marsupials – are regularly described as ‘primitive’”, which is simply nonsense.

Eleventh, Casey Luskin's table on *A Positive, Testable Case for Intelligent Design* is cited showing clearly the criteria for testing the ID Theory. Note in this context, please, that all the new specific platypus features, for which there is not even a starting point in any of its hypothetical ancestors or which appear only later in mammals and birds must have arisen **either totally de novo** (involving at least 3.284 protein coding **orphan genes** – not to speak of the regulatory ‘rest’ of the its genome) – **or by ‘convergence’** respectively. According to the ENCODE project some 80% of the human genome is functional. So, what about ID, which predicted years before this discovery that non-protein-coding DNA – formerly thought to be “junk” – would be instrumental in regulating gene expression and more?

Twelfth, since the Synthetic Theory of Evolution has proven to be systematically inadequate for its task to explain the origin of the platypus and, in contrast to this, the scientific ID-Theory has proven its worth (see the 4747 articles linked to in the article up to 15 April 2026), first/at present/for the time being I would like to invite my readers to apply the Intelligent Design Theory as shown by Luskin and many others to the 15 points discussed above.⁴

⁴ The Abstract was written on 25/26 April 2026

Brief Overview in Form of Key Quotes

“Only two species are known, one with reddish, fine, smooth hair (*Ornithorhynchus paradoxus*⁵. Blum.) The other with blackish-brown hair, flattened and curly. Perhaps these are only age varieties.”
(See the detailed description by Cuvier in the footnote.)

Georges Cuvier 1817⁶

“A little time before this I had been lying on a sunny bank & was reflecting on the strange character of the animals of this country [Australia] as compared with the rest of the world.

An unbeliever in everything beyond his own reason might exclaim, “**Two distinct Creators must have been at work; their object, however, has been the same & certainly the end in each case is complete.**” (Passage in later editions deleted after he had become a believer in unlimited and omnipotent natural selection.)

Charles Darwin 1836⁷

“Since it first became known to European scientists and naturalists in 1798, **the platypus has been the subject of controversy, interest and absolute wonder.** Found only in Australia, the platypus is a mammal that lays eggs but, like other mammals, it has fur and suckles its young on milk. platypus has been the subject of controversy, interest and absolute wonder.”

Tom Grant (‘has spent 40 years trying to unravel the secrets of the platypus’)⁸

“The platypus is nature’s crazy quilt, as this strange creature looks like **about a half-dozen different animals all rolled into one.** Turns out that platypuses were hiding yet another conspicuous feature: They can freakin’ glow in the dark.”

George Dvorsky⁹

“Meet **the world’s most confusing animal**, the platypus: It’s venomous, has an electric organ, glows in the dark and sweats milk...The animal in question also has a fleshy bill, webbed feet and sharp claws. ...they glow a soft blue green under blacklight – which may be a by-product of a camouflage strategy involving UV absorption, although **it’s hard to say for sure.** In other words, even as we come up with new ways to study platypuses, **they continue to blur our categories and confuse our boundaries.**”

From the Team at BBC Wildlife Magazine¹⁰

“However, it is far from true that biogeography unambiguously supports common ancestry, ... Sometimes it has been the discovery of fossils that created biogeographical puzzles, like the discovery of **a fossil platypus from South America** (Pascual et al. 1992), or a fossil hummingbird from Europe (Louchart et al. 2008), which **destroyed the previously undisputed evolutionary stories about the endemic origins of these groups.**

Günter Bechly¹¹

“*Ornithorhynchus*, the **Duck-bill Platypus**, is another example of **Darwin’s living fossils.**”

Sidney F. Harmer and Walter G. Ridewood (eds.)¹²

“Platypuses are extremely unusual creatures: they are a mixture [W.-E. L.: a mosaic] of **birds, reptiles, and mammals** — **and this is also reflected in their genome**, which has now been completely sequenced. Their genetic material could even provide new insights into the evolution of mammals.”

Spiegel Wissenschaft¹³

“Many characteristics of living beings are distributed so unsystematically that it is difficult to reconstruct family trees, and this is often not possible in an unambiguous way. The characteristics often appear to be assembled from different basic types, as if according to a modular system. This is also increasingly evident in the organization of the genetic material of living beings. **A modular system is easy to interpret within the framework of a creation model, since a creator is free to combine characteristics as desired.**”

Reinhard Junker and Henrik Ullrich (on “Baukastensystem”/modular system)¹⁴ – similarly other creationists and ID theorists¹⁵

“This monotreme [*Ornithorhynchus anatinus*] exhibits a fascinating combination of reptilian and mammalian characters.

For example, platypuses have a coat of fur adapted to an aquatic lifestyle; platypus females lactate, yet lay eggs; and males are equipped with venom similar to that of reptiles. **Analysis of the first monotreme genome aligned these features with genetic innovations.** We find that reptile and platypus venom proteins have been co-opted **independently** from the same gene families; **milk protein genes are conserved despite platypuses laying eggs;** and immune gene family expansions are directly related to platypus biology. Expansions of protein, non-protein-coding RNA and microRNA families, as well as repeat elements, are identified. Sequencing of this genome now provides a valuable resource for deep mammalian comparative analyses, as well as for monotreme biology and conservation.”

Wesley C. Warren et al. (more than 100 (one hundred!) co-workers/co-authors)¹⁶

⁵ “George Shaw, keeper of the natural history collections at the British Museum (which were to later become the Natural History Museum), accepted the platypus as a real animal. [W.-E.L.: after first he had suspected it to be a hoax in 1798; see https://de.wikipedia.org/wiki/George_Shaw; retrieved 13 Febr. 2026.] In 1799 he was the first to scientifically describe it, assigning it the species name *Platypus anatinus*, meaning flat-footed duck. However, *Platypus* was already in use as the name of a genus of wood-boring ambrosia beetles. So in 1803 Johann Friedrich Blumenbach published another description of the animal under the name *Ornithorhynchus paradoxus* - ‘paradoxical bird-snout’. The animal later became recognised as *Ornithorhynchus anatinus*, meaning bird-snouted flat-foot. This hybrid name was accepted in accordance with the rules of priority when classifying animals with scientific names.” <https://www.nhm.ac.uk/discover/the-platypus-puzzle.html>

⁶ <https://darwin-online.org.uk/content/frameset?itemID=A759.01&keywords=platypus&viewtype=text&pageseq=264> Cuvier: “Their elongated snout, which is also unusually broad and flattened, bears a striking resemblance to a duck’s bill, especially since its edges are lined with small transverse blades. There are only two teeth at the back of the mouth, without roots, with flat crowns, and composed, like those of the aardvark, of small vertical tubes. The front feet have a membrane that not only joins the toes, but also extends well beyond the nails; in the hind feet, the membrane ends at the root of the nails, two characteristics which, together with the flattened tail, make ornithorhynchus aquatic animals. Their tongue is, in a way, double, one in the beak, bristling with villi, and another at the base of the first, thicker, and bearing two small fleshy points at the front. The stomach is small, oblong, and has the pylorus near the cardia. The cecum is small: many protruding, parallel blades can be seen in the intestine. The penis has only two tubercles. Platypuses inhabit the rivers and marshes of New Holland, near Port Jackson. Only two species are known: one with reddish, fine, smooth hair (*Ornithorhynchus paradoxus*. Blum.) The other with blackish-brown, coarse, crimped hair. Perhaps these are only age-related variations. Translated by DeepL.”

⁷ https://darwin-online.org.uk/converted/Ancillary/2011_Was_Darwin_an_atheist_A1283.html

⁸ See also: <https://www.mja.com.au/journal/2009/191/11/charles-darwins-impressions-new-zealand-and-australia-and-insights-his-illness>
Darwin then observed an antlion larva (family Myrmeleontidae), with its conical pit, entrap an unwary fly and compared the larva with its European equivalent. He wrote: “Now what would the Disbeliever say to this? Would any two workmen ever hit on so beautiful, so simple & yet so artificial a contrivance? It cannot be thought so. — *The one hand has surely worked throughout the universe.*” More here: <https://darwin-online.org.uk/content/search-results?freetext=Two%20distinct%20creators>. See more at AI and the book of “**Jack Ashby, author of *Platypus Matters* [2023]: The Extraordinary Story of Australian Mammals, strongly argues that the platypus is not ‘primitive’.** While they are often labeled as such because they lay eggs (a trait shared with reptiles), Ashby explains that they are actually highly specialized, “wonderfully adapted” creatures that are a “pinnacle of evolution” for their specific ecological niche.” Also: “Ashby argues that calling the platypus—or any living creature—“primitive” is scientifically inaccurate and a misconception rooted in colonial history, which viewed Australian fauna as inferior or “evolutionary backwaters.”” (AI 12 February 2026)

⁹ Tom Grant (2008): The Platypus – A unique Mammal. 4th Edition. CSIRO Publishing. “**Dr. Tom Grant has spent 40 years trying to unravel the secrets of the platypus.**...” <https://www.timeforom.com.au/my-top-five-dt-tom-grant/>

¹⁰ Senior editor, Science at <https://gizmodo.com/as-if-the-platypus-couldn-t-get-any-weirder-152529134>

¹¹ <https://www.discoverwildlife.com/animal-facts/platypus> (2025)

¹² <https://scienceandculture.com/2018/06/rafting-stormy-waters-when-biogeography-contradicts-common-ancestry/>

¹³ <https://darwin-online.org.uk/content/search-results?freetext=Platypus&page=2&pagesize=50&sort=date-ascending>

¹⁴ <https://www.spiegel.de/wissenschaft/natur/erbgut-des-schnabeltiers-sequenziert-vogel-saeugtier-und-reptil-zugleich-a-552127.html> “Schnabeltiere sind äußerst ungewöhnliche Lebewesen: Sie sind eine Mischung aus Vögeln, Reptilien und Säugetieren - und dies spiegelt sich auch in seinem Genom wider, das jetzt komplett sequenziert wurde. Das Erbgut könnte sogar neue Erkenntnisse über die Evolution der Säugetiere liefern.”

¹⁵ <https://www.amazon.de/Evolution-kritisches-Lehrbuch-Reinhard-Junker/dp/3921046106> “Viele Merkmale der Lebewesen sind so unsystematisch verteilt, dass es schwierig ist, Stammbäume zu rekonstruieren und dies häufig nicht in eindeutiger Weise möglich ist. Häufig erscheinen die Merkmale wie nach einem Baukastensystem in verschiedenen Grundtypen zusammengesetzt. Dies zeigt sich auch zunehmend in der Organisation des Erbguts der Lebewesen. **Ein Baukastensystem ist im Rahmen eines Schöpfungsmodells leicht interpretierbar, da ein Schöpfer frei ist, Merkmale beliebig zu kombinieren.** (See also a good summary at AI.). R. Junker: <https://www.wort-wissen.org/wp-content/uploads/01-3.pdf>. Similarly, Junker & Scherer (2006, p. 172, 305; 2013, p. 328: “Baukastensystem”); <https://www.amazon.de/Evolution-kritisches-Lehrbuch-Reinhard-Junker/dp/3921046106>

¹⁶ For example, Michael Eggleton (2025/2026): The Puzzling Platypus: <https://whatyareckon.com/wp-content/uploads/2025/09/the-puzzling-platypus.pdf> (“Its unique combination of features provides further evidence for the intelligent, purposeful design in all of God’s creation. Finding these features together in one creature highlights something very different to ‘convergent evolution’. It displays the Master Designer exercising His prerogative to use design principles shared across different groups. And to do so in whatever combination He chooses, whether or not it fits readily within any evolutionary narrative.”). ID: <https://intelligentdesign.org/articles/testable/> (2017)

¹⁷ https://www.researchgate.net/publication/23250357_Genome_analysis_of_the_platypus_reveals_unique_signatures_of_evolution (8 March 2008)

Back to Haeckel (1871/1876): Accurate Summary at AI:

AI: "Evolution from Protoplasm to Papuan" refers to a famous 1876 [1871] evolutionary chart by German biologist Ernst Haeckel, illustrating the **supposed descent of humanity** (represented by a Papuan) **from simple life forms** (protoplasm), a visual representation of Darwinian evolution *showing humans evolving through various stages* from single-celled organisms to apes and then to early humans, reflecting 19th-century scientific understanding.

Key Aspects of Haeckel's Chart:

Title: "The Modern Theory of the Descent of Man". **Creator:** Ernst Haeckel, a strong advocate for Darwinism in Germany. **Concept:** *Depicts a linear progression of life, starting from the simplest protoplasm (early life) through various ancestral forms, culminating in modern humans*, with the Papuan often used as an example of a "primitive" human ancestor. **Significance:** *It was a highly influential*, though simplified and sometimes inaccurate, visual summary of evolutionary theory in the late 19th century, showcasing the idea that all life shares common ancestry.

Modern Understanding vs. Haeckel's Chart: Haeckel's chart presents a simplified, **linear "ladder of progress" view of evolution**, which is now understood as a more complex, branching "tree of life". While **groundbreaking for its time**, it's considered a historical artifact reflecting early evolutionary thought rather than a precise scientific diagram by today's standards.¹⁷

W.-E. L.: "[T]he majority of platypus genes (82%; 15,312 out of 18,596) have orthologues in these five amniotes" (see Warren et al. below). Perhaps today Haeckel would argue from these 82% DNA sequence similarities for his chart. Moreover, the platypus is still called "a **BRIDGE animal** because it shows characteristics of both mammals and reptiles, acting as a link between these two groups" (file "Worlds only instant tutoring platform" 2025). AI adds: "birds".

Nevertheless, as far as I can understand it, today no evolutionary biologist follows Ernst Haeckel anymore on his "groundbreaking", "highly influential" linear "ladder of progress" including the platypus being a direct ancestor in the line to humans. Often enough the world has been converted to the belief in Darwin's continuous evolution by absolute nonsense.¹⁷

Basics of the Present Neo-Darwinian Theory of Evolution

Since the basics of the Darwinian and Neo-Darwinian theory of evolution are regularly overlooked when concrete biological examples are discussed – according to my experiences often even excellent researchers are not fully aware of them – *I have to repeat them here also*¹⁸:

1. **Gradualism:** "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*" (Dawkins).¹⁹

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

A few reminders (*cf.* <https://www.weloennig.de/Hummingbirds.pdf>, p. 6):

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.*"²⁰

Virtually the same answer is presented by Neo-Darwinism today (see Barton, B. and D. Charlesworth, Coyne, Dawkins, Futuyma, Kutschera, Mayr, Moran, Muller and many others²¹).

2. **Mutations (accidental/haphazard/random DNA sequence changes):**

"No biologist will doubt that the diversity of blueprints for different organs is ultimately due to mutation processes" (Gottschalk).

"Evolution by natural selection could not be faster than the mutation rate, for mutation is, ultimately, the only way in which new

¹⁷Haeckel viewed the platypus as a "transitional form" or a "missing link" that connected reptiles to mammals. Because the platypus has fur (mammal) but lays eggs (reptile), he argued it demonstrated the gradual evolution from lower vertebrates (reptiles/amphibians) to higher mammals." (According to AI: 12 February 2026). In StudySmarter for students, the following is still claimed today: "*The platypus is considered to be the link between reptiles and mammals.* Unlike many fossilized bridge animals, it is a modern creature, as it still exists today. Platypuses combine characteristics of both reptiles and mammals."

¹⁸ <https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf>

¹⁹ Dawkins R: The Greatest Show on Earth. Free Press, New York (2009, p. 155). Emphasis added. See also comments on Dawkins at <https://www.weloennig.de/KoalaPart2.pdf> and <https://www.weloennig.de/PANDA.Part1.pdf> p. 9.

²⁰ <https://darwin-online.org.uk/>

²¹ <https://www.weloennig.de/ExplosiveOrigins.pdf> and <https://www.weloennig.de/AesV3.html>

variation enters the species” (Dawkins).

“New mutations are the ultimate source of the genetic variation upon which biological evolution depends” (Ayala and Kiger).

Objection concerning evolutionary novelties “I have seen no evidence whatsoever that these changes can occur through the accumulation of gradual mutations” (Margulis; similarly Goldschmid, Gottschalk, Grassé and many other renowned biologists).²² See perhaps also Lönnig <https://www.weloennig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf>.

3. Natural Selection:

“Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind's eye. It does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker” (Dawkins).

“But there is even more cause for wonder. For the process of evolution – natural selection, the mechanism that drove the first naked, replication molecule into the diversity of millions of fossil and living forms – is a mechanism of staggering simplicity and **beauty**” (Coyne).

“I can see no limit to this power, in slowly and **beautifully adapting** each form to the most complex relations of Life” (Darwin). “Natural selection comes **close to Omnipotence**” (Avisé). “...both the **beauty** and the brilliance of natural selection are reflected in its **omnipotence** to explain the myriad observations of life” (Exley). “The **omnipotence of natural selection**” (book title: Weismann). Another author speaks of “The triumph of natural selection” (Mayr). For further documentation and systematic refutation of these assertions, see the link in the footnote²³.

4. Convergence:

“Convergent evolution is the independent evolution of similar [or identical] features in species of different lineages. Convergent evolution creates analogous structures that have similar [or even identical] form or function but were not present in the last common ancestor of those groups.”²⁴

Some objections: “Convergence is a deeply intriguing mystery, given how complex some of the structures are. Some scientists are skeptical that an undirected process like natural selection and mutation would have stumbled upon the same complex structure many different times.” (Meyer, Minnich, Moneymaker, Nelson, Seelke).

“Now it is precisely the phenomenon of convergence that poses further major problems for neo-Darwinism. For if the one-time emergence of completely “adapted” organs or characteristics through selection of random mutations can hardly be explained, the multiple formation of similar organs eludes the Neo-Darwinian interpretation even further” (Henning Kahle).²⁵

See more on the improbabilities involved in convergence due to accidental/haphazard/random DNA mutations in <https://www.weloennig.de/KoalaPart2.pdf>, pp. 8-10 and 11-12.

Back to the Main Characteristics of the Platypuses

Jack Ashby has written the following beautiful introduction into the topic (2022, p. 31) in his award-winning book *Platypus Matters: The Extraordinary Story of Australian Mammals*:

“Truly, platypuses are things of pure wonder. They combine an incredible array of characteristics and behaviours from across the animal kingdom as well as demonstrating qualities that are all but unique among mammals. The platypus has **a body like a mole, feet like an otter, hamster-like cheek pouches and horny grinding pads in its mouth instead of teeth**, which it uses to crush up insect larvae, crustaceans, worms and occasionally tadpoles and snails. And, most conspicuously, it has **a beak**, which at first appears almost indistinguishable from that of a duck... As if all that weren't astounding enough, **these semi-aquatic burrowing mammals lay eggs, but also produce milk – despite having no nipples** (an old joke is that platypuses are the only animals that can produce their own custard). **They hunt underwater with their eyes closed while sensors in their bills detect the electricity given off by their prey's beating hearts**. Their **fur fluoresces under UV light**, but we don't know why (if indeed there is a reason). **And the males are venomous. They amaze me.**”²⁶

Or, as an anonymous commentator of the German version of the evolutionary video on *Die Verrückte Biologie des Schnabeltiers* (with English subtitles – 2.8 Mio views and 1953 commentaries) summed it up:

“As an egg-laying, semi-aquatic, milk-sweating, knuckle-walking, duck-billed, electro-recepting, stomach-lacking²⁷, prehensile-tailed, venomous-footed mammal with skin that glows under UV light, the platypus **is like a very out of hand spec-evo creature**²⁸...except its real.”²⁹

And another point on this “pure wonder” is this – as Rohit Pant comments:

“They used to be giants: The ancient versions of a lot of modern animals, including penguins, were oversized monsters compared to the animals we know today—and platypuses are no different. In 2013, the discovery of a single tooth helped researchers identify a prehistoric platypus that **was more than three feet long—double the size of the modern animal**. ... **They lack a stomach**: Platypuses ... aren't the only animals to forgo an acid-producing part of the gut; spiny echidnas, **and nearly a quarter of living fishes all have a gullet that connects directly to their intestines.**”³⁰

²² <https://www.weloennig.de/AesV3.html> and https://www.weloennig.de/Gesetz_Rekurrente_Variation.html

²³ <https://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf> (see text and also footnote on p. 11 for the use of “omnipotence” for natural selection).

²⁴ https://en.wikipedia.org/wiki/Convergent_evolution (retrieved 31 March 2026) [“identical” added by W.-E. L.: See, for examples, next footnote and Parker J, Tsagkogeorga G, Cotton JA, et al. (2013) Genome-wide signatures of convergent evolution in echolocating mammals. *Nature* 502 (7470): 228–231.]

²⁵ <https://www.weloenni2025g.de/SauropodDinosaur.pdf> See moreover <https://scienceandculture.com/?s=convergence>

²⁶ HarperCollins Publishers. Kindle-Version.

²⁷ Some critique by Nicol et al. here <https://connectsci.au/az/article-abstract/44/3/492/267604/Does-the-platypus-have-a-stomach-The-perils-of?redirectedFrom=fulltext>

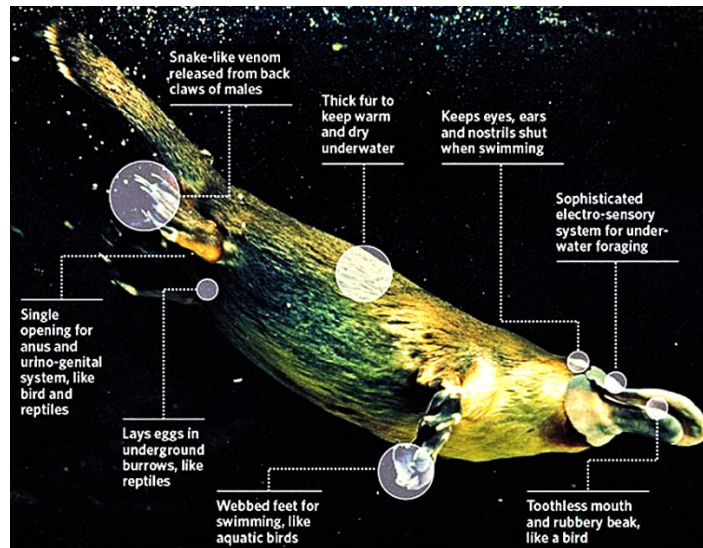
²⁸ AI: “**A spec-evo** (speculative evolution) **creature** is a hypothetical organism designed through artistic and scientific reasoning to exist in a plausible, alternate, or future environment.”

²⁹ Die verrückte Biologie des Schnabeltiers <https://www.youtube.com/watch?v=Wh2du5SOjmY&t=49s> (Retrieved 19 February 2026)

³⁰ <https://www.youtube.com/watch?v=Wh2du5SOjmY&t=49s> (@RohitPant04).// Also the authors at Watergum <https://watergum.org/courses/platypus-watch-induction/lessons/platypus-anatomy/> “Platypuses have no stomach. Like echidnas **and around 25% of living fish species, their food is transported straight to the intestines for mineral absorption**, skipping the acid digestion phase.” (Retrieved 23 February 2026)

As for the fossil details, see Jack Ashby (2022, pp. 65 of 442) in the footnote below³¹.

Applying Neo-Darwinism to the Origin of the Platypuses - Let's Start with the Anatomy:



Platypus Anatomy: Watergum <https://watergum.org/courses/platypus-watch-induction/lessons/platypus-anatomy/> Credit: National Geography³²

THE BILL/BEAK: AI: “A sensitive, rubbery, electroreceptive bill” or “Bill (Snout): Soft, leathery, and covered with thousands of receptors (electroreceptors and mechanoreceptors) used to detect prey in muddy, dark water”³³ or – as shown in the figure above: “Toothless mouth and rubbery beak, **like a bird**” [see however below] and “sophisticated electro-sensory system for underwater foraging.”

Jack Ashby (2022, p. 32):

“**Platypuses’ bills** are equipped with not one, but **two sensory systems**, which enable them to find food when the other senses have been shut off. Like most other aquatic mammals, platypuses close their nostrils when diving, eliminating smell (however, **they do have an olfactory sense organ that opens into their mouth, called the vomeronasal organ**, which could possibly be used underwater to detect chemicals given off by prey or the scent glands of other platypuses).”³⁴

Maggie Ryan Sandford (2019, p. 22):

“[A] team of geneticists in 2008 found that Glennie’s **bill** featured an **elaborate radar system** (sort of): a combination of touch receptors and electroreceptors that allowed her to pick up movements and low-frequency electrical signals in her prey **like some kind of Dadaist shark**³⁵. Indeed, **most of the other animals that use electricity as a sixth sense are fish**. But the genetic patterns that bring about the trait in platypuses read the same.”³⁶

However, AI (26 February 2026) on platypus’ electroreception and the genetic pattern so far known:

“The platypus (*Ornithorhynchus anatinus*) genome, first fully sequenced in 2008, reveals a **unique genetic blueprint** that explains its ability to use electroreception—a “sixth sense” to detect electric fields—to hunt prey in murky water.

“**Unique Electroreceptors:** The platypus bill is covered with roughly 40,000 electroreceptors that can detect weak electrical fields (as low as 20–50 V cm⁻¹) created by the muscle contractions of prey like shrimp and snails.

“**Genetic Basis:** The genome contains genes similar to those in reptiles and **birds**, which contributes to their unique sensory capabilities. The electroreception system is believed to have evolved independently from that of fish.

“**Independent Evolution:** While fish use electroreceptors for hunting, the platypus evolved this ability independently, **utilizing a completely different, independent, and more specialized system**.

“**Hybrid Sensory System:** The bill is a “mechano-electro-sensitive antenna,” combining **40,000 electroreceptors with 60,000 mechanoreceptors** to detect both electricity and pressure waves.

³¹ Ashby, Jack (2022): Platypus Matters: The Extraordinary Story of Australian Mammals (English Edition) (S.65-66). HarperCollins Publishers. Kindle-Version.

³² “A handful of fossils from the last 26 million years have been discovered in Queensland and South Australia that represent species in the genus *Obdurodon* (...). Like the earlier fossils, this genus was also first described from fossilised teeth (*Obdurodon* means ‘enduring teeth’), and the subsequently discovered 15-million-year-old skull of a species named *Obdurodon dicksoni* bears a striking resemblance to modern platypuses, except for the large crushing teeth it has at the back of its jaws. When palaeontologists discovered a single, large platypus tooth in 2012, the press went to town on stories of a “giant extinct platypus”. Based on just that one tooth, which was between 5 and 15 million years old, the researchers scaled the animal up to around a metre (3 feet) long, roughly twice the size of a modern platypus. They accompanied the announcement of the discovery with an artist’s reconstruction of the beast crushing a freshwater turtle in its bill. It was named *Obdurodon tharalkooschild*, in honour of Tharalkoo, a duck who gave birth to the platypus in an Aboriginal origin story.[37] The oldest fossils that are thought to belong to our modern-day platypus are 3.8 million years old [38].”

³³ Platypus Anatomy: Watergum <https://watergum.org/courses/platypus-watch-induction/lessons/platypus-anatomy/> Credit: National Geography (Retrieved 23 February 2026)

³⁴ Also retrieved 23 February 2026 (description is correct).

³⁵ Ashby, Jack. Platypus Matters: The Extraordinary Story of Australian Mammals (English Edition). HarperCollins Publishers. Kindle-Version (page numbers different from the printed edition).

³⁶ AI: A “Dadaist shark” refers to the iconic conceptual artwork by Damien Hirst titled The Physical Impossibility of Death in the Mind of Someone Living (1991), which features a tiger shark preserved in a tank of formaldehyde. It is considered Dadaist or Neo-Dadaist because it utilizes the “readymade” concept—taking an object out of its natural context and placing it in a gallery—to challenge the traditional definition of art, much like Marcel Duchamp did with his urinal, *Fountain*. The artwork: A 14-foot tiger shark submerged in a vitrine filled with formaldehyde. Dadaist/Conceptual Nature: By presenting a dead animal as art, Hirst forces viewers to confront themes of mortality, the sublime, and the nature of art itself, rather than appreciating artistic skill.” (Retrieved 24 February 2026.)

³⁷ Sandford, Maggie Ryan. Consider the Platypus: Evolution through Biology’s Most Baffling Beasts (English Edition) (p. 22 of 263). Workman Publishing Company. Kindle-Version (page numbers different from the printed edition).

Ann Moyal (2010, 'position 906' and 2097/2114 in the Kindle edition) on that most fascinating platypus bill:

“The **platypus bill** has been described as **the most remarkable organ for sensory perception found in the animal kingdom**. Moist, soft and highly flexible (quite unlike the hard bill of a duck) the whole is covered with a dense array of pores leading to highly specialized and sensitive ‘touch-corpuscles’ which give the animal an acute extra sense.”

“Ever since the animal’s first dramatic appearance in London nearly two centuries earlier, this curious flap of skin extending from the base of the duckbill’s upper and lower jaws had puzzled and vexed observers. **Its very presence suggested that the animal was a hoax**. Mother Nature would never make so botched and untidy a join!”

“Research on the electric monotreme opened unexpected new doors. In certain marine and freshwater **fish**, their electric receptors are known to consist of a specialized hair cell that communicates with the skin surface. Here the receptor cell responds to a stimulating voltage by secreting a chemical which excites the nerve fibres. **In the case of the platypus, the electric stimulus excites the nerve fibre directly and there is no chemical mediator**. Excited researchers now grasped the fact that not only had nature produced at least two distinctly different electrosensory systems in the evolutionary scheme but, in Proske’s words, ‘if an entire sensory system has evolved de novo in the platypus, **it must be considered a highly evolved animal and not just a primitive transition between reptiles and mammals**.’”³⁷

Alex Fornito et al. (2025, p. 12): “... echolocating **bats** have an expanded auditory cortex and **the sensory cortex of the platypus has a notoriously large bill representation**.”³⁸

Also, neuroscientist Rogier B. Mars (2026, p. 58) mentions the captivating detection that platypus’ **bill sensitivity “is backed up by a large territory of the cortex devoted to processing information from the bill”**:

“In one of my favorite examples, Krubitzer mapped the representation in the **neocortex of the bill of the platypus**. This animal explores the world through sensing electrical impulses generated by muscle contractions of other animals by using its bill. It turns out, **this sensitivity is backed up by a large territory of the cortex devoted to processing information from the bill**. In contrast, for the raccoon, to take a random example, it is information from the hand that gets assigned the most cortical territory.”³⁹

How old might the key feature be? Evolutionary biologist Tom Grant (2013, p. 101) on the fragmentary fossil record:

“In 1995, jaw fragments and teeth from two more fossils were found. Both were **around 100 million** years old – one from Lightning Ridge in New South Wales (*Kollikodon ritchiei*) and the other from a marine rock platform in Victoria (*Teinolophos trusleri*). Although different from any fossil previously found, **they were thought to have been platypus-like in basic form and to have lived in aquatic habitats**. These species were different enough from each other and from the species attributed to the platypus family for them to be placed into two separate families. *Kollikodon ritchiei* has been placed into its own family (Kollikodontidae) and *Teinolophos trusleri* into the same family as *Steropodon galmani* (Steropodontidae). The increasing diversity of these fossil monotreme discoveries continues to support the hypothesis that **the modern platypus is the sole survivor of a much more diverse range of platypus-like ancestors once occupying Australia and the rest of the eastern part of the Gondwanan land mass**.”⁴⁰

See also AI up to February 2026 below⁴¹.



Left: **Platypus** (*Ornithorhynchus anatinus*) according to https://commons.wikimedia.org/wiki/File:Wild_Platypus_4.jpg

Right: **Steropodon**: <https://en.wikipedia.org/wiki/Steropodon>: Known from “a single opalized jaw with three molars” from the **Cretaceous** (100.2-06 Ma): “Examination of the jaw fragment revealed a **mandibular canal**, which has been proposed to indicate the presence of a **bill, similar to those of the extinct species *Obdurodon dicksoni* [ca. 23 Ma] and the modern platypus *Ornithorhynchus anatinus***.” –

May I suggest that it should have been reconstructed much more modern platypus-like? (Both fotos retrieved 2 March 2026.)

³⁷ Moyal, Ann. Platypus (English Edition). Allen & Unwin. Kindle-Version (Position 906 of 2680)

³⁸ Fornito, Alex & Rodrigo Suárez, James C. Pang, Daniel Margulies, Martijn van den Heuvel, Stuart Oldham, Alexander Holmes, Ashlea Segal, Nenad Sestan, Laura R. Fenlon (2025): Transmodal association hubs of the cerebral cortex: maps, models, and mechanisms: https://osf.io/preprints/osc/tsjq6_v1

³⁹ Mars, Rogier B. (2026): The Fox, the Shrew, and You. How Brains Evolved. Princeton University Press. Details by Professor Emeritus Ken Ashwell (Uni New South Wales): <https://www.comparativebrainanatomy.org/platypus-1/platypus-brain> (Retrieved 28 February 2026)

⁴⁰ Grant, Tom. Platypus (Australian Natural History Series) (English Edition) (p.101-102). CSIRO PUBLISHING. Kindle-Version

⁴¹ AI (26 February 2026) on the *Ornithorhynchus* fossil record: “The fossil record of the platypus (*Ornithorhynchus anatinus*) provides insights into a lineage of egg-laying mammals (monotremes) that dates back to the time of the dinosaurs, over 100 million years ago. While modern platypuses are found only in Australia, their ancestors had a wider, Gondwanan distribution. **Early Monotremes (Cretaceous)**: The oldest known monotreme fossils, such as *Teinolophos trusleri* (found in Victoria, Australia), are approximately 120–130 million years old. These early relatives were small and lived during the Cretaceous period alongside dinosaurs.

Early Relatives with Bills: A **110-million-year-old** opalized jaw fragment of *Steropodon galmani* shows **features similar to the modern platypus, suggesting the presence of a bill and electrosensors early on**. **South American Ancestors**: The earliest known fossil definitely belonging to the **platypus family** (Ornithorhynchidae) is *Monotrematum sudamericanum*, which lived in Patagonia, South America, about **61–63 million years ago**. This indicates that ancestors of the platypus were present in South America when it was part of Gondwana. **“Obdurodon” Species (Miocene)**: Fossils of the genus *Obdurodon* (e.g., *O. dicksoni*, *O. insignis*) from Australia are 15 to 25 million years old. These species, unlike modern, toothless adult platypuses, had **functional molars**, indicating a transition from “toothy” to “toothless”.

Modern Species Fossils: Fossils of the modern species, *Ornithorhynchus anatinus*, are relatively young, with the oldest known remains dating back to around 100,000 years ago (Quaternary period). **Evolutionary Trends**: The fossil record shows a transition from toothed, larger, and possibly more generalist species to the highly specialized, toothless, and restricted modern platypus. **Key Fossil Discoveries**:

Lightning Ridge (NSW, Australia): Numerous opalized monotreme fossils from the Cretaceous period (approx. 100 Mya), including recently identified species like *Opalios splendens* and *Parvopalus clyti*. **Riversleigh** (QLD, Australia): Significant Miocene deposits yielding *Obdurodon* fossils. **Patagonia, Argentina**: The 61-63 million-year-old *Monotrematum sudamericanum*.”

Worthy et al. (16 March 2026): New material of *Obdurodon insignis* (Monotremata: Ornithorhynchidae) from the late Oligocene Pinpa Local Fauna at Billeroo Creek, South Australia. “The scapuloacroracoid is only the second postcranial element referred to a species of *Obdurodon*. It shows this fossil platypus had a **very similar pectoral girdle to the modern *Ornithorhynchus anatinus*** (Shaw, 1799) which, along with the general skull morphology of *Obdurodon dicksoni* Archer et al., 1992, suggests that the **general form of the extant platypus has existed since at least the late Oligocene**.” [28 to 23 Ma ago]

<https://connectsci.au/az/article/doi/10.1071/AZ26011/272039/New-material-of-Obdurodon-insignis-Monotremata?guestAccessKey=>

Insert for a little mental refreshment: Just two images of platypus mother with baby



Left: “Platypus unique characteristics and habits”: <https://www.facebook.com/groups/1572304983605443/posts/2154008068768462/>
 Right: “planetraw.my 7 Wo. This looks unreal... but it’s 100% real nature. A mother platypus curled protectively around her baby, deep inside a hidden riverbank burrow. One of the strangest mammals on Earth, quietly raising life in total secrecy.”
<https://www.instagram.com/p/DTEqoBSjN0F/> (Both images checked 2 March 2026)

Applying Gradual Evolution/Neo-Darwinism to the Origin of the Platypus BILL/BEAK and CORTEX

“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” (Dawkins). “Darwin’s theory of gradualism [...] has ultimately triumphed decisively and makes more sense the more clearly we recognize that evolution is a process involving **populations**” – “...many, if not most, mutations have only slight effects **or are entirely invisible** because they affect only nonmorphological characters.” [...] “*The smaller the effect of a mutation, the greater the probability that it will be advantageous.*” [...] “...indeed there is **no difference between mutations and the so-called small variations which Darwin and the naturalists had regarded as the principal material of evolution**” (Mayr)⁴².

So, how many thousands of mutations with “slight or even invisible effects on the phenotype” (also Mayr) – or in Darwin’s words – of the “infinitesimally small changes”, “infinitesimally slight variations”, “slow degrees”, “insensibly fine steps”, “insensibly fine gradations” etc. (“*natura non facit saltum*”– “nature doesn’t jump”) would have been necessary to form the platypus bill including its:

(1) “hybrid sensory system” (being a “mechano-electro-sensitive antenna,” combining 40,000 electroreceptors with 60,000 mechanoreceptors to detect both electricity and pressure waves” – using ***in contrast to fish*** “a completely different, independent, and more specialized system”), its:

(2) “vomeronasal organ”, its

(3) “large territory of the cortex devoted to processing information from the bill”, its

(4) correspondingly “unique genetic blueprint”? Not to speak about in detail of its

(5) bill being “moist, soft and highly flexible (quite unlike the hard bill of a duck)”, the whole of which “is covered with a dense array of pores leading to highly specialized and sensitive ‘touch-corpules’ which give the animal an acute extra sense.”

⁴² For the references, see <https://www.weloennig.de/Feduccia2020.pdf>, pp. 11 - 13. Cf. also **Gould’s excellent analysis** of why “Darwinism [if accepting saltationism], as a theory of evolutionary change, would perish—for selection would become both subsidiary and negative, and variation itself would emerge as the primary, and truly creative, force of evolution, the source of occasionally lucky saltation.”

What could have been the selective advantages of each and every single of the thousands of individual steps – the “infinitesimally small changes” – each supposed to have decided between evolutionary survival and progress or death of the respective total population until any biologically functional synorganized module⁴³ had been achieved?

Populations, Mutations and Natural Selection: The Limits

Let us have a closer look at Mayr’s assertions that "Darwin's theory of gradualism ... makes more sense the more clearly we recognize that evolution is a *process involving populations.*” And: “*The smaller the effect of a mutation, the greater the probability that it will be advantageous.*” In part further reminiscences from some of my earlier articles⁴⁴:

First the ensuing basic question: “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.*”

Population Genetics and small effects of mutations: “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.*”

Small populations: “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.”

And that would comprise each of just *the first little steps* of the postulated continuous evolution by “infinitesimally small changes”, “infinitesimally slight variations” etc. or, in Neo-Darwinian terms, as cited, by mutations with “slight or even invisible effects on the phenotype” – so just one little step after of probably altogether even thousands of the “infinitesimally small changes” adding up to the clearcut new characteristics of the Neo-Darwinian/evolutionary way to our platypus (*cf.* the five points mentioned for the platypus bill/beak):

- a) Step by step to the 40,000 electroreceptors and 60,000 mechanoreceptors mentioned above?
- b) Innumerable “insensibly fine steps” and “insensibly fine gradations” to the “vomeronasal organ”?
- c) By “Infinitesimally small changes” to the “*large territory of the cortex devoted to processing information from the bill*”? On the origin of the eye, Pierre-Paul Grasse absolutely correctly remarked that:

“In 1860 [1859] Darwin considered only the eye, but today *he would have to take into consideration all the cerebral connections of the organ.* The retina is indirectly connected to the striated zone of the occipital lobe of the cerebral hemispheres: **Specialized neurons correspond to each one of its parts** – perhaps even to each one of its photoreceptor cells. The connection between the fibers of the optic nerve and the neurons of the occipital lobe in the geniculate body is absolutely perfect.”⁴⁵

Applying the principle of Grasse’s argument to the origin of the platypus bill and correspondingly complex cortex – the question is, of course, how were all the thousands of Darwin’s and the Neo-Darwinians’ necessarily “infinitesimally slight variations”, thought to have been arisen *entirely independently* of each other by accidental/haphazard/random (“micro-”) DNA mutations appearing so exactly/precisely/faithfully and specifically so absolutely and *ingeniously coordinated that they achieved the multifunctional entity/unit of the platypus bill and cortex?*

⁴³ AI (German): “Ein Modul wird allgemein als ein austauschbares, komplexes Element innerhalb eines Gesamtsystems, eines Gerätes oder einer Struktur definiert. Es bildet eine in sich geschlossene Funktionseinheit, die unabhängig entwickelt, gefertigt und gewartet werden kann.“ English: A module is generally defined as an interchangeable, complex element within a complete system, device, or structure. It forms [in technology, for example] a self-contained functional unit that can be independently developed, manufactured, and maintained.”

⁴⁴ <http://www.weloennig.de/OmnipotentImpotentNaturalSelection.pdf>

⁴⁵ Grasse, Pierre Paul: L'Evolution du Vivant; Paris 1973 (pp. 177/178). See also: <http://www.weloennig.de/AuIAbl.html>

Disregarding the co-adaptation/synorganization issue is a gross oversimplification that neglects the biological realities.⁴⁶

To illustrate that statement, have please a look at the following *Figures* by Professor Emeritus **Ken Ashwell**, Faculty of Medicine Department of Anatomy, School of Medical Sciences, Wallace Wurth Building, The University of New South Wales:

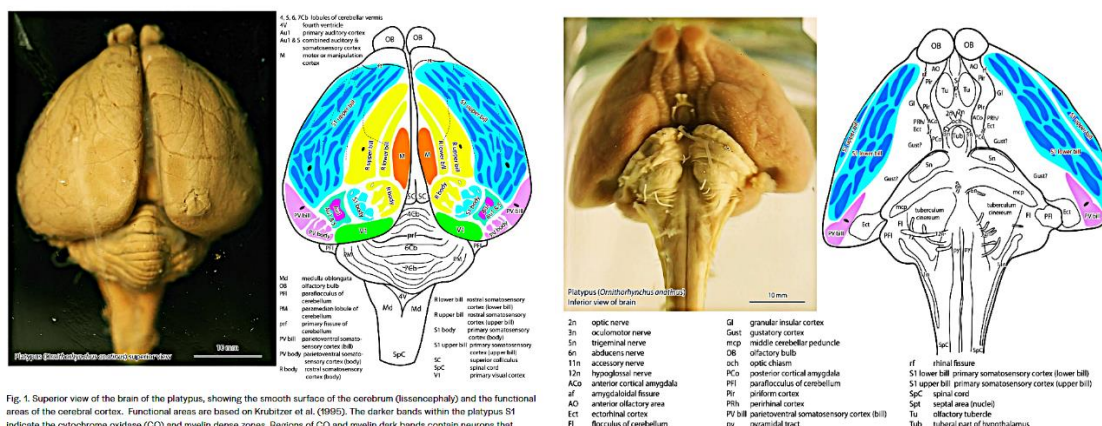


Fig. 1. Superior view of the brain of the platypus, showing the smooth surface of the cerebrum (lissencephaly) and the functional areas of the cerebral cortex. Functional areas are based on Krubitzer et al. (1995). The darker bands within the platypus S1 indicate the cytochrome oxidase (CO) and myelin dense zones. Regions of CO and myelin dark bands contain neurons that respond only to cutaneous stimulation, whereas areas between the CO dark bands contain neurons that respond to both electrical and mechanical stimuli (but more to the former). It has been suggested that the banded pattern within S1 allows for processing of temporal disparities between mechanosensory and electrosensory input as a ranging system for prey (Pettigrew et al., 1998; Elston et al., 1999).

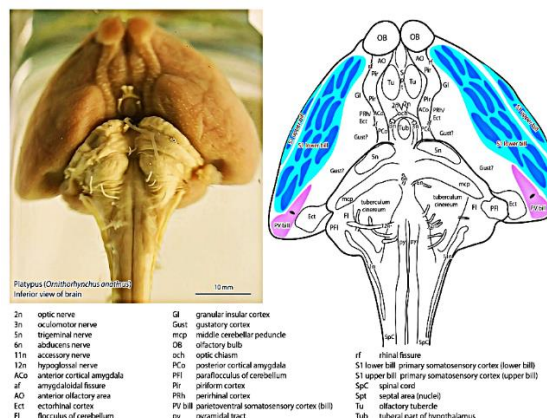


Fig. 2. Inferior view of the brain of the platypus, showing functional areas. Note that the image of the brain is slightly distorted because it has been photographed while inside a tubular bottle. See legend for Fig. 1 for explanation of coloured areas.

Almost the entire blue, violet and yellow parts on Fig.1 and the blue and violet ones in Fig. 2 represent the “large territory of the cortex devoted to processing information from the bill” See more on *The Brain of the Platypus* by Ken Ashwell, cf:

<https://www.comparativebrainanatomy.org/platypus-1/platypus-brain>⁴⁷

Figure on the right slightly stretched vertically by W.-E. L.

Applying Gradual Evolution/Neo-Darwinism to the Origin of the Platypus' Vomeronasal Organ

According to AI (6 March 2026): “The platypus vomeronasal organ (VNO), also known as Jacobson's organ, is a specialized chemosensory organ located in the roof of its mouth that detects non-volatile chemicals, such as pheromones. Although the platypus relies on electroreception to forage underwater, *it possesses a surprisingly highly developed VNO with one of the largest vomeronasal receptor gene repertoires of all vertebrates surveyed*, challenging the assumption that olfaction is unimportant to this semiaquatic mammal. Nature +3

Key Aspects of the Platypus Vomeronasal Organ:

- **Location and Structure:** The VNO consists of paired tubes located at the base of the anterior nasal septum, just above the palate.
- **Remarkable Gene Expansion:** The platypus genome contains 270 intact V1R genes (vomeronasal type-1 receptors), which *is the largest repertoire identified among vertebrates surveyed, alongside a moderate expansion of V2R genes*.
- **Function:** It is thought to play a **critical role in social communication**, specifically for detecting pheromones involved in courtship, mating, and parental care.
- **Mechanism:** While many mammals use a vascular “pump” to move scents into the VNO, studies on newborn platypuses indicate they possess *a thick sensory epithelium and a cartilaginous capsule*.
- **Ecological Significance:** Due to the platypus closing its eyes, ears, and nostrils while foraging underwater, **the VNO likely serves as a primary, non-visual sense for navigating their social environment**, particularly during the breeding season. Nature +6

The VNO sends signals to the accessory olfactory bulb (AOB) in the brain, which is notably larger in the platypus than in its close relative, the echidna.”

⁴⁶ https://www.unser-auge.de/Entstehung-des-Auges_1.htm and <https://www.weloennig.de/AuIAbl.html> as well as: <https://www.weloennig.de/AuEng.html>
The basic arguments of the following summary concerning the origin of the eye can also be applied to the synorganization of the platypus bill and its correspondingly “large territory of the cortex devoted to processing information from the bill”:

Neo-Darwinism breaks down when faced with the immense complexity of the organic structures discussed in this paper. The “absurd theory of chance” (J. von Uexküll) is an entirely inadequate attempt to explain this complexity as evidenced by the several mathematical investigations by the authors cited. - When dealing with problems in textbooks and discussions, the followers of neo-Darwinism frequently remain silent on the subject of co-adaptation, - the problem that presents its greatest difficulty. - Because its method of explanation *can only be applied linearly and not to a network of hundreds of anatomical structures and their physiological functions which are precisely attuned to one another*, the principles of neo-Darwinism have proved completely unsatisfactory in relation to the co-adaptation problem. - The co-adaptation problem requires that many random mutations on a whole chain of different genetic sites (according to Prof. Klein more than six thousand genes), e.g. the numerous structures in the eye, optical nerve, optic chiasm, brain, muscles etc. have to operate in a precisely defined direction simultaneously and all working to the same end. We find here multiple co-adaptation: on the one hand at the inner and outer structures of the eye itself, then the interaction between eye and brain, together with the eye-muscles with the control-centre in the mid-brain (mesencephalon) and finally with the various centres for regulation and integration in the brain with their correlations to the organism and its environment.

⁴⁷ Retrieved 6 March 2026.

Although the vomeronasal organ (VNO/Jacobson's organ) is widespread in the animal kingdom, we find here essentially the same problem for Neo-Darwinism as discussed above for the functions of the platypus beak: Co-adaptation/synorganization of the organ with corresponding areas of the brain.

Taking Darwin and the Neo-Darwinians literally (which the latter do not practice any more in this case): Otherwise: Are we really to believe that the 270 intact V1R genes (vomeronasal type-1 receptors), as well as the moderate expansion of V2R genes, increased in many “insensibly fine steps” – one additional nucleotide after another (which would regularly destroy the original gene function) – up to their present numbers and that each of such “infinitesimally slight variations” determined the survival or extinction of the respective entire population (Haldane’s Dilemma)?

Could large steps by duplications⁴⁸ of entire genes perhaps help in this situation? – However, would there not be several similar basic problems as for the stepwise addition of individual nucleotides? Each new duplication really deciding between the survival or extinction of the respective entire population? But let’s not forget the coadaptation/synorganization with the platypus brain: Independently occurring random mutations (including gene duplications) for brain functions that finally fit perfectly well with the tasks and operations of the many additional numbers of the V1R genes and the moderate expansion of V2R genes?

How could the postulated enormously long evolutionary series of ancestral animals successfully be surviving with so many imperfect functions in each population?

Applying Gradual Evolution/Neo-Darwinism to the Origin to “all the Rest” of the Platypus Organ System

Above I have mentioned and discussed 5 points scientifically demonstrating the problems of the dominant evolutionary theory.

Additional topics *and even more* could be investigated for our questions on Neo-Darwinism including the ensuing ones (see figure above, a Wikipedia article⁴⁹, and AI):

- (6) Webbed feet for swimming (“while walking on land, the feet are folded up in knuckle-walking to protect the webbing”)
- (7) Eyes, ears and nostrils *shut when swimming*
- (8) Thick waterproof fur that keeps the animal warm and dry underwater by “flattened guard hairs and curly underfur hairs”
- (9) “Cheek pouches for storing food”
- (10) Wide, flat tail (in contrast to a beaver’s ‘it is furry rather than scaly’) “It stores **fat reserves** and can act **as a rudder** during swimming” as well as “carrying things”⁵⁰
- (11) Origin of the **spurs**. Snake-like **venom** released from back claws of males (“The spurs of the male inject venom, which is powerful enough to inflict pain in humans”) / “The venom is composed largely of defensin-like proteins (DLPs) produced by the immune system, *some* [“**five putative toxins**”⁵¹] *of which are unique to the species*”
- (12) AI: “Lactation genes: Despite **laying eggs**, it possesses **genes for milk production, a defining mammalian trait**”
“While they lay eggs, monotremes possess most of the casein genes found in **therian mammals**. They also have **unique extra caseins** (e.g., CSN2B and CSN3B) **not found in other mammals**”
“**Monotreme Lactation Protein (MLP)**: Platypus milk *contains a unique protein known as Monotreme Lactation Protein (MLP)*, which provides antibacterial protection. This protein is unique to monotremes and likely evolved specifically to protect the young in the absence of nipples, as the milk is secreted onto the skin (“milk patches”) rather than through a teat” / “The single remaining platypus vitellogenin gene is orthologous...to the genes found in **birds and amphibians**”
- (13) AI: “Sex Determination (AMHY): Unlike almost all other mammals that use the SRY gene for sex determination, monotremes lack this gene. Recent evidence suggests their sex is determined by the AMHY (Anti-Müllerian Hormone) gene, a mechanism **more common in some fish and amphibians**”
- (14) AI: “Complex Sex Chromosomes: Monotremes have an **extraordinary system of multiple sex chromosomes—10 in the platypus (5X and 5Y) and 9 in the echidna—which show more homology to bird (Z) chromosomes than to the XY pair of other mammals**”
- (15) Biofluorescence: No specific genes so far known. However, AI comments: “The trait appears in widely divergent groups—monotremes (platypus), marsupials (opossums), and placental mammals (flying squirrels). This suggests that **if the trait is ancestral, the underlying genes are highly conserved across over 150 million years of mammalian evolution.**” W.-E. L.: But what about **convergence – as postulated also for so many other features of the platypus?** However, both hypotheses would be equally problematic.

⁴⁸ <https://www.weloennig.de/Genduplikationen.html>; see also <https://scienceandculture.com/?s=gene+duplications&site-current-site=1> Up to 9 March 2026 you can find there **71 articles**. Most probably further articles will follow.

⁴⁹ <https://en.wikipedia.org/wiki/Platypus> (retrieved 7 March 2026, AI: 7 and 8 March 2026).

⁵⁰ <https://www.youtube.com/watch?v=7-b73LX8IY> (See 9:31. “2,4 Mio. Aufrufe vor 5 Jahren”)

⁵¹ Wong, Emily S. W. et al (2012): “**5,157 genes were expressed in the venom glands, 1,821 genes were up-regulated in the in-season gland, and 10 proteins were identified in the venom.** New classes of platypus-venom proteins identified included antimicrobials, amide oxidase, serpin protease inhibitor, proteins associated with the mammalian stress response pathway, cytokines, and other immune molecules. Five putative toxins have only been identified in platypus venom: growth differentiation factor 15, nucleobindin-2, CD55, a CXC-chemokine, and corticotropin-releasing factor-binding protein.” Abstract: <https://pubmed.ncbi.nlm.nih.gov/22899769/> Full text: [https://www.mcponline.org/article/S1535-9476\(20\)34139-6/fulltext](https://www.mcponline.org/article/S1535-9476(20)34139-6/fulltext)

For each of these points (6) to (15) the following questions may be raised:

- (a) *How many suboptimal links* may have been necessary to obtain the present (more) optimal state of the respective organ(s)? (Cf. beak and brain etc.) “But just in proportion as this process of extermination has acted on an enormous scale, so must the **number of intermediate varieties**, which have formerly existed on the earth, be **truly enormous**”. Or, “[T]he number of intermediate and transitional links, between all living and extinct species, must have been **inconceivably great**” (Darwin).⁵²
- (b) *How did the coordination* (co-adaptation/synorganization) by independently arisen accidental DNA mutations over eons of time thought to have produced, perfected and adapted gene functions and organ systems (including bones, muscles, sinews, connective tissue⁵³ etc.) and by equally independently arisen and yet exactly fitting large numbers of random mutations for the neuronal network including the necessary complementarily adjusted/remodeled/amended brain areas and functions in the animals⁵⁴ – see above the enormous reorganization of the platypus brain as compared to other animals⁵⁵ – *take place*?⁵⁶
- (c) If the number of transitional links was “inconceivably great” – did each additional “slight or even invisible” step – (recall 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 and so has to occur at least 50 times independently of each other to have a chance of survival – see above; cf. moreover the extreme improbability of positive mutations in plants and animals⁵⁷) really regularly lead to the substitution of the entire respective population by the slightly more fittest one on its way to ‘perfection’ (Haldane’s dilemma again)?

Now let’s have a closer look at the points (6) to (15) as enumerated above:

(6) Webbed feet for swimming (“while walking on land, *the feet are folded up in knuckle-walking* to protect the webbing”):

AI (11 March 2026): “Webbed feet occur in a *wide variety of semi-aquatic animals across different classes—including birds, mammals, reptiles, and amphibians*—as an evolutionary adaptation for swimming, diving, and navigating muddy terrain. The webbing acts as a natural paddle, increasing surface area to push against the water.

... **Mammals**: Webbed feet in mammals are typically associated with hunting or foraging in water. **Platypus**: Use their front webbed feet to paddle, which fold back on land. **Rodents**: Beavers, muskrats, capybaras, and nutria. **Carnivores**: Otters (sea and river), minks, and polar bears. **Cats**: Fishing cats and flat-headed cats. **Dogs**: Many breeds with a history of water work have webbed feet, including Newfoundland, Labrador retriever, Chesapeake Bay retriever, and Portuguese water dog. Others: **Opossums** (specifically the water opossum) and some marsupials like kangaroos.”⁵⁸

If one does not want to derive all mammals from a knuckle-walking ancestor, this feature must have arisen dozens of times independently of each other (manifold convergences).

⁵² <https://darwin-online.org.uk/content/frameset?itemID=F373&viewtype=text&pageseq=1>

⁵³ The fact that all these structures do not simply fit together by themselves—without any genetic program and fine-tuning—is clearly proven by the countless pathological aberrations for which a genetic basis—random DNA mutations/gene defects—has been unequivocally demonstrated (in humans and other organisms). See for example the **Ehlers-Danlos-Syndromes** (AI: “Ehlers-Danlos syndromes (EDS) are a group of 13+ inherited, genetic connective tissue disorders characterized by overly flexible joints, stretchy skin, and tissue fragility. They are caused by collagen defects. Symptoms include joint dislocations, chronic pain, easy bruising, and poor healing. Mayo Clinic +3” / And/or: “**Muscle mutations** in humans range from rare, benign conditions increasing strength to severe, inherited diseases causing degeneration. Key mutations involve the **MTSN** gene (myostatin-related hypertrophy), causing excessive, {“type”:“text”,“value”:“strong, low-fat muscle growth. Conversely, mutations in **DES** or **LMNA** genes cause progressive disorders like desminopathy or Emery-Dreifuss muscular dystrophy, resulting in severe weakness. Wikipedia +4” – Or: **Nerve mutations** in humans, often manifesting as hereditary peripheral neuropathies, are genetic changes—typically deletions, duplications, or single-gene mutations—that disrupt the structure or function of nerve cells, their myelin sheath, or their communication points (synapses). These mutations primarily cause progressive muscle weakness, atrophy, and sensory loss, most commonly affecting the hands, feet, arms, and legs.” See also <https://www.merckvetmanual.com/nervous-system/congenital-and-inherited-anomalies-of-the-nervous-system/neuromuscular-disorders-in-animals> (2025)

⁵⁴ Even from an evolutionary viewpoint: <https://www.youtube.com/watch?v=LK6tCVIHxkM>

⁵⁵ Cf. perhaps again the details in Ashwell: <https://www.comparativebrainanatomy.org/platypus-1/platypus-brain> (even compared to the echidnas the platypus displays many ‘extravagant’ features not occurring or definitely not quantitatively and/or qualitatively comparable to the former.)

⁵⁶ More on **accidental mutations**: Genetic Animal Models of Malformations of Cortical Development and Epilepsy: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4618289/>

⁵⁷ “In plant breeding less than 1 percent of all the induced mutants have been chosen as possible candidates for further investigations. Of these again only 0.5 to 1 percent have passed the necessary further field trials until they were found suitable for commercial use. Thus, in plant breeding the average proportion of negative or useless mutants to positive ones is smaller than 10,000 : 1. Making calculations on the basis that only 0.5 percent of all induced mutations were suitable for further investigations and that again only 0.5 percent displayed a positive selection value for the breeder, this proportion is about **40,000 : 1**. An approximate mean value of 25,000 negative (or useless) mutants to 1 being positive should therefore not to be an unrealistic calculation for plant breeding.

As to the genetically even more severely balanced animals, the state of affairs has been so arduous that no realistic numbers have been produced, which could provide the basis of similarly approximate calculations regarding the proportions of negative (or useless) mutants to positive ones in animal husbandry. If – as an educated guess – one multiplies the proportionate number of disadvantageous mutations by the factor of 10, the result would already be some **100,000 to 400,000 negative (or unavailing or neutral) mutants to 1 useful for breeding research**.”...“Providing an affirmative answer of the applicability of the law of recurrent variation not only to cultivated plant and animal lines but also to species in the wild, the statements and assertions of the synthetic theory as quoted below [in that article] will have to be revised” (There also further facts for the latter point): <https://www.weloenig.de/Loennig-Long-Version-of-Law-of-Recurrent-Variation.pdf>

⁵⁸ All citations on this page retrieved 11 March 2026.

The genetic basis of the platypus' anatomically highly specialized, finely differentiated webbed feet – “that act as versatile tools for both swimming and burrowing: *Their front and back feet serve different functions*⁵⁹, featuring retractable webbing and claws *tailored for a semi-aquatic lifestyle*” – **is presently unknown.**

Believing “that the more complex organs and instincts *should have been perfected*, not by means superior to, though analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor” (Darwin 1859⁶⁰), but in each phase still astonishingly imperfect as compared to the present state (platypus' feet **neither well-structured for walking on land as well as digging, nor for swimming** (speed up to **1m/s**) or burrowing) – it would probably have looked like the imperfectly reconstructed *Steropodon* shown above – apart from the general objections already mentioned above, can never be tested empirically (Popper⁶¹) and thus is definitely outside and beyond science.

Briefly **back to the dogs.** AI⁶²: “Webbed feet occur in **Newfoundland**: Known as "natural lifeguards," they have large webbed paws designed for water rescues. **Labrador Retriever**: Bred to help fishermen in Newfoundland, they have webbed feet that act as natural flippers. **Portuguese Water Dog**: Specifically bred to herd fish and carry messages between boats. **Chesapeake Bay Retriever**: Designed to work in cold water, their webbing helps them swim in harsh conditions. **German Shorthaired Pointer**: Versatile hunters with webbed feet that aid in both swimming and navigating uneven terrain. **Dachshund**: Their webbed feet are used for digging rather than swimming, designed to help them scoop soil. Other breeds: **Otterhounds**, **Weimaraners**, **Poodles**, and **Nova Scotia Duck Tolling Retrievers**.”

Is this perhaps also due to what has been called “convergent evolution”⁶³? Definitely not! As far as I could find out, all dog forms are derived from the gray wolves. Are wolves' feet webbed? “**Wolves** have long toes, strong claws, and **webbed feet**. These help with swimming, digging, running, and climbing on all sorts of terrain.”⁶⁴ So the genetic potential is already there.

(7) Eyes, ears and nostrils shut when swimming

AI (20 March 2026): “When diving, a platypus uses a highly effective, "watertight" sealing mechanism for its eyes, ears, and nose. *The closure is so complete that the platypus is rendered essentially blind and deaf during its hunt, relying instead on electrical signals in its bill.* Here are the specifics of the closing mechanisms: Eyes and Ears (Muscular Grooves): The eyes and ears are nestled within a single, muscular groove on each side of the head. **When the platypus dives, the sides of these grooves tighten and fold over, completely covering both the eyes and ear openings to prevent water from entering.** ...

Nose (Nostrils): The tiny nostrils located on the tip of the bill seal **shut tightly**.

Effectiveness: **This adaptation ensures that these delicate organs are protected from debris and water pressure while swimming, forcing the animal to rely on its "sixth sense" (electroreception) to navigate and find food.** ...

This sealing action is instinctive and automatic, occurring immediately upon diving.”

The idea that the postulated long evolutionary line of platypus ancestors (consisting, in fact, according to the present theory of millions of generations: *Steropodon* was dated up to be ca. **110 Ma** old)⁶⁵ – while diving and digging in the ground, have repeatedly gotten water – including muddy water – up their noses, into their ears, and in their eyes until natural selection of “infinitesimally small changes”, “infinitesimally slight variations” and “slow degrees” etc. shut them as tightly as we find them today, can hardly be convincing for any thinking person.

Although Darwin used the term “perfection” dozens of times in his *Origin* from the 1st edition (1859) to the last one (6th edition 1872) – speaking even of “**organs** of extreme perfection” (a whole chapter)⁶⁶ – the term has largely fallen into disrepute among evolutionary biologists especially during the last several decades⁶⁷.

⁵⁹ AI (23 March 2026): Swimming: “**Front Feet**: Primarily used as paddles to propel the platypus through the water. **Hind Feet**: Primarily used as rudders for steering and as brakes to control speed and direction.” Burrowing: “Claws: All feet are equipped with strong, **sharp claws. These are essential** for digging the long, complex nesting and shelter burrows platypuses construct along riverbanks.”

⁶⁰ In the context of the origin of the eye, Darwin finally suggested the following: “His [the reader's] reason ought to conquer his imagination” – without presenting the reader's “reason” – so Darwin puts the problem into the mind of the reader's imperfect imagination (see Darwin 1859, p. 188.) Cf. also ANONYMOUS (2026, p. 69): “A word about ‘imagination’ – last sentence of the previous Darwin quote: Here the difficulty is deliberately not seen in theory, but transferred to the imagination. *The reader is therefore to be persuaded that the difficulty lies with ‘us’, not in theory.* Without reliable evidence, this method is only a dishonest attempt at a reevaluation.”

⁶¹ <https://www.weloennig.de/Popper.html>

⁶² Retrieved 13 März 2026

⁶³ Cf. for example (2023): <https://www.weloennig.de/SauropodDinosaur.pdf> and (2025): <https://www.weloennig.de/KoalaPart2.pdf> (especially pp. 8-10).

⁶⁴ Ohio Canid Center: <https://www.facebook.com/ohiocanidcenter/posts/lets-talk-about-wolf-pawswolves-have-long-toes-strong-claws-and-webbed-feet-thes/1647261368779982/>

⁶⁵ “Platypuses have a life expectancy of often only 5 to 8 years in the wild. They reach sexual maturity at around two years of age.” (AI, abbreviated, 20 March 2026)

⁶⁶ He relativized it, however, by speaking of “many degrees of perfections”, “high stage of perfection”, or “natural selection will never produce absolute perfection” - yes, natural selection cannot do it, but an absolutely ingenious designer could.

⁶⁷ AI: “Stephen Jay Gould strongly rejected the idea that evolution is a progress-oriented process leading to "perfection," "higher" forms of life, or a pre-determined goal. He viewed perfection as an inaccurate, anthropocentric (human-centered) misconception of evolution.”

In contrast to this trend among modern Darwinian evolutionists, eminent engineers and biologists – especially the ‘**organ researchers**’ (as I call them) – like **Stuart Burgess**, have systematically proved that Darwin and his followers have given up the terms “perfect” and “perfection” *much too early* – see for a large series of examples (organs as well as their modern researchers) Burgess’ excellent book of 2026: *Ultimate Engineering: An Engineer Investigates the Biomechanics of the Human Body*. Discovery Institute Press.

Applying the main scientific conclusions of Burgess’ investigations (as well as that of several further highly qualified authors who have in principle come to the same conclusion as he has⁶⁸), the eyes, ears and nostrils of the platypus were shut when swimming right from the start of the very existence of the genus and the family.

(8) Thick waterproof fur that keeps the animal warm [32°C] and dry underwater by “flattened guard hairs and curvy underfur hairs”

Basically, the same as for the characters cited above: A perfect origin from the very beginning (if one does not want to imagine an endless series of sick ancestors overcoming hypothermia in Ma (millions of years) by “insensibly fine steps” towards a waterproof fur keeping the animal warm and dry underwater by “flattened guard hairs and curvy underfur hairs”). See also Dobson et al. (2026): *A unique hollow melanosome morphology in the hairs of the platypus Ornithorhynchus anatinus*: <https://royalsocietypublishing.org/rsbl/article/22/3/2025.0721/480922> (Occurs *only in birds and this one mammal so far*).

(9) “Cheek pouches for storing food”

Basically, the same as for the characters cited above: What about a perfect origin from the very beginning? One could perhaps argue that the platypus ancestors would also have survived without such cheek pouches for storing food. But, if that feature was unnecessary, why did it then evolve at all by so many “slow degrees” in eons of years according to the theory?

(10) Wide, flat tail (in contrast to a beaver's ‘it is furry rather than scaly’) “It stores **fat reserves** and can act **as a rudder** during swimming” as well as “carrying things”

Basically, the same as for the characters cited above: What about a perfect origin from the very beginning? **Fat reserves, rudder** as well as **carrying things**: All 3 important characters! Now, in *Steropodon* shown as reconstructed above, **all 3 are missing**, apart from the fact that its imperfect bill (and other incomplete features) would definitely not have favored its survival.

(11) Origin of the **spurs**. Snake-like **venom** released from back claws of males (“The spurs of the male inject venom, which is powerful enough to inflict pain in humans”). “The venom is composed largely of defensin-like proteins (DLPs) produced by the immune system, *some* [**“five putative toxins”**]⁶⁹ *of which are unique to the species*”

Overview by AI (21 March 2026): “The platypus spur is a specialized venom-delivery apparatus found only on the hind ankles of adult male platypuses, functioning as a weapon [W.-E. L.: possibly – not proven] for intraspecific competition during the breeding season. These spurs, along with their associated crural glands, represent a unique, seasonally active venom system in mammals.

Anatomy of the Platypus Spur. Location and Structure: A single, sharp, 15–18 mm long spur is located on the inner hind ankle of each leg. They are similar in shape to a dog's canine tooth and are curved and pointed.

Composition: The spurs are **keratinous sheaths that cover a core of bone known as the os calcaris, which articulates with the ankle skeleton.** **Canalization:** *The spurs are hollow, featuring a narrow central canal approximately 0.2 mm in diameter that runs from the base to an opening near the tip, allowing for the injection of venom.* **Muscular Connection:** The spurs are **surrounded by strong muscles that allow the male to voluntarily erect or move them.** **Development and Ageing:** Juveniles have their spurs encased in a soft, white keratinous sheath. *This sheath is shed around 9–12 months of age, exposing the sharp, mature spur.* Females are born with tiny vestigial spur buds but lose them entirely within their first year.

Physiology and Function

Crural Gland Apparatus: The spur is connected via a duct to **the crural gland** (or femoral gland), **a large, kidney-shaped gland located in the upper thigh.** This gland is a modified sweat gland [W.-E. L.: if so, most certainly not by selection of “infinitesimally small changes”, “infinitesimally slight variations” and “slow degrees”, or: most certainly not by accidental mutations “with slight or even invisible effects on the phenotype” etc. – see above].

⁶⁸ Richard Dawkins argues that biological perfection does not exist, as natural selection produces functional adaptations, not flawless engineering. He emphasizes that evolution is a gradual process limited by historical constraints and genetic variation, leading to “good enough” designs rather than ideal ones. His work highlights examples of sub-optimal, or “badly built,” structures resulting from this evolutionary history. Substack.”

None was able to explain the origin of irreducibly complex structures in biology.

⁶⁸ For example Steve Lauffmann and Howard Glicksman (2022): *Your Designed Body*. Discovery Institute Press. Seattle, USA. <https://www.amazon.de/Your-Designed-Body-Steve-Lauffmann/dp/1637120206>. Further authors: The articles and books by Douglas Axe, Günter Bechly, Michael J. Behe, David Berlinski, Tom Bethell, William A. Dembski, Michael Denton, Marcos Eberlin, Anne Gauger, Cornelius Hunter, Stephen J. Jacoboni, Phillip E. Johnson, Matti Leisola, Wolf Ekkehard Lönning, Casey Luskin, Andy McIntosh, Jonathan McLatchie, Stephen C. Meyer, J. P. Moreland et al. (eds.), Walter Myers III, Walter James ReMine, Paul Nelson, John C. Sanford, Siegfried Scherer, Granville Sewell, Geoffrey Simmons, Rob Stadler, David W. Swift, Neil Thomas, James Tour, Jonathan Wells, Daniel Witt, Jonatan Witt, and many others. See also <https://evolutionnews.org/> on intelligent design

⁶⁹ Wong, Emily S. W. et al (2012): “**5,157 genes were expressed in the venom glands, 1,821 genes were up-regulated in the in-season gland, and 10 proteins were identified in the venom.** New classes of platypus-venom proteins identified included antimicrobials, amide oxidase, serpin protease inhibitor, proteins associated with the mammalian stress response pathway, cytokines, and other immune molecules. Five putative toxins have only been identified in platypus venom: growth differentiation factor 15, nucleobindin-2, CD55, a CXC-chemokine, and corticotropin-releasing factor-binding protein.” Abstract: <https://pubmed.ncbi.nlm.nih.gov/22899769/> Full text: [https://www.mcponline.org/article/S1535-9476\(20\)34139-6/fulltext](https://www.mcponline.org/article/S1535-9476(20)34139-6/fulltext)

Seasonal Activity: Venom production is closely tied to the reproductive cycle. Gland size and venom production increase significantly during the breeding season (June to August). Outside this season, the gland regresses and produces little to no venom.

Venom Composition: The venom is a complex mixture of **at least 19 different peptide fractions**, including defensin-like Proteins (DLPs), C-type natriuretic peptides (CNPs), and nerve growth factors (NGFs). Some of these compounds are unique to the platypus.”

4 Platypus spur with 1 cm markings at base of photo for scale



Image provided by the Tasmanian Museum and Art Gallery, specimen number TMAG A4497. ♦

From the article by Irene M Moyer de Miguel Jennifer C Jamieson Lori Coulson Ingrid Berling (2025):
https://www.mja.com.au/system/files/issues/222_08/mja252632.pdf
 Platypus envenomation

Now, let's imagine the origin of the spurs in the males according to the Neo-Darwinian theory: My first question would be: From invisible to microscopically small *none-functional beginnings* – would each “*insensibly fine step*” nevertheless have decided over the future life or death of the entire population⁷⁰ when and where ever it occurred?

Second question: We have heard that “Juveniles have their spurs encased in a soft, white keratinous sheath. This **sheath is shed around 9–12 months of age**, exposing the sharp, mature spur.”⁷¹ So, it appears that not only during *the entire phase of the none-functional very beginnings* – already consisting of “numberless small gradations” so that “the number of intermediate and transitional links, between all living and extinct species, must have been inconceivably great” (see above) – *the whole, complete, total platypus spur system* –

recall please the ‘keratinous sheaths that cover the os calcaris articulating with the ankle skeleton’, ‘the central canal approximately 0.2 mm in diameter running from the base to an opening near the tip, allowing for the injection of venom’, ‘the spurs are surrounded by strong muscles that allow the male to voluntarily erect or move them’, ‘the crural gland apparatus’ (“venom producing system” “composed largely of defensin-like proteins (DLPs) produced by the immune system, some [**five putative toxins**]” of which are **unique to the species**”

– *was and is without its functions during the first 9-12 months of the male platypus.*⁷² “Neo-Darwinism is dead” (Denis Noble, Oxford University 2025)⁷³.

⁷⁰ Recall please that “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.*” <https://www.weloenig.de/NaturalSelection.html>. Also, let's not forget that each new successful evolutionary step implied the substitution of the entire [platypus] population.

⁷¹ For an exact analysis of all the platypus spur developmental stages, see paper below by Grant et al. (2024).

⁷² Grant et al. (2024); “Male spurs grow from a mean length of 12.4 (±0.5) mm after emergence from the nesting burrow to 18.6 (±0.6) mm by the end of the first year of life in Victoria.” ... “Mature male platypuses have a functional venom system, which appears to have evolved for use in competition between males in the breeding season (Carrick et al. 2023).”

<https://connectsci.au/am/article/46/3/AM24020/36276/Age-determination-in-the-platypus-Ornithorhynchus?guestAccessKey=>

⁷³ *Neither does Neo-Lamarckism explain the origin of the whole platypus spur system being without its functions during these first 9-12 months.*

Since ‘platypuses have a life expectancy of often only 5 to 8 years *in the wild* and reach sexual maturity at around two years of age’ (see details again above), the males seem to use their spur system hardly more often than only 3 to 6 times during their entire life cycle.

How important are these spurs say roughly in comparison to the animals’ claws?

AI (22 March 2026) on platypus claws and spurs:

“**Claws:** All feet are equipped with strong, sharp claws. These are *essential for digging the long, complex nesting and shelter burrows platypuses construct along riverbanks.*”

“**Spurs: Non-Fatal but Debilitating** [temporarily]: The venom is designed to cause excruciating pain [W.-E. L.: at least in humans] and temporary paralysis of the limb forcing the rival to retreat and allowing the dominant male to mate. Scarring and Long-Term Effects: **It is common to see male platypuses with scarring from these**, and some envenomated males have shown temporary paralysis.”

Hence, usually the males survive these reciprocal venom attacks *without long-term negative effects* not least for the populations thus affected – so the effects on the entire corresponding populations seem to be more or less subordinate. The following general factors should also be taken into account (see <https://www.weloennig.de/NaturalSelection.html>):

Strongly different abilities and varying environmental conditions can turn up **during different phases of ontogenesis**. Hiding places of predator and prey, the distances between them, local differences of biotopes and geographical circumstances, weather conditions and microclimates all belong to **the repertoire of infinitely varying parameters. Coincidences, accidents, and chance occurrences are strongly significant in the lives of all individuals and species.** ... King Solomon wrote around 1000 BC: "I returned, and saw under the sun, that the race is not to the swift, nor the battle to the strong,...but time and chance happeneth to all of them" (KJV 1611).

So, as martial and menacing as these spurs may look (see above) – all I would like to suggest here at present is not to overestimate the function of the spurs for the existence and micro-evolution of platypus populations. Question: Main task of this feature: Is it perhaps just involved in a kind of subordinately stabilizing selection, if at all? Tasks not all discovered yet?

With Wong et al. (2012) <https://www.sciencedirect.com/science/article/pii/S1535947620341396> I have noted above that:

“**New classes of platypus-venom proteins** identified included antimicrobials, amide oxidase, serpin protease inhibitor, proteins associated with the mammalian stress response pathway, cytokines, and other immune molecules. **Five putative toxins have only been identified in platypus venom:** growth differentiation factor 15, nucleobindin-2, CD55, a CXC-chemokine, and corticotropin-releasing factor-binding protein.”

Assuming with the answer detected by AI (24 March 2026) that “the genes for growth differentiation factor 15 (GDF15), nucleobindin-2 (NUCB2), CD55 (complement decay-accelerating factor), a CXC-chemokine, and corticotropin-releasing factor-binding protein (CRF-BP) were recruited from existing, *non-toxin functional gene families*”, the following questions may be relevant for further evolutionary reflections:

Exactly how many of the postulated very slight steps – each with decisive selective advantages for the entire population – were necessary to achieve all this? To what extent precisely were the genes reorganized/reprogrammed (including some possible gene duplications)? All this by an almost infinite series of Darwin’s and the Neo-Darwinian’s “infinitesimally small changes”, “infinitesimally slight variations” ... “insensibly fine steps” and “insensibly fine gradations”, *which could hardly have had any selective advantages before functioning at all* and even in their final stages may be only useful for some subordinate tasks within the correspondingly slightly affected entire populations? [Additional note 26 March 2026: So far I could not open the author’s supplemental File 2 and supplemental Files 3-8.]

Another point for further considerations could be that the development of the venomous spurs in the platypus seems to be directly linked to their male-specific sex chromosomes.⁷⁴

So, this was/is a poisonous amalgam consisting of numerous ingredients – *in fact, of an entire series of more or less toxic/venomous/noxious components*, which apparently exert their specific harmful effects only as a whole/*in toto* to temporarily debilitate a male competitor. Wong et al. report (p. 1354; see also the footnotes on previous pages, now also continued):

“5,157 genes were expressed in the venom glands, 1,821 genes were up-regulated in the in-season gland, and **10 proteins were identified in the venom.** New classes of platypus-venom proteins identified included antimicrobials, amide oxidase, serpin protease inhibitor, proteins associated with

⁷⁴ AI (24 March 2026): “These proteins, identified in the platypus venom gland as potential toxins, **were likely repurposed** [W.-E. L. Precisely *how were they repurposed?* In how many steps?] to serve a specialized role in venom, which is used primarily for male-male competition, rather than feeding. Key findings regarding their origin include:

Independent Recruitment (**Convergent Evolution**): Like other platypus venom components, these genes evolved from ancestral genes [W.-E. L. Again: **In how many steps? – each with decisive selective advantages before becoming fully poisonous?**] involved in normal physiological processes, such as inflammation and immune response. This is part of a broader pattern of convergent evolution, where distinct lineages (e.g., reptiles and monotremes) **recruit the same protein families for venom.**” (W.-E.L.: Thus, this extremely unlikely process is now believed to have **occurred also multiple times independently of each other!**) ... “Recruitment Strategy: While many venom systems evolve through gene duplication (e.g., defensin-like peptides in the platypus)” [W.-E.L.: this would be anything except an insensibly fine step!] “the recruitment of these specific proteins may have occurred in combination with, **or independently of, massive duplication, allowing them to take on specialized roles in the crural system** [W.-E.L.: I would describe that as “evolutionary “fog” (“Evolutionsnebel”) **without any real and concrete content** to hide the improbable message “Neo-Darwinian evolution explains it all”. For the problems of gene evolution by gene duplications see again: <https://www.weloennig.de/Genduplikationen.html> and Kunze, R., Saedler, H. and Lönig, W.E. (1997) Plant Transposable Elements. *Advances in Botanical Research*, 27, 332-409. [http://dx.doi.org/10.1016/S0065-2296\(08\)60284-0](http://dx.doi.org/10.1016/S0065-2296(08)60284-0)

the mammalian stress response pathway, cytokines, and other immune molecules. **Five putative toxins have only been identified in platypus venom:** growth differentiation factor 15, nucleobindin-2, CD55, a CXC-chemokine, and corticotropin-releasing factor-binding protein.”

(p. 1355) “Early proteomics studies identified at least 19 classes of peptides in platypus venom (8, 10, 11, 12, 13). Five different types of molecules were identified: hyaluronidase, C-type natriuretic peptides, nerve growth factor (OvNGF), L-to-D-amino acid-residue isomerase, and defensin-like peptides. Only two of these components have been fully sequenced: natriuretic peptides and defensin-like peptides (10, 14, 15). **These polypeptides and enzymes likely work together to cause swelling, lowered blood pressure, and pain.** C-type natriuretic mRNA is posttranslationally cleaved to produce peptides that form cation channels in lipid bilayer membranes (16), relax smooth muscles, release mast cell histamine (10), and cause calcium influx into neuroblastoma cells (15). The function of venom defensin-like peptides is unclear; although they have a three-dimensional structure similar to those of sea anemone sodium channel neurotoxins and antimicrobial peptides (defensins), they do not modulate sodium channel function or display antimicrobial activity (14, 12).”

“...*Given the independent evolution of venom in the platypus and the evolutionary divergence of platypus and other venomous lineages*, this prevented the identification of truly novel venom genes. Here, we have combined proteomic analysis on three samples of whole platypus venom with a comparison between the transcriptomes of an in-season and out-of-season venom gland to identify platypus-venom peptides and compare their expression during the breeding cycle.”

So, if these ‘polypeptides and enzymes *likely work together* to cause swelling, lowered blood pressure, and pain’ and if one definitely/explicitly/absolutely excludes the thesis that the male platypus obtained the entire spur system including its multicomponent venom altogether abruptly, “in one tremendous event” [“in einem gewaltigen Geschehen”], or in “a genetic revolution”⁷⁵ (now you will probably have guessed my questions already 😊) – how could the polypeptides and enzymes have arisen *independently of each other* by “infinitesimally small changes”, “infinitesimally slight variations”, “insensibly fine steps” and “insensibly fine gradations” for “*natura non facit saltum*” – each of the countless insensibly fine steps finally deciding – according to population genetics – over the life and death of the entire population wherever and whenever it occurred? Recall Mayr’s doubtful assertions that “The smaller the effect of a mutation, the greater the probability that it will be advantageous.” [...] “...indeed there is no difference between mutations and the so-called small variations which Darwin and the naturalists had regarded as the principal material of evolution”.

The Following Points (12 to 15) will Discuss the Subtopic of Convergence in More Detail

(12) AI: “Lactation genes: Despite **laying eggs**, it possesses **genes for milk production, a defining mammalian trait**”... “While they lay eggs, monotremes possess most of the casein genes found in **therian mammals**. They also have **unique extra caseins** (e.g., CSN2B and CSN3B) **not found in other mammals.**”

“**Monotreme Lactation Protein (MLP)**: Platypus milk *contains a unique protein known as Monotreme Lactation Protein (MLP)*, which provides antibacterial protection. This protein is unique to monotremes and likely evolved specifically to protect the young in the absence of nipples, as the milk is secreted onto the skin (“milk patches”) rather than through a teat”/ “The single remaining platypus vitellogenin gene is orthologous...to the genes found in **birds and amphibians.**”

Is convergent evolution involved here? Recall please the definition that “Convergent evolution is the independent evolution of similar [or identical] features in species of different lineages. Convergent evolution creates analogous structures that have similar [or even identical] form or function but were not present in the last common ancestor of those groups.” Also, I had noted the following objections by different authors:

“Convergence is a deeply intriguing mystery, given how complex some of the structures are. Some scientists are skeptical that an undirected process like natural selection and mutation would have stumbled upon the same complex structure many different times.” (Meyer, Minnich, MoneyMaker, Nelson, Seelke).

As well as:

“Now it is precisely the phenomenon of convergence that poses further major problems for neo-Darwinism. For if the one-time emergence of completely “adapted” organs or characteristics through selection of random mutations can hardly be explained, the multiple formation of similar organs eludes the Neo-Darwinian interpretation even further” (Biologist Henning Kahle).”

Adding: ‘See more on the improbabilities involved in convergence due to accidental/haphazard/random DNA mutations at <https://www.weloennig.de/KoalaPart2.pdf>, pp. 8-10 and 11-12.’ Cf. perhaps also <https://www.weloennig.de/SauropodDinosaur.pdf>

⁷⁵ A. Portmann and C. Luskin used these terms in the context of *The Evolution of Man: What do We Really Know?*: See <https://www.weloennig.de/HumanEvolution.pdf>

Revision of Former Outdated Views on the Monotremata

Before I go into detail about the genetics of the milk production in the platypus, I would first like to address the fundamental revision of fully outdated views (yet still forwarded every now and then) on the platypus and echidna (as well as the order Monotremata in general), namely ‘being primitive mammals’, ‘being direct primitive ancestors of placental mammals’, ‘being intermediates between reptiles and marsupials/placentals’, ‘a bridge animal’ being “a cornerstone of biology textbooks for illustrating transitional traits in evolution”⁷⁶.

The evolutionary biologist Jack Ashby⁷⁷ (2020, 2021 and 2026⁷⁸) has documented and called such specifications, which are often “represented in museums and other educational settings” the inadvertent perpetuation of “a colonial view of these species by inferring relative inferiority”, stating in his *Abstract* (2021, p. 35):

“Australian mammals are generally considered fondly, however there are particular trends in the way that they are represented in museums and other educational settings **which inadvertently perpetuate a colonial view of these species by inferring relative inferiority**. These tropes include describing species as ‘**weird and wonderful**’, ‘**strange**’, ‘**peculiar**’ and **primitive**; **using often unhelpful comparisons with placental mammals**; implying that convergent evolution is directional; **the ways that placental-derived names deny Australian mammals an individuality**; and the notion that ‘everything in Australia is trying to kill you’. While these practices appear harmless, they risk devaluing and othering Australian wildlife. This paper traces the origins of these habits among early colonial accounts of Australia, **and concludes that value judgements continue to be applied to Australian species, unlike animals from elsewhere**. These subconscious suggestions that Australian animals **are inferior** have inevitable impact on the ability to lobby for their conservation; and were intertwined with political arguments for the British invasion and colonisation of Australia, which has had profound impacts on Indigenous Australians.”

In his *Introduction* the author repeats some points and continues:

“...They [the Australian mammals] are considered fondly but not fairly. It is extremely common to see phrases such as ‘**weird and wonderful**’, ‘**bizarre**’, ‘**strange**’ and ‘**peculiar**’ being used. One illustrative example is a recent cover-story about platypuses in *BBC Wildlife magazine* which read, ‘Stranger things // Up close with nature’s **weirdest mammal**’ (Vergnani, 2019). Elsewhere, The New York Times’ coverage of a story relating to monotreme genomes described the **platypus** as ‘**a Frankencreature**’ (2021). Additionally, in a slightly different way, platypuses and echidnas – but also marsupials – are regularly described as ‘**primitive**’.”

See for an in-depth documentation of such terms used up to the present, Ashby’s paper. Incidentally, I am especially fond of the platypus as ‘a Frankencreature’ (Frankenstein monster).

So, ‘**How should we think of monotremes?**’ The evolutionary authors of *The Open University*⁷⁹ have excellently summed up the latest research on that question as follows (2026):

Not long ago⁸⁰ “biologists often thought of the term ‘**egg-laying mammal**’ as synonymous with ‘**reptile-like mammal**’ or ‘**primitive mammal**’. Now, with our greater understanding of monotreme biology, **these emotive terms are disapproved of**, since these animals have so **many authentic mammalian features**. For example, if echidnas didn’t lay eggs, you might be forgiven for thinking of this animal as another species of hedgehog. However, the hedgehog is a placental mammal. Although the period of development within the egg is relatively brief, **many aspects of reproduction and maternal care in the monotremes are distinctly mammalian**.”

...And how long have monotremes existed? A platypus fossil found in Queensland is about 25 million years old, but the oldest monotreme fossil (a jaw bone) is over 100 million years old. **Their evolution could therefore be described as conservative, with little evidence of major changes over time.**”

And the ensuing sentence of that quote notes a so weighty/substantial/far reaching key point concerning the origin of the order Monotremata that I am continuing to cite it in the same font size as that of most of my commentaries. The authors correctly state: “**However, biologists remain ignorant about what the ancestors of monotremes looked like and what historic relationship they had with the evolutionary lines that gave rise to marsupial and placental mammals.**”

⁷⁶ AI (19 February 2026): “The platypus (*Ornithorhynchus anatinus*) is a cornerstone of biology textbooks for illustrating transitional traits in evolution and the diversity of mammals. As a monotreme (egg-laying mammal), it highlights the link between reptiles and mammals, possessing a unique blend of characteristics, including venomous spurs, electroreception, and milk production without nipples. Oxford Academic (19. 2. 26) +4) I also noted: “Campbell Biologie (Pearson Studium - Biologie) Hardcover – 15 Sept. 2025 DEUTSCH” (W.-E. L.: AI often changes its answers sometimes even within minutes. So, trying to check that answer again on 5 April 2026 I received a more differentiated answer. Nevertheless, it still spoke about “1. Reptilian-like Transitional Traits (Ancestral Retention).”

⁷⁷ Assistant Director, Museum of Zoology, University of Cambridge, UK. <https://www.zoo.cam.ac.uk/directory/jack-ashby>

⁷⁸ <https://www.youtube.com/watch?v=0iYpKrPNGsl>, https://www.natsca.org/sites/default/files/publications/JoNSC-Vol9-Ashby_2021.pdf / p. 41: “Another common trope that paints an unreasonable picture of Australian wildlife is that **everything there is dangerous** (see for example an article in *The Huffington Post* entitled, ‘**Everything In Australia Wants To Kill You, In This Order**’ (Degnate, 2017) and the presenter of the BBC programme *Deadly 60*, Steve Backshall, describing **Australia as the ‘home of deadly**’ in *Australian Geographic* (Dineley, 2013). <https://www.repository.cam.ac.uk/items/4a16aae1-9b14-486e-823e-10cb80ef0103>

⁷⁹ <https://www.open.edu/openlearn/nature-environment/introducing-mammals/content-section-3.1>

⁸⁰ The sentence begins as follows: “Years ago biologists...” My comment: Well, some even up to this very day. For the details see the paper by Ashby 2021.

In section 3 the authors emphasize some important differences between reptiles and monotremes:

“The reptile embryo feeds on a supply of highly nutritious yolk and, by the time the embryo hatches, it is sufficiently well-developed to go looking for food on its own.

By contrast, the platypus and echidna are very different from their reptilian ancestors. Their eggs are smaller, containing only a limited amount of yolk, and their young hatch in a far less developed state. They need a lot more nourishment if they're going to grow and survive.

Platypus young develop without having to leave their mother's burrow. **Four months after hatching, a youngster emerges from the burrow for the first time and already it has grown to almost full adult size. That is thanks to an amazing form of nourishment that is a defining feature of all mammals: milk.**⁸¹

And on the reproduction of marsupial and placental mammals:

“Thinking of the marsupial method of reproduction as ‘primitive’ or inferior to that of placental mammals is misleading. What we see is a successful reproductive strategy (or rather a range of strategies, because the details vary between different marsupial species) that is very different from our own. What is biologically so interesting is that such a large fraction of the early development of the young occurs after birth, in the pouch.”⁸²

AI (3 April 2026): including the references for the statements:

“The historical interpretation of monotremes and marsupials as direct ancestors or simple intermediates to placental mammals was largely challenged due to modern analyses revealing that **monotremes are highly specialized (derived) and do not represent a “primitive” or ancestral Mesozoic model.** ScienceDirect.com +1

“Scholars, including proponents of molecular phylogenetics and comparative anatomy, pointed out that while monotremes retain egg-laying characteristics, **their specific brain structure, electroreception, and reproductive physiology are uniquely derived adaptations rather than ancestral traits.** ScienceDirect.com +1

“Parallel Evolution: Similarities between marsupials and placentals are often recognized as convergent or parallel evolution rather than a direct ancestral-descendant relationship. Australian Museum +5

“Consequently, rather than viewing them as primitive ancestors, biologists today view **monotremes and marsupials as independently evolved,** specialized lineages that represent unique solutions to mammalian survival.

National Institutes of Health (.gov) +1

AI (26 March 2026) **“Platypus shares over 80% of its genes with other vertebrates such as mice, dogs, and humans.”**

Ann Moyal (2010, position 2296 of the Kindl edition):

“Published as a lead article in Nature in June 2008, the platypus genome findings reverberated around the world. The study exposed **some 18,500 genes of enormous significance to biological research. Of these, the platypus shares 82%⁸³ with other mammals: humans, dogs, opossums; and some similar to chickens.** The platypus's complex set of ten sex chromosomes, already identified and now underwritten with vastly multiplied evidence, provided a clear marker to a different evolution from the basic eutherian hereditary line. Gene mapping revealed that there was no homology between the platypus sex chromosomes and the XY pairs of other mammals. Platypus females have five pairs of X chromosomes; males have five Xs and five Ys, and the animal has no SRY gene, the gene that makes the human male. Mapping also confirmed that **the platypus is the only mammal that shares sex chromosome homology with the Z chromosome of birds,** a condition suggesting that monotreme sex chromosomes derived from an ancient reptilian system.”⁸⁴

“...suggesting that monotreme sex chromosomes derived from an ancient reptilian system”: Not necessarily: Even on evolutionary presuppositions this phenomenon could be due to convergence.

AI (6 April 2026):

“The sex chromosomes of the platypus **are significantly more similar to the Z chromosomes of birds than to those of reptiles...**” “Bird-like Homology: The platypus X chromosomes, particularly X3 and X5, **share high sequence similarity with the chicken Z chromosome**”. This is followed by some evolutionary speculations (“Independent Evolution: Platypus sex chromosomes likely evolved from an ancestral amniote ZW system (**similar to modern birds**) that was retained by monotremes but later evolved into a male heterogametic XY-chain system, rather than the X-Y system that evolved independently in therian mammals”).

“Avian Z chromosome: The platypus' X chromosomes (particularly X3 and X5) **contain numerous genes homologous to the Z chromosome of birds.** A prominent example is the **gene DMRT1, which plays a central role in sex determination in birds and is also found on the sex chromosomes of the platypus.**”

Maggie Ryan Sandford emphasized the following point (2008, p. 25):

“Platypuses exhibit several genetic markers that are **related to egg-making birds, amphibians, and fish.** Platypuses exhibit **several codes found only in egg-making birds and fish.**”⁸⁵

Warren et al. (AI: 7 April 2026: **“103-member team** listed in the full author list”) (2008, p. 181):

“The platypus has fully elaborated piRNA and miRNA pathways, the latter including many monotreme-specific miRNAs and miRNAs **that are shared with either mammals or chickens.**”

⁸¹ <https://www.open.edu/openlearn/nature-environment/introducing-mammals/content-section-3> (Retrieved 6 May 2026)

⁸² <https://www.open.edu/openlearn/nature-environment/introducing-mammals/content-section-4>

⁸³ This percentage of 82% of the protein coding genes was first published in the original research paper by Warren et al. 2008:

https://www.researchgate.net/publication/23250357_Genome_analysis_of_the_platypus_reveals_unique_signatures_of_evolution

⁸⁴ Moyal, Ann (2010): Platypus (English Edition). Allen & Unwin. Kindle-Version.

⁸⁵ Sandford, Maggie Ryan. Consider the Platypus: Evolution through Biology's Most Baffling Beasts (English Edition) (S.25). Workman Publishing Company. Kindle-Version.

Back to Point 12 on the Platypus Milk Production

The gist according to AI (8 April 2026) – is convergence involved?

“Platypuses possess, and express, all key milk protein genes (including caseins) found in therian mammals, *confirming a shared ancestral origin of lactation*⁸⁶. Unique to monotremes is the **Monotreme Lactation Protein (MLP)**, which has antimicrobial properties for protecting milk delivered through skin pores rather than nipples.

... Hormonal Regulation: Platypus milk protein genes, including MLP and Beta-lactoglobulin (BLG), are regulated by prolactin, insulin, and glucocorticoid signaling, similar to other mammals. Antibacterial Function: Functional analysis indicates **MLP is highly effective against specific bacteria**, including *Staphylococcus aureus*. Egg-Laying Vestige: Although they produce milk, they retain one functional vitellogenin gene (used for yolk) which is lost in other mammals. National Institutes of Health (.gov) +7”

(From additional information originally in German) “Casein genes (alpha, beta, kappa): These genes are organized in clusters in the platypus genome, **similar to cattle or humans**. They are responsible for the production of casein proteins, a major component of mammalian milk. Lactoglobulin (BLG): An important whey protein gene that is also present in the platypus genome and is hormonally regulated. The **expression of milk genes in platypuses is controlled by mechanisms similar to those in placental mammals, suggesting a very ancient evolutionary origin for this control**⁸⁷ National Institutes of Health (.gov) +1

Lactogenic hormones: The combination of insulin, dexamethasone (a glucocorticoid substitute), and prolactin is required for the maximum induction of the MLP and BLG genes. Transcription factors: **Conserved binding sites** for factors such as STAT5, NF-1, and C/EBP in the promoters of these genes demonstrate that basic hormonal control of lactation was **established at least 166 million years ago**. National Institutes of Health (.gov) +2”

Interestingly there is *no word on a possible convergent origin* of the genetics of platypus milk production (as has in contrast been noted for so many other unlikely features of the platypus – see some examples above). Instead, the appeal to a **common ancestor**. In the original research paper by Yang Zhou et al. (altogether 42 authors/co-workers) the term “convergent evolution” occurs only once, namely for the **reduction** of the copy numbers of bitter taste receptor genes in platypus, echidna and pangolins as compared to eutherian mammals⁸⁸.

Now Yang Zhou et al. on milk genes and evolution (2021):

“**The monotreme genomes contain most of the milk genes that have been identified in therian mammals**. Most mammals have three casein genes⁴¹, which encode the most abundant milk proteins secreted throughout lactation (Fig. 4c). In addition to these genes, *monotremes have extra caseins that are not found in therian mammals*, with unknown functions, an extra copy of CSN2 (CSN2B) (previously reported) and CSN3 (CSN3B) in platypus (described here), which has the classic structure of CSN342 (Extended Data Fig. 10i and Supplementary Table 54).”

After noting their calculation methods for their phylogenetic analysis, the authors state that:

“Points and time range included the most recent common ancestor of **human–mouse, 85–94 million years ago; human–opossum 150–167 million years ago; human–platypus, 163–191 million years ago; human–chicken, 297–326 million years ago; anole–chicken, 276–286 million years ago.**”

Under the subheading *Insights into mammalian genome evolution* the authors record that their phylogenomic reconstruction shows that:

“...**monotremes diverged from therians around 187 million years ago**, and *the two monotremes diverged around 55 million years ago* (Extended Data Fig. 2a). This estimate provides a date for the **monotreme–therian split** that is **earlier than previous estimates** (about **21 million years ago**)², but agrees with recent analyses **of few genes and fossil evidence**⁶. **We also inferred that monotremes had similar genome substitution rates** (approximately 2.6×10^{-3} substitutions per site per million years) **compared with other mammals** (Supplementary Table 15). About 14 Mb of mammalian specific highly conserved elements were identified by comparison among vertebrates.”

The paper referred to is MJ Phillips, TH Bennett, MSY Lee (2009): *Molecules, morphology, and ecology indicate a recent, amphibious ancestry for echidnas*.

“The fossil record has provided few clues as to their origins and the evolution of their ecological specializations; however, recent reassignment of the Early Cretaceous *Teinolophos* and *Steropodon* to the platypus lineage implies that **platypuses and echidnas diverged >112.5 million years ago**, reinforcing the notion of **monotremes as living fossils**. ... A multigene evaluation of the echidna–platypus divergence using both a relaxed molecular clock and direct fossil calibrations **reveals a recent split of 19–48 million years ago**.”⁸⁹

AI: 8 April 2026 mentions **170 to 310 million years ago**:

“The ability to produce milk is estimated to have developed around **170 to 310 million years ago** in a common ancestor of all present-day mammals.”

Similarly, the original *Science* comment speaks of **200 million to 310 million years ago**:

“Because platypuses split from other mammals 180 million years ago, the find indicates that lactation arose in a **common ancestor of both groups thought to have lived 200 million to 310 million years ago**--well before the loss of egg-laying genes.”⁹⁰

⁸⁶ This is **not an empirically reproducible fact**, but a deduction from the unproven philosophy of the Neo-Darwinian evolutionary worldview.

⁸⁷ See previous footnote and for the “least 166 million years ago” in the next paragraph the contradictory time assertions below.

⁸⁸ Yang Zhou et al: Platypus and echidna genomes reveal mammalian biology and evolution: <https://www.nature.com/articles/s41586-020-03039-0> “Chemosensory systems mediate animal behaviour that is essential for survival and reproduction through the direct interaction with environmental chemical cues²⁷. For example, **eutherian mammals have more than 25 copies** of bitter taste receptor genes (TAS2R genes)^{27,28}, whereas this gene family is **considerably smaller in monotremes** (Extended Data Fig. 9a) **with only 7 in platypus** (Supplementary Tables 44, 45). The number is **reduced to three in echidna** (Fig. 4a and Supplementary Results). This reduction is also observed in pangolins, which **suggests convergent evolution** that results from the insectivore diet of both echidnas and pangolins²⁹.”

⁸⁹ <https://www.pnas.org/doi/full/10.1073/pnas.0904649106>

⁹⁰ <https://www.science.org/content/article/milk-does-evolution-good>

I am especially fond of such exact/accurate/rigorous time specifications as of ‘**170**’ or ‘**200 to 310 million years ago**’, not to speak of the other contradictory time calculations just cited⁹¹.

Fact is that all these dates depend on a whole range of varying (including contradictory) evolutionary parameters and presuppositions so that even several evolutionary biologists did not hold back from critiquing the molecular clocks.⁹²

Because of the enormous improbabilities often involved in the origin of structures due to convergence (as briefly noted above), whenever theoretically possible *evolutionists prefer common ancestry* as a way out of the convergence dilemma as shown here for the platypus milk genetics⁹³.

However, Warren et al. who have noted that “the repertoire of milk protein genes is typically mammalian” also pointed out that “*platypus milk changes in protein composition during lactation (as it does in marsupials, but not in most eutherians)*.”

Question: Did monotremes and marsupials inherit their lactation strategy (changing composition over time) from a common ancestor or is it thought to be due to convergence?

Evolutionary answers at AI (10 April 2026):

“Platypus milk demonstrates evolutionary convergence with eutherian mammals in that they produce a nutrient-rich milk (including lactose and lipids) containing caseins, despite their distinct, reptilian-like reproductive method of laying eggs. Furthermore, the adaptation of utilizing **antibacterial proteins** to protect young in a non-sterile environment is a specific convergent strategy seen in **marsupials and even certain birds** (pigeon milk), despite the lack of a teat. International Milk Genomics Consortium +2”

(11 April 2026):

“Although both monotremes (platypus) and marsupials greatly alter their milk composition during lactation, research suggests that **they evolved these strategies independently**.”

Why convergence? “Different mechanisms: The molecular signals and the specific proteins that control these changes differ considerably between the two groups. While marsupials, for example, use highly specialized Late Lactation Proteins (LLP), platypuses rely on the Monotreme Lactation Protein (MLP).”⁹⁴

“Monotremes: They possess **additional copies of casein genes** (such as **CSN2B and CSN3B**) that arose through independent duplications⁹⁵ within their lineage.

Marsupials: In contrast, marsupials often have only single copies of the classic alpha and beta caseins and appear to have lost parts of the original casein locus.

“Marsupials: In **marsupials**, WAP [Whey Acidic Protein] is produced almost exclusively **in the middle to late lactation phase**, whereas in **monotremes it is often permanently present**.”

Also: “Through “exon shuffling”⁹⁶, monotremes and marsupials have developed different configurations of the WAP protein.”

Moreover, there are “differences in sugars (oligosaccharides): “Even though they are not proteins, their genetic control reflects the distance: **marsupials produce unique linear sugar structures that are not found in monotremes or placental mammals**.

Concerning the evolutionary interpretations given at AI (reflecting the original Neo-Darwinian governed publications) I would like to remind my readers of the comments of (1) Walter Höres and (2) Anton Neuhäusler:

- (1) [More than] “One hundred years after Charles Darwin and sixty years after Ernst Haeckel's death - despite all the essentially insignificant modifications - nothing has changed in the basic intellectual form of Darwinism. It is and remains

⁹¹ More dates, for example, here: Flannary et al. (2022) <https://www.tandfonline.com/doi/full/10.1080/03115518.2022.2025900#abstract> (“Tarver et al. (2016) found that **poor resolution of mammalian phylogenies results from inadequately fitted evolutionary models**. Further work is therefore required to resolve this aspect of monotreme evolutionary biology.”)

⁹² (2004) Evolution's “Molecular Clock”: Not So Dependable After All? <https://pmc.ncbi.nlm.nih.gov/articles/PMC509321/> “The clock assumes that mutations occur independently of each other and at a constant rate. By analyzing thousands of noncoding DNA sequences scattered throughout the human genome, Edward Vowles and William Amos have found that **the clock is anything but constant**. Instead, a mutation in one spot in the genome affects the chance of getting another mutation nearby.

Jeffrey H. Schwartz and Bruno Maresca (2006): https://www.academia.edu/7239541/Do_Molecular_Clocks_Run_at_All_A_Critique_of_Molecular_Systematics (2001): *Science*: <https://www.science.org/content/article/molecular-clocks-not-exactly-swiss>

Moreover, qualified ID-scientists have discussed “Evolutions FAILED Clock predictions (2026): https://www.youtube.com/watch?v=gX6p_rSSxJc. See also the scientific **101 articles** (if I counted correctly) at <https://scienceandculture.com/?s=Molecular+clocks> (Date range 1991-2026) (Retrieved 11 April 2026)

⁹³ This was also true for the origin of the **Carnivorous Plants** (Lönnig 2016): “In a scenario of strong convergence based on morphological data, the pitchers might have arisen seven times separately, adhesive traps at least six times, snap traps two times and suction traps possibly also two times. Nevertheless, such conclusions have been questioned by some authors as perhaps “more apparent than real” (Juniper et al., 1989, pp. 4, 283), discussing the origin of all carnivorous plant families from one basic carnivorous stem group (Croizat had already dedicated a larger work to this hypothesis; see Croizat, 1960). *The independent origin of complex synorganised structures, which are often anatomically and physiologically very similar to each other, appears to be intrinsically unlikely to many authors so that they have tried to avoid the hypothesis of convergence as far as possible.*” <https://onlinelibrary.wiley.com/doi/abs/10.1002/9780470015902.a0003818.pub2>

⁹⁴ Original German text: “Obwohl sowohl Kloakentiere (Schnabeltiere) als auch Beuteltiere ihre Milchzusammensetzung während der Laktation stark verändern, deutet die Forschung darauf hin, dass sie diese Strategien unabhängig voneinander entwickelt haben.”

„Unterschiedliche Mechanismen: Die molekularen Signale und die spezifischen Proteine, die diese Veränderungen steuern, unterscheiden sich zwischen den beiden Gruppen erheblich. Während Beuteltiere beispielsweise hochspezialisierte Late Lactation Proteins (LLP) nutzen, setzen Schnabeltiere auf das Monotreme Lactation Protein (MLP).“ Weitere deutsche AI Texte hier nicht mehr wiedergegeben.

⁹⁵ For easy checking I repeat the here the links to the scientific problems involved in this hypothesis: <https://scienceandculture.com/?s=gene+duplications&site-current-site=1> (now up to 11 April 2026 you can find there 73 articles). See also <https://www.weloennig.de/Genduplikationen.html> and

⁹⁶ Concerning problems of exon shuffling cf. <https://scienceandculture.com/?s=exon+shuffling&from=1991&to=2026&author=&orderBy=relevance&site-current-site=1>, <https://www.weloennig.de/OffeneFragenEvol.html>, <https://www.weloennig.de/Genduplikationen.html> (Nachtrag)

the greatest imposition on the human mind that modern times, and perhaps the whole of Western history, have ever experienced. The challenge of explaining the wonders of the organic world by claiming that they arose “by themselves”.⁹⁷

- (2) According Neuhäusler the Neo-Darwinian origin of species is the result of “primeval stupidity and original brutality” (“Urdummheit und Urbrutalität” for random mutations and the elimination of the weakest by natural selection).⁹⁸

Suggestion to my readers: Let’s accept all the facts, of course, but let’s accept the regularly doubtful evolutionary interpretations only as long as they are *empirically reproducible*.

Last not least here is another aspect on platypus milk production, birds and convergences from the *Milk Genomics Consortium* (2013):

“Could monotremes be birds? This is a provocative question, and *there is an interesting relationship between monotreme lactation and nutrient provision in some species of birds*. Recent work has suggested that *the sex chromosomes of platypus are more like that seen in birds than mammals*. Interestingly, some birds, such as the pigeon, produce an essential nutrient substance in the crop sac (located next to the oesophagus) that is fed to their young and seems to be functionally similar to mammalian milk. The “lactation cycle” of the crop sac includes a growth phase during egg incubation, the onset of “milk” production at hatching, and sustained delivery of milk to the squab during the first five to 10 days. *Prolactin, a hormone that is central to milk synthesis in mammals, also controls growth and function of the crop sac. Pigeon milk is similar to mammalian milk in that it contains protein, carbohydrate, lipids, vitamins, minerals, and growth factors*. In addition, it includes *antimicrobial proteins* and other innate and adaptive immune factors that play a role in the development of their immune and digestive systems. When the squab is weaned, it begins to eat seeds, consumes crop milk less frequently, and the crop involutes and remodels in preparation for the next cycle. A recent study examined the transcriptome (all the genes expressed) of the pigeon crop (Gillespie et al., 2013) during the lactation cycle, and *there was no evidence of expression of mammalian milk protein genes during lactation*. However, *the mechanism is an interesting example of evolutionary convergence to provide essential nutrients, protection from infection, and signalling for development of the young*.⁹⁹

Comment by Gregg Davidson, Professor of Geology and Geological Engineering, University of Mississippi¹⁰⁰, on *Platypus: A Darwinian Cautionary Tale* (2016):

“Thus, *the platypus will remain a significant misfit in any Darwinian scheme*. Is it from a sauropsid lineage which includes reptiles and birds? Is it from a synapsid lineage which supposedly led to the emergence of the mammals? *Or is it derived independently from some unknown ancestral amniote?* Or could it be that the Darwinian hypothesis, cladistic analysis or any other classification system for that matter *is just far too restrictive?* Without doubt, there are mammal-like reptiles as there are reptile-like mammals. *The platypus is a Darwinian cautionary tale. Is it a bird or is it a plain ... old platypus?*”¹⁰¹

The next point is “Sex Determination” in our platypuses:

(13) AI: “Sex Determination (**AMHY**): Unlike almost all other mammals that use the SRY gene for sex determination, monotremes lack this gene. Recent evidence suggests their sex is determined by the AMHY (Anti-Müllerian Hormone) gene, a mechanism *more common in some fish and amphibians*.”

AI (12 April 2026): “Independent Evolution: The AMHY gene is a classic example of convergent evolution.”

Question: Why is the AMHY gene of the platypus not found in reptiles?

The following evolutionary answers by AI (March/April 2026) mainly consist of empty phrases adapted from the original papers without concrete content:

“The AMHY (anti-Müllerian hormone Y-linked) gene is not found in reptiles because it is a unique genetic adaptation that evolved specifically in the lineage leading to modern monotremes (platypuses and echidnas) approximately 100 million years ago, long after their split from the reptile lineage. National Institutes of Health (NIH) | (.gov) +1)

So, it is an evolved “unique genetic adaptation” – a “pseudo-explanation”¹⁰², which is possible, of course, for any unique feature in the world of living and extinct organisms. Hence: It is unique because evolution (natural selection of accidentally arisen numberless insensibly fine gradations) made it unique.

⁹⁷ (“by themselves” “von selbst”) <https://www.weloennig.de/KoalaPart2.pdf>

⁹⁸ <https://www.weloennig.de/Koala.pdf>

⁹⁹ <https://www.milkgenomics.org/?splash=mining-animal-biodiversity-to-improve-dairy-outcomes#:~:text=Could%20monotremes%20be%20birds?,their%20immune%20and%20digestive%20systems>

¹⁰⁰ <https://olemiss.edu/profiles/davidson>

¹⁰¹ https://www.truthinscience.uk/Articles/718106/Platypus_A_Darwinian.aspx

¹⁰² “A pseudo-explanation is a statement that appears to explain a phenomenon but fails to provide a genuine, causal reason.”

(AI continued) “While AMH is a common hormone involved in sex development across vertebrates, AMHY is a highly modified copy of AMH exclusive to the Y chromosomes of monotremes.”

Thus: It is highly modified because evolution modified it that way.

(AI continued) “Here is why AMHY is specific to monotremes and absent in reptiles:
Independent Evolution (Monotreme Innovation): The AMHY gene arose from a gene duplication event and *subsequent differentiation* after monotremes branched off from other mammals, following an ancient inversion event on the proto-Y chromosome in their common ancestor.”

Random gene duplications occur regularly (*cf.* links above). But what should have been the decisive selective advantages of each of the haphazardly arisen “infinitesimally slight variations” for the “subsequent differentiation after monotremes branched off from other mammals”? The accidental “ancient inversion event on the proto-Y chromosome”¹⁰³ (deduced from comparable chromosomal structures of extant mammals – synteny analysis) *with positive effects and correspondingly selective advantages in a line of putative monotreme ancestors is as hypothetical and irreproducible as “the proto-Y chromosome”*¹⁰⁴ itself, not speak of the postulated “common ancestor” in that evolutionary scenario. In other words: The assertion that the monotremes branched off from other mammals by selection of mutations ‘with slight or even invisible effects on the phenotype’ is just another doubtful and unverifiable assumption of the Neo-Darwinian (and other theories of overall) evolution.

(14) AI: “Complex Sex Chromosomes: Monotremes have an extraordinary system of multiple sex chromosomes—10 in the platypus (5X and 5Y) and 9 in the echidna—*which show more homology to bird (Z) chromosomes than to the XY pair of other mammals*”

Ann Moyal (2010, position 2284 of the Kindl edition¹⁰⁵) reports:

“Working laboriously from old methods, they [Graves and Grützner] and their Cambridge collaborators had, by the 1990s, managed to isolate some 23 genes from the platypus genome and to locate the platypus’s unique ten sex chromosomes, *the most complex sex determination system seen in any vertebrate. More probing had established similarities between the platypus sex chromosomes and those of birds.*”

And at position 2300 von 2680:

“Gene mapping revealed that there was no homology between the platypus sex chromosomes and the XY pairs of other mammals. Platypus females have five pairs of X chromosomes; males have five Xs and five Ys, and the animal has no SRY gene, the gene that makes the human male. *Mapping also confirmed that the platypus is the only mammal that shares sex chromosome homology with the Z chromosome of birds*, a condition suggesting that monotreme sex chromosomes derived from an ancient reptilian system.”¹⁰⁶

In the original *Nature* paper by Frank Grützner et al. (2004): “*In the platypus a meiotic chain of ten sex chromosomes shares genes with the bird Z and mammal X chromosomes*” the authors state (among other things) that:

¹⁰³ AI (12 April 2026): “A chromosomal inversion is a structural rearrangement where a segment of a chromosome breaks in two places, flips 180 degrees, and reinserts itself into the same location in reverse order. *These events usually do not lose or gain genetic material* (balanced).” Assuming for a moment that such an inversion event really occurred – how could it explain the origin of the monotremes? “While this is a balanced rearrangement that often causes no health issues for the carrier, inversions can cause infertility or result in unhealthy offspring with genetic deletions or duplications. ScienceDirect.com +3.”

¹⁰⁴ (Hier ausnahmsweise noch einmal deutsch und englisch.) “Das Proto-Y-Chromosom ist der evolutionäre Vorläufer des heutigen Y-Chromosoms, der *vor etwa 150–300 Millionen Jahren* aus einem normalen Chromosomenpaar (Autosomen) entstand. Es entwickelte sich, als ein Chromosom ein männlich bestimmendes Gen (wie SRY) erwarb und die Rekombination mit seinem Partner (dem Proto-X) unterdrückte, was zur schrittweisen Degeneration und zum massiven Genverlust führte.“ Or in English: “The proto-Y chromosome originated from an ordinary pair of autosomes, which became differentiated when one member *acquired a male-determining gene*, such as SRY, approximately *180–300 million years ago*. Recombination was then suppressed between this proto-Y and its homologous proto-X to lock in this sex-determining signal, leading to progressive degeneration and mass gene loss on the Y due to its inability to repair damage.” How did it “acquire” a male-determining gene? Again by selection of an almost endless series of accidental, haphazard, random (“micro-”) mutations producing insensible fine steps/insensibly fine gradations? – Each step having decisive selective advantages on their way to sexual differentiation?

And there appears to be another basic problem: AI (13 April 2026): “The *“50 percent cost of meiosis,”* often referred to as the cost of genome dilution or cost of sex, refers to the genetic disadvantage sexual reproduction has compared to asexual reproduction. In sexual reproduction, an individual passes on only 50% of its genes to each offspring, whereas in asexual reproduction, an individual passes on 100% of its genes. Key aspects of this cost include: Genome Dilution: Because meiosis reduces the genetic material by half to produce gametes (sperm and eggs), the offspring inherits only half its genome from each parent. Lowered Genetic Influence: Sexual parents have less genetic representation in future generations compared to asexual individuals, who produce clones of themselves. Context: This is often grouped with the *“two-fold cost of males,”* where asexual organisms (producing only females) *can grow in number twice as fast as sexual populations that invest 50% of their resources into males who cannot directly produce offspring.* This means the 50 percent cost represents the “dilution” of a parent’s unique genetic identity.” Despite many selectionist attempts (including the Red Queen hypothesis) to explain the 50 percent cost of meiosis, the problem has never been convincingly explained by the Neo-Darwinian theory of evolution. See, for example, *Jonathan McLatchie* (2011): *Sex, the Queen of Problems in Evolutionary Biology*: https://scienceandculture.com/2011/07/spinning_fanciful_tales_about/ See also *John Sanford* on the Red Queen hypothesis in his work (2015) *Genetic Entropy*. 4. Auflage: https://www.amazon.de/Genetic-Entropy-English-John-Sanford-ebook/dp/B00TYWLC08/ref=sr_1_1?__mk_de_DE (Print 2014; Kindl 2015).

¹⁰⁵ Moyal, Ann: Platypus. Allen & Unwin. Kindle-Version 2010.

¹⁰⁶ Nobody has ever seen, examined, investigated and analyzed such “an ancient reptilian system” – this suggestion is nothing but another deduction from the doubtful evolutionary worldview.

"Here we demonstrate that platypus have five male-specific chromosomes (Y chromosomes) and five chromosomes present in one copy in males and two copies in females (X chromosomes). These ten chromosomes form a multivalent chain at male meiosis, adopting an alternating pattern to segregate into XXXXX-bearing and YYYYY-bearing sperm. ... The largest X chromosome, with homology to the human X chromosome, lies at one end of the chain, and a chromosome with homology to the bird Z chromosome lies near the other end. **This suggests an evolutionary link between mammal and bird sex chromosome systems**, which were previously thought to have evolved independently."¹⁰⁷

In *News in Science* Anna Salleh (2004) quotes Grützner as follows:

"The platypus actually links the bird sex chromosome system with the mammalian sex chromosome systems."¹⁰⁸

AI (13 April 2026):

"According to Grützner et al., the *platypus genome acts as an evolutionary link between mammalian and avian sex chromosomes*, as it has a meiotic chain of ten chromosomes that shows homologies to both systems. The discovery of **DMRT1, a bird-like sex gene**, and the linking of X- and Z-homologous regions refutes the theory of a completely independent evolution of these systems."

However, twenty years after the publication of the *Nature* paper by Frank Grützner et al., Nicholas C. Lister et al. (2024) have, together with Frédéric Veyrunes et al. (2008), specified that:

"The platypus sex chromosomes **have no homology with the sex chromosomes of therian mammals**¹⁰⁹ **but share considerable homology with the chicken Z chromosome**."¹¹⁰

Frédéric Veyrunes et al. (2008):

"We have also tested the hypotheses that platypus sex chromosomes share homology with both the mammal XY and the bird ZW systems. **In complete contradiction to early data, we find that the 10 sex chromosomes of platypus share no homology with the ancestral therian X chromosome**, which is homologous to platypus chromosome 6. Instead, **we find that regions homologous to the chicken Z are scattered throughout the chain, principally on X₅ and X₃**. These results have major implications for our understanding of mammalian sex chromosome evolution."

... Thus, the platypus meiotic chain shares **no gene homology with the therian X chromosome, whereas bird Z orthologs are scattered throughout it**. **The platypus sex chromosome complex is, therefore, not a link between the bird and mammal systems as previously proposed** (Grützner et al. 2004) but is, in fact, derived from a chromosome with homology with a region on the bird Z and human associated regions (Fig. 4).¹¹¹

Also in their *Footnotes*:

"Most significantly, comparative mapping shows that, **contrary to earlier reports, there is no homology between the platypus and therian X chromosomes**."

Note, please, also their evolutionary deductions presupposing the entire Neo-Darwinian worldview, which has – not only never been proved scientifically – but against which also a whole range of powerful scientific argument have been raised¹¹².

"Orthologs of genes in the conserved region of the human X (including *SOX3*, **the gene from which *SRY* evolved**) all map to platypus chromosome 6, which therefore represents the ancestral autosome from which the therian X and Y pair derived.

Has all this ever been proved by **empirically reproducible** investigations and experiments? So, how do they (and other evolutionary biologists) know that *SRY* evolved from the *SOX3* gene? And *how* did it evolve? By natural selection of hundreds of "insensibly fine steps"? Each minute step deciding over life and death of the entire population where it occurred? Has this transition ever been observed – all the many hypothetical steps thought to have been caused by accidental, haphazard, random DNA mutations? Definitely not. It is just **sequence similarities** which are the basis for such hypotheses. However (to repeat Kuhn's basic statement¹¹³):

"The similarity of forms [W.-E. L.: **and of DNA sequences**] was explained by evolution, and evolution in turn was proven by the various grades of [DNA] 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. [Zoologist] 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."

¹⁰⁷ https://scholar.google.com/scholar_lookup?title=In+the+platypus+a+meiotic+ch

¹⁰⁸ https://www.abc.net.au/science/news/enviro/EnviroRepublish_1225871.htm

¹⁰⁹ The authors also specify that "**Therian (eutherian and marsupial) mammals** have XY males and XX females in which approximately 859 X-borne coding genes in eutherians (see human genome assembly Ensembl GRCh38.p14) and approximately 497 X-borne coding genes in marsupials (see opossum genome assembly Ensembl ASM229v1) are unequally represented between the sexes. **Birds have ZZ males and ZW females in which approximately 865 Z-borne coding genes** are unequally represented between the sexes (see chicken genome assembly Ensembl bGalGal1.mat.broiler.GRCg7b).

¹¹⁰ <https://academic.oup.com/gigascience/article/doi/10.1093/gigascience/giae112/7943461?login=false&guestAccessKey=>

¹¹¹ Frédéric Veyrunes, Paul D Waters, Pat Miethke, Willem Rens, Daniel McMillan, Amber E Alsop, Frank Grützner, Janine E Deakin, Camilla M Whittington, Kyriena Schatzkamer, Colin L Kremitzki, Tina Graves, Malcolm A Ferguson-Smith, Wes Warren, Jennifer A Marshall Graves (2008): <https://pmc.ncbi.nlm.nih.gov/articles/PMC2413164/>

¹¹² See, for example, the articles and books mentioned at my homepage <https://www.weloennig.de/internetlibrary.html> and the relevant biological commentaries at <https://scienceandculture.com/>

¹¹³ Noted several times because of its utmost importance, for example https://ad-multimedia.de/evo/long-necked-giraffe_mU.pdf

Concerning the endless repetition of evolutionary slogans like “Evolution is a fact, beyond reasonable doubt, beyond serious doubt, beyond sane, informed, intelligent doubt, beyond doubt evolution is a fact”, calling critics of macro-evolution “history-deniers” (Dawkins) and much more (see <https://www.weloennig.de/KoalaPart2.pdf>, pp. 1 and 7 and <https://www.weloennig.de/GiraffeFossilRecord.labc.pdf>, pp. 14 and 15), I had asked the following questions (now extended by DNA and protein sequence similarities; in my text I had substituted Dawkins’ assertions on “evolution” by “morphological similarities”):

So, would Dawkins have been right, if he had said: “...*history deniers who doubt the fact of morphological [and DNA as well as protein sequence] similarities are ignorant of biology*”? Yes, that’s true. “*Morphological [and DNA as well as protein sequence] similarities are a fact, beyond reasonable doubt, beyond serious doubt, beyond sane, informed, intelligent doubt, beyond doubt morphological similarity is a fact. The evidence for morphological [and DNA as well as protein sequence] similarities is at least as strong as the evidence for the Holocaust, even allowing for eye witnesses of the Holocaust.*” Correct. Or: “*The number of clues, the sheer weight of evidence, totally and utterly, sledgehammeringly, overwhelmingly strongly supports the conclusion that morphological [and DNA as well as protein sequence] similarity is true.*” Or Jay Mathers Savage: “*No serious biologist today doubts the fact of morphological [and DNA as well as protein sequence] similarity.*” Also “*The fact of morphological similarity [...] is amply clear.*” And “*The fact of morphological similarity [and DNA as well as protein sequence similarities] is demonstrated on every side in all fields of biology.*” And “*We do not need a listing of evidences to demonstrate the fact of morphological [and DNA as well as protein sequence] similarities any more than we need to demonstrate the existence of mountain ranges.*”

Okay. However, the problem with such statements would be, of course, that they are altogether unsurpassably simplistic truisms, which could be set on par with such stupendously information rich assertions like “no serious geologist today doubts the fact of mountain ranges.”

My hypothesis for the (usually scientifically baseless) *leap from morphological and further similarities to macro-evolution is this*: Materialist metaphysics and its *re-ligio (being bound to a postulate)* **translate these biological similarities directly into evolution thus generating a shortcut to the naturalistic world view in the absence of real/testable proofs** by, among other points, the incessant repetition of the slogan that “evolution is a fact”, “beyond reasonable doubt, beyond serious doubt” etc.

Moreover, there is another absolutely serious/severe/acute biological problem for the Neo-Darwinian worldview of evolution: **Most of the “infinitesimally small changes”, “infinitesimally slight variations”, “insensibly fine steps” etc.** of the theory of Darwin and the Neo-Darwinians are not only *invisible for natural selection* but *also slightly deleterious*.

AI (14 April 2026) on the invisibility of the majority of genetic variation for natural selection:

“The neutral theory of molecular evolution, proposed by Motoo Kimura in 1968, states that the **majority of genetic variation** within species and most evolutionary changes at the molecular level **are caused by random genetic drift of mutant alleles that are selectively neutral, rather than by natural selection**. It focuses on DNA and protein levels, not physical traits, and suggests many mutations are neither advantageous nor disadvantageous.”

The Wikipedia anonymous author(s) (last edited 7 Dezember 2025)¹¹⁴:

“*Empirical evidence for the neutral theory*. Predictions derived from the neutral theory **are generally supported in studies of molecular evolution**.”

Masatoshi Nei, Yoshiyuki Suzuki and Masafumi Nozawa (2010, p. 265):

“The neutral theory of molecular evolution has been widely accepted and is the guiding principle for studying evolutionary genomics **and the molecular basis of phenotypic evolution**. *Recent data on genomic evolution are generally consistent with the neutral theory.*”¹¹⁵

Incidentally, it would almost be amusing (if the truth weren't occasionally lost in the process) to note how many doubtful rescue attempts¹¹⁶ have been made to protect the sacred cow of Neo-Darwinism from refutation by Neutral Theory.

Tomoko Ohta (1973) has refined and further elaborated the Neutral Theory emphasizing the topic of “Slightly Deleterious Mutant Substitutions in Evolution”¹¹⁷:

¹¹⁴ https://en.wikipedia.org/wiki/Neutral_theory_of_molecular_evolution#cite_note-:27-44

¹¹⁵ <https://www.annualreviews.org/content/journals/10.1146/annurev-genom-082908-150129> and full article at http://bpg.utoleledo.edu/~afedorov/ABPG2016/L16_March16/Nei2010.pdf

¹¹⁶ Could be a topic of a PhD thesis.

¹¹⁷ <https://www.nature.com/articles/246096a0>

“The concept of neutral mutant substitution in the population by random genetic drift can be extended to **include random fixation of very slightly deleterious mutations** which have more chance of being selected against than of being selected for.”

Geneticist John C. Sanford¹¹⁸ (2015, pp. 31/32) on slightly deleterious substitutions¹¹⁹:

“The vast bulk of the nucleotide positions are considered to be “nearly-neutral” sites, as will be seen more clearly below. Misspellings in life’s instruction manual will sometimes be very deleterious, **but in the overwhelming majority of cases they will be only slightly deleterious**. No new information can be expected, although existing information can be modulated or fine-tuned to a limited extent. **Biological modulation would involve adjusting the cell’s “rheostats”**¹²⁰. For example, it is well known that mutations can adjust activity of a promoter or enzyme, either up or down. However, when we use a rheostat to dim a light, we are not creating a new circuit, **nor are we in any way creating new information**. We are just fine-tuning the system that is already there, which was, in fact, designed to be fine-tuned.”

Some reasons why ‘the overwhelming majority of mutations should be nearly-neutral’ (p. 32):

“I have just stated that the overwhelming majority of mutations should be nearly-neutral. **All population geneticists would agree**, for many reasons. First, it can be seen by the nature of misspellings in any written language (as you can picture for yourself by changing any single letter in this book). Second, it can be seen by the total number of nucleotides. On average, each nucleotide position can only contain one 3-billionth of the total information. Third, **it can be seen from innumerable studies on the mutation of specific coding sequences, promoters and enhancers**. **Experimentally, we can show that most nucleotide positions have very subtle effects on any given cell function**, and only a few mutations are real “killers” of gene function (remember, any single gene function is just a minuscule part of the whole cell’s system). Lastly, the near-neutral impact of most nucleotides can be seen from the very subtle role that single nucleotides play in genome-wide patterns (codon-preferences, nucleosome binding sites, isochores, “word” compositional differences between species, etc.)”

Pp. 29/30 on the scarcity of clear cases of information-creating mutations:

“**The overwhelmingly deleterious nature of mutations can be seen by the incredible scarcity of clear cases of information-creating mutations**. It must be understood that scientists have a very sensitive and extensive network for detecting information-creating mutations, and most geneticists are diligently keeping their eyes open for them all the time. This has been true for about 100 years. The sensitivity of this observational network is such that **even if only one mutation out of a million unambiguously creates new information** (apart from “fine-tuning” which I will describe), **the literature would be over-flowing with reports of this happening**. Yet I am still not convinced there is a single, crystal-clear example of a known mutation which unambiguously created information. There are certainly many mutations which have been described as beneficial, but most of these beneficial mutations have not created information, but rather have destroyed it. For illustration, some of us (like me) would view a broken car alarm as “beneficial”. However, such random changes, although they might be found to be “desirable”, still represent a breakdown and not the creation of a new functional feature. Information consistently decreases.”

On Kimura’s curve (p. 34):

“As can be seen from Kimura’s curve, most mutations are negative, and pile up steeply near the zero mark. They are overwhelmingly deleterious and nearly-neutral. Kimura is famous for showing that there is a “zone of near-neutrality” (shown here as a box). Kimura calls near-neutral mutations “effectively neutral”, meaning that **they are so subtle that they are not subject to selection**.¹²¹”

For much more reasons for the neutral theory and slightly deleterious alleles, see John C. Sanford: *Genetic Entropy*. Kindle-Version.¹²² See also my article on the panda bear.

Comment at Amazon¹²³: “**His work largely invalidates classic neo-Darwinian theory**. The mutation/selection process by itself is not capable of creating the new biological information that is required for creating new life forms.”¹²⁴

This is, of course, also true for our platypus (*Ornithorhynchus anatinus*) including the statement on “*SOX3*, the gene from which *SRY* evolved”.

Now, since Darwinism has so completely failed, how can the fact be expounded that the platypus’ sex chromosomes show homology to bird (Z) chromosomes? I will briefly come back below to that question by a quotation on the explanatory power of the ID Theory and an invitation to my readers.

¹¹⁸ “Sanford and colleagues developed the “Biological Particle Delivery System” or so-called “gene gun” ... “Sanford and colleagues developed the quantitative forward genetic modeling program called Mendel’s Accountant, publishing several papers on it and genetic entropy in peer-reviewed venues.[12][13][14][15][16][17][18][19]” https://en.wikipedia.org/wiki/John_C._Sanford (as for the final comment of that article (“Intelligent-design advocate William Dembski cites the accomplishments of Sanford as evidence of the scientific status of intelligent design, since Sanford is a specialist in genetic engineering and a Courtesy Associate Professor in Horticulture. However, the mainstream scientific community rejects intelligent design and does not consider it science.”) (Retrieved 15 April 2026) I would add: “...**for totalitarian ideological reasons** (materialism) “the mainstream scientific community rejects intelligent design and does not consider it science.” (The Wikipedia article was retrieved 15 April 2026).

¹¹⁹ Sanford, John. *Genetic Entropy*. FMS Publications. Kindle-Version. List of his publications: https://17d6be2c-5d1b-427e-a006-953035353c59.filesusr.com/ugd/a704d4_ba922b8017a34dfbacda737844545834.pdf

¹²⁰ Rheostat: “A device used to control and change the flow of electric current through a machine such as an electric light”

<https://dictionary.cambridge.org/dictionary/english/rheostat>

¹²¹ “not subject to selection” by Sanford in italics.

¹²² See perhaps also my article on the panda bear <https://www.weloennig.de/PANDA.Part1.pdf> p. 30

¹²³ https://www.amazon.de/Genetic-Entropy-English-John-Sanford-ebook/dp/B00TYWLC08/ref=tmm_kin_swatch_0

¹²⁴ More here: <https://scienceandculture.com/?s=%22slightly+deleterious%22&from=1991&to=2026&author=&orderby=relevance&site-current-site=1> (check “slightly deleterious”). See perhaps also <https://scienceandculture.com/2024/05/fossil-friday-three-modern-scientific-challenges-to-the-causal-adequacy-of-darwinian-explanations/>

Point No. 15 of our series mentioned above is:

Biofluorescence: No specific genes so far known. However, AI comments: “The trait appears in widely divergent groups—monotremes (platypus), marsupials (opossums), and placental mammals (flying squirrels). This suggests that **if** the trait is ancestral, the underlying genes are highly conserved across over 150 million years of mammalian evolution.” W.-E. L.: But what about **convergence – as postulated also for so many other features of the platypus?** However, both hypotheses would be equally problematic.

Paula Anich et al. (2021) reported in their original research article “Biofluorescence in the platypus (*Ornithorhynchus anatinus*)” the ensuing discoveries:

“We examined three specimens of the platypus (*Ornithorhynchus anatinus*) from Tasmania and New South Wales, Australia, housed in the Field Museum of Natural History (Chicago, Illinois, USA) and the University of Nebraska State Museum (Lincoln, Nebraska, USA) under visible light and ultraviolet (UV) light. The pelage of the animals **appeared uniformly brown under visible light and green or cyan under UV light, due to fluoresced wavelengths that peaked around 500 nm**. Our observations are the first report of biofluorescence in a monotreme mammal.”

In the introduction to their findings they also mention that:

“...Biofluorescence, in which short wavelengths of light are absorbed and longer wavelengths are re-emitted by living organisms, has been observed in a wide range of **fishes** (Sparks et al. 2014), **reptiles** and **amphibians** (Gruber and Sparks 2015; Lamb and Davis 2020) and **birds** (Pearn et al. 2001; Weidensaul et al. 2011). Within **mammals**, biofluorescence of the pelage under ultraviolet (UV) light has been previously documented in nocturnal–crepuscular New World taxa including **marsupial opossums** (Meisner 1983; Pine et al. 1985) and **placental flying squirrels** (Kohler et al. 2019).”¹²⁵

And they finish their article with the question:

“Biofluorescence in mammals is not restricted to a few closely related specialists; instead, it appears across the phylogeny, which begs the question: **Is biofluorescence an ancestral mammalian trait?**”

AI (15 April 2026):

“Biofluorescence in the platypus, a phenomenon discovered in 2020 where their fur glows a cyan-green color under ultraviolet (UV) light, **is considered an example of convergent evolution**. This trait is shared with distantly related nocturnal mammals, such as flying squirrels and various¹²⁶ marsupials, suggesting it has evolved or been retained independently across different mammalian lineages to serve a similar function. ... **Convergent Evolution:** The ability to glow is not unique to the platypus; it has been documented in marsupial opossums and placental flying squirrels, which are far removed from monotremes (egg-laying mammals). This suggests that biofluorescence may be an ancient trait in mammals or a case of convergent evolution, where unrelated species independently develop similar traits to adapt to their environments.”

Both answers presuppose the doubtful Neo-Darwinian world view and appear to be equally questionable/implausible/improbable when you have really carefully considered the arguments presented above.

Professor Ferdinand Schmidt (medicine and biology) noted that:

“Neo-Darwinism has only put **the god of chance** in the place of a divine creator, who is just as omnipotent, omniscient and omnipresent. **He can do everything:** He makes countless of the most amazing inventions. He knows everything: He is a master of all biochemical, biophysical and biological laws and puts all scientific achievements in these areas far into his shade. He is in action everywhere and yet it 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.”¹²⁷

Similarly, Professor Robert Nachtway (zoology) once commented:

“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

¹²⁵ Anich, P., Anthony, S., Carlson, M., Gunnellson, A., Kohler, A., Martin, J. and Olson, E. (2021): Biofluorescence in the platypus (*Ornithorhynchus anatinus*). *Mammalia* 85: 179–181. Full article here: <https://www.degruyterbrill.com/document/doi/10.1515/mammalia-2020-0027/html> (Instructive figures!)

¹²⁶ Moreover AI (also 15 April 2026): “Several Australian marsupials, along with some related monotremes, display biofluorescence (glowing under UV light) rather than true bioluminescence (producing their own light). When exposed to ultraviolet light, these animals absorb the light and re-emit it as visible colors, typically pinks, blues, and greens. Eastern Quolls: Photographed in 2025 exhibiting a vivid blue glow in the Tasmanian wild. Wombats: Emit a ghostly green/cyan glow under UV light. Sugar Gliders: Shimmer with neon pink or green-blue highlights. Bilbies: Show a pinkish/purplish glow, particularly on their ears. Tasmanian Devils: Display a blue glow around their ears, snout, and eyes. Bandicoots: Northern brown bandicoots and other species have been observed glowing pink under UV light. Possums: Including brushtail and ringtail possums, which can show shades of pink or blue. Antechinus: A mouse-like marsupial that glows bright white under UV light. Thylacine (Tasmanian Tiger): Though extinct, testing on preserved pelts has shown that the hair of the thylacine glows blue under black light. Nature +7 ...Note: While **bioluminescence** refers to organisms generating their own light, **biofluorescence** requires an external light source like UV rays.”

¹²⁷ <https://www.weloennig.de/PlantGalls.xyz.pdf>

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.*¹²⁸

Well, you the reader, is invited to apply these reflections to the origin of our platypus including its instincts.

Now, what about the scientific theory of Intelligent Design? You may find the satisfactory answer including a systematic refutation of the counter arguments of Neo-Darwinian critics in the (at present¹²⁹) **4747 articles** at <https://scienceandculture.com/?s=Theory+of+intelligent+design>

Here is an excellent summary of important points by Casey Luskin (2005 and 2011)¹³⁰:

Table 1. Ways Designers Act When Designing (Observations):

- (1) Intelligent agents think with an "end goal" in mind, allowing them to solve complex problems by taking many parts and arranging them in intricate patterns that perform a specific function (e.g. complex and specified information): "Agents can arrange matter with distant goals in mind. In their use of language, they routinely 'find' highly isolated and improbable functional sequences amid vast spaces of combinatorial possibilities." (Meyer, 2004 a) "[W]e have repeated experience of rational and conscious agents – in particular ourselves – generating or causing increases in complex specified information, both in the form of sequence-specific lines of code and in the form of hierarchically arranged systems of parts. ... Our experience-based knowledge of information-flow confirms that systems with large amounts of specified complexity (especially codes and languages) invariably originate from an intelligent source from a mind or personal agent." (Meyer, 2004 b.)
- (2) Intelligent agents can rapidly infuse large amounts of information into systems: "Intelligent design provides a sufficient causal explanation for the origin of large amounts of information, since we have considerable experience of intelligent agents generating informational configurations of matter." (Meyer, 2003.) [See also Lönnig 2000/2001.] "We know from experience that intelligent agents often conceive of plans prior to the material instantiation of the systems that conform to the plans – that is, the intelligent design of a blueprint often precedes the assembly of parts in accord with a blueprint or preconceived design plan." (Meyer, 2003.)
- (3) Intelligent agents re-use functional components that work over and over in different systems (e.g., wheels for cars and airplanes): "An intelligent cause may reuse or redeploy the same module in different systems, without there necessarily being any material or physical connection between those systems. Even more simply, intelligent causes can generate identical patterns independently." (Nelson and Wells, 2003.)
- (4) Intelligent agents typically create functional things (although we may sometimes think something is functionless, not realizing its true function): "Since non-coding regions do not produce proteins, Darwinian biologists have been dismissing them for decades as random evolutionary noise or 'junk DNA.' From an ID perspective, however, it is extremely unlikely that an organism would expend its resources on preserving and transmitting so much 'junk.'" (Wells, 2004.)

These observations can then be converted into hypotheses and predictions about what we should find if an object was designed. This makes intelligent design a scientific theory capable of generating testable predictions, as seen in Table 2 below:

Table 2. Predictions of Design (Hypothesis):

- (1) Natural structures will be found that contain many parts arranged in intricate patterns that perform a specific function (e.g. complex and specified information).
- (2) Forms containing large amounts of novel information will appear in the fossil record suddenly and without similar precursors.
- (3) Convergence will occur routinely. That is, genes and other functional parts will be re-used in different and unrelated organisms.
- (4) Much so-called "junk DNA" will turn out to perform valuable functions.

These predictions can then be put to the test by observing the scientific data, leading to conclusions:

Table 3. Examining the Evidence (Experiment and Conclusion):

- (1) Language-based codes can be revealed by seeking to understand the workings of genetics and inheritance. High levels of specified complexity and irreducibly complexity are detected in biological systems through theoretical analysis, computer simulations and calculations (Behe & Snoke, 2004; Dembski 1998b; Axe et al. 2008; Axe, 2010a; Axe, 2010b; Dembski and Marks 2009a; Dembski and Marks 2009b; Ewert et al. 2009; Ewert et al. 2010; Chiu et al. 2002; Durston et al. 2007; Abel and Trevors, 2006; Voie 2006), "reverse engineering" (e.g. knockout experiments) (Minnich and Meyer, 2004; McIntosh 2009a; McIntosh 2009b) or mutational sensitivity tests (Axe, 2000; Axe, 2004; Gauger et al. 2010). [In his 2005 paper C. L. mentions the bacterial flagellum, the specified complexity of protein bonds and the simplest self-reproducing cell.]
- (2) The fossil record shows that species often appear abruptly without similar precursors. (Meyer, 2004; Lönnig, 2004; McIntosh 2009b.)
- (3) Similar parts are commonly found in widely different organisms. Many genes and functional parts not distributed in a manner predicted by ancestry, and are often found in clearly unrelated organisms. (Davison, 2005; Nelson & Wells, 2003; Lönnig, 2004; Sherman 2007.)
- (4) There have been numerous discoveries of functionality for "junk-DNA." Examples include recently discovered surprised functionality in some pseudogenes, microRNAs, introns, LINE and ALU elements. (Sternberg, 2002, Sternberg and Shapiro, 2005; McIntosh, 2009a.)

You may also have a look at Luskin's further comments on the topic in **2017**:

<https://intelligentdesign.org/articles/testable/>

and **2021**: <https://caseyluskin.com/2021/02/16/how-can-we-positively-test-intelligent-design/>

<https://caseyluskin.com/2021/09/09/the-science-behind-intelligent-design-theory/>

Since the Synthetic Theory of Evolution has proven to be systematically inadequate for its task to explain the origin of the platypus (not speak of other organisms) and, in contrast to this, the scientific ID-Theory has proven its worth (see the 4747 articles mentioned above), at present I would like to leave it to the reader to apply the Intelligent Design Theory to the 15 points discussed above.

¹²⁸ For the original German text, see please <http://www.weloennig.de/NeoE.html>

¹²⁹ 15 April 2026

¹³⁰ See also <https://www.weloennig.de/Utricularia2011Buch.pdf>, p. 118

Supplement

(27 April 2026) Above I have discussed the “large territory of the cortex devoted to processing information from the bill” but what do we know about (4) the correspondingly “unique genetic blueprint”?

AI on platypus (18 April 2026): Neocortex Evolution & Genes: “While specific studies mapping *hundreds of unique cortical genes in platypus are specialized*, comparative research suggests they possess the “genetic toolkit” for constructing a neocortex similar to other mammals, *with variations reflecting their unique sensory organization, such as an expanded sensory motor cortex*.

Sensory Expansion: **The platypus cortex is specialized for electroreception and mechanoreception (detecting prey), featuring an expanded sensory-motor area (ventral posterior nucleus) that reflects the importance of the bill for survival.** *Gene Expression Patterns: Similar to other mammals, platypus cortical development involves the expression of genes that establish the molecular identity of cortical fields.* National Institutes of Health (.gov) +4”

In the main text I had already cited Yang Zou et al.¹³¹ (2021) on: *Platypus and echidna genomes reveal mammalian biology and evolution*.

Concerning brain development they have noted that:

“About **14 Mb of mammalian specific highly conserved elements were identified by comparison among vertebrates** (Methods): **around 90% of elements were located in non-coding regions** (Extended Data Fig. 2c), **and are associated with genes that are enriched in processes such as brain development** (Extended Data Fig. 2d, e, Supplementary Results and Supplementary Tables 18–20).”

Which genes are involved in the platypus’ brain development?

AI (27 April 2026):

The platypus (*Ornithorhynchus anatinus*) genome contains a unique combination of reptilian, avian, and mammalian genes that contribute to its distinctive brain development, which is characterized by a relatively small, smooth cerebral cortex (lissencephalic) that develops late. [Nature +3](#)

Key genetic factors and developmental processes involved include:

- **Emx2 Variations:** Studies indicate that variations in the *Emx2* gene (empty spiracles homeobox 2) are likely involved in the unique organization and evolution of the platypus pallium, particularly regarding neuron positioning during migration and the absence of a corpus callosum.
- **Expansion of Sensory Nuclei Genes:** The unique development of the platypus’s trigeminal sensory nuclei, which is crucial for its electroreception abilities, is linked to the expansion of specific neural regions (like the rostro-lateral region or *rrl*) and an enlarged rostral migratory stream, controlled by specialized genetic factors.
- **Thalamocortical Axon Guidance:** The development of the dorsal thalamus, which expands rapidly post-hatching to produce a large Ventrobasal (VP) complex, suggests changes in the genetic control of thalamic neurogenesis, similar to the subplate zone in placental mammals.
- **Conservation of Neural RNA Pathways:** The platypus retains conserved small RNA pathways, including PIWI (e.g., *PIWIL4*), which are crucial for early brain development and germline defense.
- **Homeobox Genes:** Similar to other mammals, platypus brain development involves *Emx* and *En* (engrailed) gene families, which govern the regionalization of the brain, though the platypus shows unique patterns in *Emx* gene regulation.
- **Neural Growth Factors:** While not specific to brain development, the platypus genome shows significant expansion of the Nerve Growth Factor (NGF) gene family, associated with venom production, which highlights a repurposing of neural-related genetic tools. [Nature +6](#)

The development of the platypus hypothalamus and pituitary, specifically the formation of lateral hypothalamic nuclei, is quite distinct and, at hatching, bears a stronger resemblance to marsupials than eutherian mammals. [PubMed Central \(PMC\) \(.gov\)](#)

¹³¹ Altogether 42 authors

AI on the day before (26 April 2026):

“Research into the platypus genome has identified several genes and genetic mechanisms involved in the development and unique structure of its brain, which is characterized by a relatively smooth cortex (lissencephalic) and specialized sensory areas for electroreception.¹³² Key findings include:

Homeobox Genes (*Emx1*, *Emx2*): The development of the platypus cortex is influenced by *Emx1* and *Emx2* genes. Monotremes and marsupials share a specific sequence in these genes—only two alanine amino acids, compared to a longer poly-(Ala) tract in eutherian mammals—which may be linked to differences in brain organization, such as the absence of the corpus callosum.

Expansion of Sensory Areas: The platypus possesses a specialized somatosensory cortex for electroreception, specifically an enlarged trigeminal field representation. This is driven by an expansion of the rostral rhombic lip (*rrl*) and an enlarged rostral migratory stream.

Nerve Growth Factor (NGF): NGF genes have been duplicated and involved in venom production, but they also play crucial roles in nervous system development and maintenance.

Vomeroneural Receptors (V1R): There is a significant expansion of vomeronasal type-1 receptors (over 262 V1R genes), which are crucial for detecting pheromones and are likely involved in courtship, parental care, and lactation, reflecting the development of the olfactory system.

Neural Activity Genes: Studies indicate that genes regulating exploration and foraging behavior are active in the platypus brain.

Brainstem Development: At hatching, the brain is immature, but the trigeminal sensory nuclear complex, which is critical for processing sensations from the bill, is highly developed. Nature +6

Now, it would be extremely interesting to find out *how many genes are entirely unique* for the platypus’s brain development—and which ones. Recall please that there are at least **3.284** protein coding **orphan** genes and that non-protein-coding DNA is important for gene regulation and more – according to AI (27 April 2026):

Non-coding DNA (ncDNA), constituting ~98–99% of the human genome, is not “junk” but crucial for **regulating gene expression, maintaining chromosome structure, and producing functional RNAs**. It acts as a complex molecular switch, turning genes on/off, and provides structural integrity via telomeres and centromeres. [Genomics England +2](#)

Key Functions of Non-Coding DNA:

- **Gene Expression Regulation:** Non-coding sequences act as promoters, enhancers, and silencers, determining when and where proteins are produced.
- **Functional RNA Production:** Rather than proteins, some ncDNA is transcribed into functional RNA molecules, including transfer RNAs (tRNAs), ribosomal RNAs (rRNAs), microRNAs (miRNAs), and long non-coding RNAs (lncRNAs).
- **Structural Integrity:**
 - **Telomeres:** Repetitive sequences at the ends of chromosomes protect them from degradation during division.
 - **Centromeres:** Regions that enable chromosomes to be pulled apart during cell division.
- **Chromatin Organization:** It helps organize DNA into functional units, such as Topologically Associated Domains (TADs), crucial for structuring the genome within the nucleus.
- **Evolutionary Reservoir:** Non-coding regions, including repurposed viral elements (transposons), contribute to genome evolution and adaptation. [Wikipedia +6](#)

Common Misconception:

Historically termed “junk DNA,” research has shown that while some regions are non-functional, a massive portion is essential for life. However, variations in non-coding DNA can still be associated with diseases like cancer or diabetes. [Genomics England +3](#)

Concerning the “Evolutionary Reservoir” it would probably better to speak of a “**Micro-Evolutionary Reservoir**”.

Question: How many unique ncDNA sequences are involved in the platypus’ cortex formation and which ones?

Furthermore, it should be noted that there still is the largely unexplored field of *membrane patterns that carry ontogenetic information that is specified independently of DNA* (Jonathan Wells 2013, 2014¹³³, see also Wolf-Ekkehard Lönnig 1986, 2001¹³⁴ on the plasmatic regulatory system (PLASMATISCHES REGULATIONSSYSTEM)).

¹³²The following note was given: “Karger Publishers +4”

¹³³ <https://bio-complexity.org/ojs/index.php/main/article/view/BIO-C.2014.2/BIO-C.2014.2>

See also: <https://idthefuture.com/756/> <https://idthefuture.com/757/> <https://idthefuture.com/760/> <https://idthefuture.com/762/>

<https://scienceandculture.com/2019/11/bioessays-editor-junk-dna-full-of-information-including-genome-sized-genomic-code/>

<https://www.weloennig.de/EndogenousRetroviruses.pdf>: References on Do Pseudogenes and Endogenous Retroviruses Prove Evolution (2025)

¹³⁴ <https://www.weloennig.de/AesIV3.Hi.html>

Hence, there are still many open questions so that there remains still much to do. Same here on the question: How many genes are involved in the platypus bill formation?

AI (27 April 2026):

While there is no single number provided in scientific literature for the total count of genes involved in the development and function of the platypus bill, its unique features—especially the 40,000 electroreceptors used for hunting—are supported by a complex mix of specialized and repurposed genes. [Wikipedia +1](#)

Key genetic aspects of the platypus bill include:

- **Sensory Specializations:** The bill's electroreceptors and mechanoreceptors dominate the platypus brain's somatotopic map, suggesting a high density of specialized cells.
- **Expansion of Sensory Genes:** The platypus genome has shown a significant expansion of certain odorant/vomeroneasal receptor genes, with approximately 262 vomeronasal type-1 receptors (V1R genes) in the platypus compared to only 28 in the echidna, which likely contributes to their unique sensory capabilities, possibly aiding navigation and foraging alongside electroreception.
- **General Genome Information:** The overall platypus genome, which underpins the development of the bill, contains around 18,500 to over 20,000 protein-coding genes.
- **Independent Evolution:** Research indicates that the specialized features of the platypus are the result of unique gene duplications and modifications, distinguishing it from other mammals. [Wikipedia +4](#)

There is much more involved in the platypus bill formation than just “independent evolution” by “unique gene duplications and modifications”: Entirely new genes and completely new ncDNA sequences as well as a correspondingly fine-tuned cytoplasmic system along with ‘*ontogenetic information that is also specified independently of DNA*’ will be necessary – altogether (and much more) **proving ingenious intelligent design** for the origin of that ‘egg-laying, semi-aquatic, milk-sweating, knuckle-walking, duck-billed, electro-recepting, stomach-lacking, prehensile-tailed, venomous-footed mammal with skin that glows under UV light’.

Many more questions could be addressed, of course. For example, what was the extent/size/magnitude of the **redundancy necessary to adapt** to the varying and ever changing abiotic and biotic environmental factors in the original creation of the platypus? Which genes and functions have been lost during the history of the animal? For the present state of research including a series of examples, check please AI for “gene losses in the platypus” along with my **general explanation of this phenomenon** (now also called the “loss-is-more-hypothesis”) in the footnote below¹³⁵.

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¹³⁵ Cf. <https://www.weloennig.de/AesVII.html> (1993/2001): In his studies on *Antirrhinum* (1966, p. 154), Stubbe pointed out “that all environmentally induced modifications of the phenotype may also be caused by mutations.” Furthermore, it was shown “that numerous, though not all, mutation-induced phenotypes can also occur as non-heritable modifications, as phenocopies.” In other words, it can be shown that all modificative changes caused by various environmental conditions have also been recognized as mutants, but that not all manifestations of mutants can be phenotypically reproduced as environmentally induced modifications” (emphasis in the original). Goldschmidt arrived at the same conclusions primarily in his phenocopy studies [*Drosophila*] (1935a and b, 1961). With their greater genetic potential, the original species possessed a wide adaptability to all possible environmental conditions. Over time, this broad adaptability was increasingly restricted in the respective areas due to the accumulation of weakly deleterious alleles (as well as the total loss of gene functions redundant at that location) (with the exception, of course, of the part necessary for coping with the specific environment). **Other lines and forms of the same species, however, have not yet degenerated to this extent and consequently still possess greater adaptability.** Through the mutational reduction of genetic potential, the modifications become “hereditary” over time. — However, as strange as this may sound at first, this has nothing to do with the inheritance of acquired characteristics. For these characteristics were not acquired through evolution, but were present from the beginning as part of greater adaptability. Of this adaptive potential, only the aspects necessary for the respective environmental conditions have been retained in many species. The “rest” has been lost through mutations (accumulation of weakly deleterious alleles)—the formation of secondary species. Through recombination, part of the lost potential can be regained (see p. 126 ff.). Mutations and transposon activities contribute to variability and microevolution in secondary species.