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Article in *Current Molecular Biology Reports* · June 2020

DOI: 10.1007/s40610-020-00127-y

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Quasi-religious Belief in Darwin and Darwinism: “Straw-Men” Scientist Believers Everywhere

Rui Diogo¹

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Abstract

Narratives that describe models of how the world works involve some form of idealization, but all models are subjective and influenced by many human factors including the location, period of time, and profession of the narrator. Charles Darwin is a particularly fascinating case. Many scientists have tended—and continue—to idealize him as a person and a scientist, as well as his evolutionary ideas, in particular those related to “adaptationism” and the “struggle for existence.” In fact, many still defend that there is no need for any kind of new or even “extended” evolutionary theories: what we have from Darwin, or from the subsequent “Modern Synthesis,” is enough, as if the thousands of studies made in the last decades, including the discovery of the DNA, the genomes of humans and other species, or the crucial evolutionary role played by epigenetics, did not add anything relevant to how we understand biological evolution. Interestingly, such reactions are somehow comparable with those of some religious leaders that, when certain scientific discoveries contradict narratives of a religious text, argue that these are just “minor” details that do not put those narratives into question. An example concerns certain adaptationist narratives, which as Gould noted cannot be falsified: by assuming a priori that a structure has to have an “adaptive function,” even when hypotheses that the function is A, B, C, or D are contradicted, one tries to show that perhaps the function is E, or F, and so on, instead of being at least open to the hypothesis that perhaps those “negative results” mean that the structure has no current “adaptive function.” Such circular reasoning is deeply related to another common feature of humans—the storytelling—animals: our continuous search for “purpose.” As the founder of biology, Aristotle, famously stated, nature “does nothing in vain”—a teleological notion that deeply influenced Darwin, and continues to influence us. The aim of this paper is not to criticize Darwin—I profoundly admire his life, travels, persistence, naturalism, and brilliant ideas such as that of natural selection. Instead, here, I discuss subjects such as adaptationism and the notions of progress, purpose, and “struggle for life” and their links to racism and misogyny to call attention to the remarkable parallel between religious thinking and the inflexible way in which many defend Darwin’s, Darwinist, or Neo-Darwinist ideas, even when such ideas might have contributed to enduring biases and prejudices within both the scientific community and broader society.

Keywords Misogyny · Eugenics · Human evolution · Selfish genes · Religion · Adaptationism · Darwin · Racism · Capitalism · Eurocentrism

Introduction

Narratives that describe models of how the world works involves some form of idealization, but all models are subjective and influenced by many human factors including the location, the time and profession of the narrator (e.g., [1–3]). As noted by Tallis [2: 117–138], idealization is a very common psychological phenomenon: “it simplifies the word in order to reduce the anxiety caused by inconsistency and troublesome complexities ... *idealization* always incorporates a degree of *denial*, because in order to see someone as perfect, we must deny the existence of their less favorable attributes.” In the

This article is part of the Topical Collection on *Evolutionary Developmental Biology*

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case of idealization of scientists, such denial often comprises neglecting the fact that every scientist has his/her own ego—i.e., our own sense of self-esteem or self-importance—as well as biases and prejudices, which are related to the specific contingencies of life, such as when and where one is born, studies, lives, interacts with, and so on.

What is particularly interesting in the case of Charles Darwin is that it provides a profound example of how strong is this tendency to create idealized narratives, or “just-so stories.” This is because so many scientists have tended to idealize Darwin as a person—often recurring to the image of a “humble,” “objective,” bearded old naturalist—or to strictly defend all his evolutionary ideas or even the more extreme “adaptationist,” “struggle-for-existence” versions of them later supported by several so-called “Neo-Darwinists” (N.B. I completely agree with Delisle’s [4–6] statements that “Darwinism” and “Neo-Darwinism” comprise multiple different ideas and ideologies—when I use these terms I am therefore merely referring to the way scholars call themselves and/or are named by other scholars). This despite the crucial fact that, as will be shown below, the relatively few scholars that have studied in detail either the personal aspects and historical and geographic context of his life, or the validity of his ideas and/or of subsequent caricatures of them—e.g., Dawkins’ [7] “*Selfish gene*” book—have plainly shown that the reality is much more nuanced, as inevitably happens in such cases of idealization. For instance, many scholars continue to defend that we do not need (e.g., [8–12]) any kind of new or even “extended” (as designated by, e.g., Pugliucci, Laland, and colleagues [13–17]) evolutionary theories, because what we have from Darwin, or from the subsequent “Modern Synthesis,” is more than enough. As if all the thousands of evolutionary studies made in the last decades, and discoveries such as those of the structure of the DNA, the reading of the genome of humans and several other species, and of the importance of epigenetics and the inheritance of characters acquired during life that do not imply changes in the genetic code, and so on, did not add anything at all that is relevant for how we comprehend biological evolution. This would be remarkable and unique, if one compares with what happened in other fields of science, such as physics—the information accumulated since Newton has dramatically changed our understanding of the universe. Indeed, the type of idealization of—sometimes even veneration for—Darwin and/or his ideas, done by so many biologists, has almost no current parallel in other scientific disciplines. Clearly, in the last decades, there were/are more biologist researchers than the sum of all previous ones—in the whole human history—and the number of research papers has been growing exponentially. That most of the ideas defended by Darwin and/or his followers, particularly the ones that have proven wrong, as noted above, continue to be often disseminated as the ‘whole, and only, biological truth about evolution,’ clearly seems to be due mainly to this

quasi-religious belief, although some other reasons might have also contributed to this situation. For instance, maybe most biologists are more interested in clarifying details than to test, and discuss “fundamental ideas.” Also, the publish or perish pressure, as well as the pressure to have grants that mainly need to be about very specific issues, makes it easier to study/publish “details” as well as to avoid “negative results” that would contradict the prevailing paradigms, more than actually deeply discuss such paradigms. I myself was accused, even by close colleagues, of trying to “think too broadly,” and even, one time, of “risking too much by criticizing Darwin,” and within the few grant proposals that my lab never succeeded in having granted, in most cases this happened because the reviewers said they were “too broad,” “too conceptual,” or not “being part of the current evolutionary paradigms.”

In this sense, such conservative reactions for the maintenance of the status quo, concerning Darwin’s, “Darwinian” or “Neo-Darwinian” ideas are strikingly similar to those of religious fundamentalists, whom faced with scientific discoveries further contradicting the original narratives of the religious texts they believe in—e.g., earth not being the center of the universe—argue that these are just “minor” details that do not truly put those narratives in question. One of the more extreme examples concerns Darwinian and Neo-Darwinian evolutionary adaptationist ideas that are “just-so stories” sensu Gould [18]. As explained by Smith [19], “just-so stories” refer to the fairytale-like creations of Kipling’s *Just So Stories for Little Children*: unfalsifiable ad hoc stories based on little or no empirical evidence. For instance, if an adaptationist wants to “find out the adaptive function” of a certain feature, and hypothesizes that it is A, then B, then C, then D, and these are all contradicted, he/she would state that this simply means that the “function” is not yet known, and then try E, F, G, H, and so on, instead of being at least open to the hypothesis that maybe there is no current adaptive function at all. As Landau [20: 40–41] remarked “like the hand of Providence in the biblical account, natural selection justifies even where it fails to explain ... what happens is not always ‘right’ or well understood, but it is ‘fit’.” What is particularly interesting is that despite clearly being an “adaptationist,” Darwin was clearly not a fundamentalist. For example, Darwin [21: 450] did recognize that not all features displayed by an organism at a certain geological time and stage of development are necessarily being “useful”: e.g., he noted that vestigial and rudimentary “organs or parts in this strange condition, bearing the stamp of inutility, are extremely common throughout nature.” Therefore, this is a further example of how “Darwinism” or “Neo-Darwinism” have some fascinating parallels with religion: like fundamentalists of a certain religion tend to be more extreme than the figures they venerate (see, e.g., [22]), many self-designated “Darwinists” or “Neo-Darwinists” have defended, and continue to defend, much more extreme versions of the ideas truly put forward by Darwin.

In order to clearly show that I am not just creating theoretical “straw-man” examples of such a type of circular adaptationist reasoning, in the Sections below I will provide specific examples of how such a reasoning is not only still often applied, but is even explicitly defended as a valid research methodology, by renowned scholars working on biological evolution. In fact, such a circular reasoning is deeply related to another common human feature associated to our obsession of creating stories: our profoundly embedded tendency to think teleologically, i.e., to seek for a “purpose.” As the founder of biology, Aristotle, famously stated, nature “does nothing in vain”—a teleological notion that influenced Darwin and that continues to be highly influential today (see, e.g., [23]). Darwin tried to avoid applying teleology in his theories, but was not successful in doing so (e.g., [24–27]), although he was better at it than many subsequent Darwinian and Neo-Darwinian adaptationists. Unfortunately, the resulting adaptationist “just-so stories” are not mere anecdotes. They have strongly influenced not only biologists but scholars from various other areas of science such as anthropology and psychology, particularly evolutionary psychologists, thus directly or indirectly affecting the life of many people. These include, among many others, the thoughts of Freud and his followers (e.g., [19]), which affected numerous clinical psychologists and their millions of patients, as well as many misogynistic, racist and eugenic ideas that have been, and continue to be, so detrimental to our species as will be discussed below (see, e.g., [28–34]).

The aim of this brief review is not to criticize Darwin or all his ideas per se—I have a huge admiration for him, his life and travels, his persistence, and the brilliance of his idea of natural selection and how it helped to explain, and contribute to the acceptance of, the occurrence of biological transformism. Instead, by discussing subjects such as adaptationism, the notions of purpose and progress, and issues such as misogyny and racism in face of the empirical data now available, I want to call attention to a topic that in my opinion has not been as discussed as it should have been. Namely, the parallels between religious thinking and the inflexible—and sometimes unfalsifiable—way in which many scholars defended, and continue to defend, either the validity of the ideas of Darwin and/or of his subsequent followers or the social implications of those ideas or metaphors used to disseminate them to the broader public.

Notion of Purpose, Ego, Adaptationism, Struggle, Selfish Genes, Straw-Men, and Three Heretics

As explained in detail in my 2017 book [30], it is clearly not an accident that Darwin [21] referred to gravity, and to Newton’s mechanicism, in the last sentence of his most prominent work: “there is grandeur in this view of life, with its several powers ... that, whilst this planet has gone cycling

on according to *the fixed law of gravity*, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.” By doing so, Darwin could be seen as the Newton of biology—as noted in Ruse’s 2018 *On Purpose* [27: 77]: “what spurred the move to natural selection was the strongly felt need to be the Newton of biology—to find a cause for the change.” As Hoffmeyer [35: 148–152] put it, “Darwin created a perfectly *externalist* theory, a theory that seeks to explain the internal properties of organisms, their adaptations, exclusively in terms of properties of their external environments, natural selection pressures.” However, as emphasized by Hoffmeyer, Darwin “was not a fundamentalist in his externalism, as were his followers (the Neo-Darwinists) in the 20th century, who thought they could get rid of organismic agency by enthroning the gene and seeing organisms as passive derivatives of genotypes.” In reality, Darwin did distinguish between his notion of (“external”) natural selection and “sexual selection” associated to the behavioral choices made by organisms of the very same species being selected, which broadly corresponds to a subset of “organic selection” sensu Baldwin (e.g., [36–40]). Another type of selection recognized by Darwin was “artificial selection,” which mainly refers to the behavioral choices of humans concerning traits of other taxa, e.g., during domestication.

The fact that Darwin’s *Origin* paid much more attention to his (external) “natural selection” and that for him such “natural selection” and “artificial selection” clearly contrasted with “sexual selection” does illustrate that he mainly emphasized the passive role of organisms in biological evolution. This is because both in his “natural selection” and “artificial selection” the organisms being selected are mainly passive, powerless in face of the “selectors,” i.e., the external environment or humans respectively. This contrasts with a much more logical grouping of these three “types” of selection: “external” natural selection sensu Darwin versus organic selection sensu Baldwin. The latter is mainly driven by the behavior of organisms themselves, rather than by the external environment, thus being in turn subdivided into “sexual” selection—driven by sexual behavior—and “artificial” selection—driven by the behavior of those taxa actively involved in the process of domestication (e.g., [30, 31, 41]). That is, by establishing a parallel between planets impotently moved by the force of gravity and passive organisms selected by the external environment, and by combining it with an emphasis of the Malthusian notion of “struggle for existence” (see below), Darwin was in fact attributing a particular powerful strength to his “external” natural selection. In several occasions, such as a letter from Darwin to Lyell (18 June 1858), Darwin makes it very clear that this “struggle for existence” is not just a crucial part of his theory, the whole theory *depends* on it: “I explained to you here very briefly my views of ‘natural selection’ depending on the struggle for existence” [42: 93].

Clearly, the vast majority of biologists nowadays—including myself—accept the importance of Darwin’s “external” natural selection, as we accept the fact that there is “artificial” selection. But this acceptance does not mean that these are always, or even often, particularly strong phenomena that tend to lead to an optimal, or at least sub-optimal, current “design” due to a continuous, suffocating, struggle for life. Depending on the specificities of when, where and how it occurs, natural selection *sensu* Darwin can be very strong, or more relaxed, or very relaxed, as indicated by the frequent—and usually much neglected—occurrence of phenomena such as morpho-ethological mismatches and/or so-called “maladaptive behavioral syndromes” (for recent reviews, see, e.g., [30, 31, 41, 43]). The same applies to “artificial selection”: there are cases in which it is quite intense—e.g., occurring at each generation of the famous Siberian domesticated foxes (e.g., [44])—while in others, it is much more relaxed—e.g., some stray dogs or cats of villages of many parts of the globe.

When I refer to these issues, either in my books, papers or talks, I often hear: “you are using a ‘straw-man’ example—since the ‘Modern Synthesis’, or in particular today, nobody really uses such a circular adaptationist reasoning, or notions of ‘struggle for existence’ or teleological ‘purpose.’” My answer is: if these are truly “straw-man” examples, then I see “straw-men” (and “straw-women”) everywhere. It is just too easy to say “you are creating straw-man” to avoid any in-depth discussions on these subjects. As I provided clear examples of—and specific references for—hundreds of such cases in my recent paper on evolutionary mismatches [31]—mainly concerning ecomorphologists—and in my 2017 book [30]—concerning also scholars from many other areas—I will provide here just a few examples illustrating how “straw-men” adaptationists are not only alive but are influential in many fields. Before that, one should note that such Neo-Darwinist views of evolution—e.g., concerning the passive evolutionary role of organisms themselves—were followed by one of the most influential biologists in the last decades—and that is alive and continues to be particularly active: Richard Dawkins, with his notion of “selfish genes” and famous quote that organisms are “no more and no less than survival machines” [26: 414]. Even authors such as Edward Wilson—also very influential in the last decades—who do not subscribe to Dawkin’s “selfish genes” idea, at times described insect colonies as “growth-maximizing machines” formed by “cellular automata” whose operations can be portrayed using language of physical or computer science (e.g., [43, 45]). In fact, such notion of evolutionary passivity of organisms within a suffocating “struggle for existence” is clearly stressed in the emphasis on “survival” in the most common current definition of natural selection as “the differential *survival* and reproduction of individuals due to the differences in phenotype,” and particularly in the still prevailing Neo-Darwinist definition of evolution as “changes in allele frequencies within populations.”

When the two latter definitions are still prevailing, e.g., being the ones given in most biological and anthropological textbooks, it seems difficult to accept that these are just “straw-man” examples, or that they just apply to what happened decades ago. Among numerous examples I could provide here, two recent books specifically focusing on Darwin, “Darwinism” and “Neo-Darwinism” clearly support the idea that there are still such “straw-men” everywhere. For instance, Depew notes [46: 82] that in Bowler’s book *Darwin Deleted* [47] “what counts as Darwinism is not far removed from what Gould called “Darwinian fundamentalism” ... it is true that in recent decades gene-by-gene, trait-by-trait adaptationism, especially applied to animal and human behavior, passes as Darwinism’s highest achievement, final justification, and hence defining mark.” In my opinion, *Darwin Deleted* provides illustrative examples of both the high influence of adaptationism nowadays and, more importantly, of the quasi-religious idealization of Darwin and his ideas. Regarding the “positive” aspects related to Darwin’s theory, as the idea of natural selection, Bowler states that “no one else, not even Wallace, was in a position to duplicate Darwin’s complete theory of evolution by natural selection” [47: book cover]. Firstly, we should note that he refers to Darwin’s theory as a ‘complete theory of evolution’, as if there is nothing else to be discovered, an assertion strikingly similar to what religious people say about the religious texts they follow: they explain everything, the whole cosmos. Secondly, what about the “negative” aspects? Bowler does recognize (p. 26) that some scholars relate some of Darwin’s ideas to “an outgrowth of Victorian cutthroat capitalism—social Darwinism was possible because the selection theory was actually modeled on the ideology of competitive individualism.” He also recognizes [47: 52] that Darwin saw Malthus’ “struggle for existence”—which “was a product of the individualistic utilitarian ideology ... more individuals are born that can be fed, so many must die, and the result is competition for scarce resources”—as “the driving force of selection.” In fact, he even subscribes to the point that I made above, by noting (p. 204) that “Darwin drew upon the Malthusian image of a world ruled by scarcity and struggle to promote his theory ... he certainly modified that image by making struggle a creative force,” also noting (p. 27) that some scholars have related “social Darwinism” and in particular that strong version of “struggle for existence” with “militarism, racism, or eugenics.” Importantly, he does even recognize that Darwin “may have highlighted the harsh implications of this image of nature” and that “Darwinism *was* involved, certainly in the promotion of the heartless individualism of the mid-nineteenth century middle classes, and less directly in the promotion of the later, very different models of ‘progress’ through struggle—Darwin himself shared some of the concerns that drove social Darwinism” (p. 27, 89, 238).

However, puzzlingly, after recognizing all this, and explaining [47: 27] that his aim is not “to absolve Darwinian from all responsibility” because there *is* empirical evidence showing that actually his “theory *was* used to justify” militarism, racism, or eugenics, Bowler then states (p. 278) in the conclusion of his book—in my opinion without providing any strong, plausible data to support such a statement—that “most of the effects that have been labeled as ‘social Darwinism’ could have emerged” without Darwin, “some of these effects, most notably scientific racism, might well have been even more strident in the absence of the Darwinian theory.” They might, and we can never go back in history to test this hypothesis. But why could we not similarly hypothesize that without Darwin, the general consensus about the importance of “struggle for existence” for biological evolution would be “less strident” and therefore more likely accurate, nowadays? What a coincidence that after recognizing that (1) Darwin’s use of the notion of struggle for life was mainly due to the particular time and place where Darwin lived more than about a general condition of life in the planet and that (2) Darwin further used that notion to increase the importance of his “external” natural selection within biological evolution, one would then conclude both that (3) Darwin’s theory is actually an accurate and complete description of how evolution happens in the globe in general and that (4) without it racist ideas that were precisely based on such an exaggerated notion of a “struggle for existence” combined with Spencer’s “survival of the fittest” would even be more “strident”? It is important to emphasize that the powerful “survival-of-the-fittest” metaphor, so much used by white supremacists such as Ku Klux Klan (KKK)’s former Grand Wizard David Duke or Hitler (see below), was precisely coined by Spencer *after* he read, and became highly influenced by, Darwin’s works (e.g., [42]). For me, there are some clear logical inconsistencies here, such as those that are so intrinsic in religious narratives (see, e.g., [1]), as for example, “God being always good” and at the same time “God punishing people that do not believe in him.” That is, for us to avoid the cognitive dissonance created by the commonly accepted narratives about Darwin, one has to argue that Darwin was unique and without him A, B, and C (all “good” things) would not have happen, while arguing that “he was not so unique” in the sense that D, E, and F (all “bad” things) would have happened anyway, probably even in a more drastic way.

Apart from doing so in order to exaggerate the power of natural selection, the fact that Darwin inflated the importance of the “struggle for existence” within biological evolution also shows that he was just a human, influenced as we all are by the biases and prejudices of his time, and therefore that contrary to the idealized quasi-religious image that many continue to construct about him and his theories, there were clear flaws within his works. As explained by Wetherington [42: 90], Darwin’s exaggeration and overgeneralization of the “struggle for

existence” was profoundly influenced from not only what Darwin read (e.g., Malthus, Smith) but also what he physically saw in England. The “London Charles now settled in (after his travels) had added a million souls—numbering about 2.3 million ... lighted factories could employ more people for longer hours ... poverty increased ... the unbelievable density of humanity—over four hundred people per acre in Greater London—brought the rampant disease, increased mortality, and accelerated reproduction so starkly described by Adam Smith and enumerated by Thomas Malthus.” It can thus be said that one of the most crucial aspects of Darwin’s theory—the incessant, omnipresent struggle for existence, central for the importance that he attributed to natural selection—was clearly at least partially the result of *seeing London as representing the whole world*. This is a part of his highly Eurocentric views, and is striking when we consider that he wrote his books *after* traveling to, and observing in detail, so many other parts of the globe, including native people living within much lower population densities, or areas with abundant natural resources and/or where many animals have no natural predators. Todes’ 1989 book *Darwin Without Malthus* [48] discusses in detail this fallacy of Darwin and his obsession with the “struggle for existence.” Todes explains that Russian biologists in general had no problem accepting Darwin’s transformism and natural selection, but did have a huge problem with the “struggle for existence” metaphor and the related capitalistic notions of individual selfishness, for obvious political—including socialism—and geographical differences. As he noted, in many parts of Siberia—as I can attest myself—one is lucky to see even a single animal, for hours and hours—where is the incessant competition leading to the selection of selfish individuals, for instance? Personally, what I found more striking is that many people attribute a huge importance to Galapagos in Darwin’s theories, because of all the numerous places I have been, this is the one that appears to display less a “struggle for existence.” This idea has actually been supported by empirical studies done by numerous researchers: because these islands have plenty natural resources, and many large animals have no natural predators, one of the notable characteristics of their wildlife is that those large animals are in general relaxed and tame, e.g., not displaying clear signs of being afraid of other animals or even of humans (e.g., [49]).

We will come back to these subjects, particularly Eurocentrism, in the Section below, in which I will explain that Evolutionary Psychology, together with Behavioral Ecology, as well as with Evolutionary Medicine (see, e.g., [33]), are among the areas of science that continue to be more plagued by adaptationism. This was also stressed by Pigliucci [16], who provides several other clear examples of current “straw-men” being everywhere, including within Evolutionary Psychology. He states (p. 100) that “behavioral biologists ... are still clinging to simplistic notions from

sociobiology and evolutionary biology, which have long since been debunked ... it's not the basic idea that behaviors, and especially human behaviors, evolve by natural selection and other means that are problematic ... the problem, rather, lies with some of the specific claims made, and methods used, by evolutionary psychologists." In fact, there is basically not a single human behavior for which there are not numerous papers, and often even whole books, desperate to attribute to it crucial "adaptative functions." Suicide, or being killed by an overdose after taking drugs, clearly does not increase either the rates of survival or of reproduction of the person that dies, but it does not matter, they are clear examples of "adaptative evolution" anyway, they *have to be*, we just need to find what are their "true" adaptive functions. For instance, in Aubin et al.'s (2013) paper "The Evolutionary Puzzle of Suicide," the abstract clearly summarizes this type of circular reasoning [50: 6873]: "mechanisms of self-destruction are difficult to reconcile with evolution's first rule of thumb: survive and reproduce. However, evolutionary success ultimately depends on inclusive fitness ... the altruistic suicide hypothesis posits that the presence of low reproductive potential and burdensomeness toward kin can increase the inclusive fitness payoff of self-removal." In turn, "the bargaining hypothesis assumes that suicide attempts could function as an honest signal of need ... the payoff may be positive if the suicidal person has a low reproductive potential." These are of course just two of the current adaptationist hypotheses about the adaptative function of suicide, the A and B of the series, there are also C, D, E, F, G, H, and so on. Of course, it is possible, and indeed likely, that in some cases of e.g. suicide the group might have a potential advantage (group selection) but clearly this does not apply to all the millions of suicide cases that happen every year in this planet. However, if you have no doubts, a priori, that evolution of life is nothing more than "survival and reproduction," of course you will not stop until you find a way to argue that anything happening with any organism in this planet clearly has to increase "inclusive fitness," even concerning all the types of suicide. And for those that will quickly try to absolve Darwin at any cost for such a reasoning, by arguing that such adaptationists are not necessarily influenced by his writings, here's the sentence that the authors used immediately after that abstract, revealing the main theoretical framework for their a priori assumptions [50: 6873]: "natural selection will never produce in a being any structure more injurious than beneficial to that being, for natural selection acts solely by and for the good of each. No organ will be formed for the purpose of causing pain or for doing an injury to its possessor—Charles Darwin." Just to give one more example, among an endless number of them, in a recent monograph by Mancuso & Viola that I otherwise enjoyed very much reading, it was stated [51: 110]: "in the plant world as in the animals, no one does anything for nothing." Prum further cites numerous similar examples of quasi-

religious, unfalsifiable adaptatism in his 2017 book, stressing [41: 227, 238] that in particular "contemporary evolutionary psychology has a profound, constitutive, often fanatical commitment to the universal efficacy of adaptation by natural selection ... (which) is *the organizing principle* of the field ... there is never any doubt what the conclusion of any evolutionary psychology study will be ... the only question is how far the study will have to go to get there ... this is how a faith-based scientific discipline operates—looking for new reasons, however inadequate, to maintain belief in a theory that has failed." He asks (p. 227) "where's the harm in this intellectual mission? What concerns me most is not merely that so much of evolutionary psychology is bad science ... what's worse is that evolutionary psychology is beginning to influence how we think about our sexual desire, behavior, and attitudes." In fact, as I will explain in the section below, unfortunately it is not "beginning to influence": it already has done a huge damage in the way many scholars, and a vast part of the broader public, think about human evolution, in particular the way women are often seen as more passive and less innovative than men, less sexual, and so on.

To finish this part about the circular adaptationist reasoning, I will provide here one example that I consider particularly relevant. This is because it concerns top, renowned scholars, it is written in a very influential—and otherwise, fascinating—book, and it shows how such a reasoning is not only still much in vogue but is actually being promoted as *the* theoretical framework to be used in evolutionary research. Namely, in the book *Evolutionary Behavioral Ecology*, Fox & Westneat's [52: 29] stated that "Gould and Lewontin objected to the adaptationist paradigm adhered to by most behavioral ecologists," which "remains dominant in behavioral ecology because, in case after case, the focus on adaptationist explanations has led to new insights." They argue that "a perfect example" of such insights was "David Lack's hypothesis that clutch size in birds would be optimized to balance the number of offspring produced with the parent's ability to feed those offspring well enough to survive." As they admit, "experimental studies on multiple species of birds revealed that clutch sizes were close to, but did not match exactly, what Lack predicted." However, they argue that because "Lack was *invested* in the adaptationist paradigm," "despite the possibility that many nonadaptive hypotheses could be proposed to explain the disparity between data and theory, Lack chose instead to hypothesize that other factors affected selection on clutch size." Specifically, "this search for adaptive explanations led to a diversity of new adaptive hypotheses," for instance "many studies show that parental workload is indeed important in lifetime reproductive success." They then conclude that "no doubt some nonadaptive processes also affect clutch size in birds, but Lack's focus on adaptive processes nonetheless led to substantial new insights." I need to emphasize that this is not an attack on Fox or Westneat, as their

works are otherwise excellent. However, “leading to new insights” clearly does not necessarily mean that one is following a correct scientific path. Non-scientific reasoning also leads to “new insights,” including the biased “works” of supporters of *Intelligent Design*, as evidenced by the increasing number of books and papers they are publishing, precisely because they are *invested* in blindly pursuing a path and reasoning that is impossible to be falsified.

Ironically, I would therefore say that the obsessive search for evolutionary *advantages* everywhere, within the adaptationist framework, is actually often a *non-advantageous* research methodology. Perhaps more problematic is the fact that, apart from its circular reasoning and thus questionable methodology per se, many adaptationists often want to *force* others to think like them and do the same methodological flaws. That is, not only there are “straw-men” everywhere: many of them are highly influential, and often dominant, particularly in fields such as functional morphology, ecomorphology, and above all evolutionary psychology, behavioral ecology and evolutionary medicine as noted above. For instance, as reviewers. Among many disturbing cases, an illustrative one was provided in Prum’s 2017 [41: 66–67] book *The Evolution of Beauty*. Notably, he submitted a paper to a peer-review journal about bird behavior, explaining that the data he collected indicated that a certain feature evolved “through arbitrary mate choice.” As he notes, “the reviewers ... argued ... that I had not specifically rejected each of the many adaptative hypotheses that they could imagine ... of course, this made it impossible to “prove” my point, and I ultimately cut this section out of the manuscript in order to publish the paper.” He thus asks: “how many of these adaptative hypotheses ... would I have to test before I could conclude that any given display trait was arbitrary? When should I ever be done with this task? Even if I were able to test every adaptative explanation they could think of ... their reasoning implied that I would have to test other hypotheses in order to satisfy other skeptical reviewers, and then others, ad infinitum.” Further stressing the point that the numerous existing “straw-men” are indeed dominant in many fields, he states: “I was trapped ... the prevailing standard of evidence meant it would be impossible for me to ever conclude that any trait had evolved ... arbitrarily.” And this was just because his data indicated that a feature was mainly the result of arbitrary, and therefore likely non-detrimental or “neutral,” evolution—imagine if his data strongly indicated that the feature was actually detrimental, a “maladaptation”? It would be exponentially more difficult that this idea would be published, as I explained recently in my paper about eco-ethomorphological mismatches, showing that actually, the very results of most papers done by ecomorphologists contradict their a priori assumptions that the form of an organism is mainly correlated to the habitats where it lives [31]. In the overwhelming majority of the cases, it was instead more

highly correlated with phylogeny, strongly supporting the idea of authors such as Gould that developmental constraints are hugely important in evolution and that many adaptationist ideas are indeed just-so stories. But, as I explained in that paper, this was not the conclusion of the ecomorphologist authors that wrote those papers—it could not be due to their a priori assumptions, adaptationist circular reasoning, and also the fact that their whole careers, grants, and the meetings where they normally go are precisely based on those a priori assumptions. Therefore, in most cases the authors instead “concluded” that the “problem” was perhaps the type of methods they used, i.e., they did not allow to recover the “true” correlation between form and habitat. I will thus end this part about adaptationism, a priori assumptions, and “straw-men,” by citing Ruse’s 2018 book *On Purpose* [27] which also clearly shows that adaptationist “straw-men” are not only everywhere but also are often still the rule. He states (p. 98–99): “so where are we today in evolutionary thinking? Don’t go away with the message that ... biologists today are now questioning seriously what was labeled ... the design-like nature of the world ... in the world of organisms, adaptation is the norm—the hugely well-justified null hypothesis—and it is your task to make the contrary case if you wish: purpose thinking rules, and it is cherished today’s biologists use end-directed thinking and language when they are dealing with organisms.”

As I explained in two recent works [30, 31] in the last decades some authors—particularly evo-devoists—have called out for a “post-Darwinian” theory of evolution, or an “Extended Evolutionary Synthesis” (e.g., [13–17, 53, 54]). They put in question the adaptationist, “struggle for existence,” gene-centered views of many current Neo-Darwinists, by stressing precisely the importance of developmental constraints (e.g., [18]) as well as by calling for an “epigenetic turn,” i.e., emphasizing the crucial evolutionary role played by physiological, cellular and anatomical traits that are not necessarily “coded” in the genome (e.g., [55]). Importantly, such ideas and experimental data have revived some of the ideas of one of the scholars that was often seen by Darwinists and Neo-Darwinists as one of the main—if not the major—“heretic”: Lamarck. In reality, not only molecular and developmental studies but also behavioral and ecological works are showing that types of extragenetic inheritance, such as behavioral inheritance associated with niche construction, are crucial for evolution and widen the notion of heredity beyond genetics (e.g., [13–17, 56–61]). It has been very interesting to see recent confrontations between scholars that write papers entitled “Lamarck Rises From His Grave” (e.g., [62]) versus papers entitled “We Should Not Use The Term Lamarckian” that literally state that “discussing examples of inheritance of IAC (acquired characteristics) ... is all fine as long as it is clear they do not embody alternatives to Darwinism, but

illustrate the incredible versatility of natural evolution working in accordance with its basic assumptions ... to paraphrase the most celebrated words from Darwin's magnum opus: 'by so simple a model endless forms most beautiful and most wonderful have been, and are being, explained' ... so, stop using the 'L-word!'" [63]. As long as it is clear they do not embody *alternatives* to Darwinism, and stop using the "L-word": I do not know if there is a more illustrative example to show how, in the year of 2020, there is still often a quasi-religious veneration for Darwin/Darwinism, to the point of telling others scholars to not even commit the heresy of simply using the name of its main "evil" heretic while not even pronouncing his name, or of putting in question any part of Darwin's theory or, worse, of embodying any alternative to it. This clearly reminds me of a commonly used expression deriving from the European Middle Ages: "don't speak of the devil ... or he shall appear."

But it is not only Lamarck that is re-appearing: he is rising from his grave together with other main heretics: Baldwin and Goldschmidt. As explained above, Baldwin's idea of "organic selection" has been increasingly cited because of the growing empirical evidence showing that organisms are not merely passive evolutionary players—they are often crucial active players, for instance in cases of niche construction, which is one of the major items emphasized by the Extended Evolutionary Synthesis (for more details, see [30]). Regarding Goldschmidt, more and more authors are now talking about him, including his notion of "hopeful monsters" that was so discredited by Neo-Darwinists (e.g., [64–68]). The main reason why it was so discredited is that within a "struggle for existence" framework in which life is seen as a forceful, never-ending "struggle, war, famine, and death," forms should in theory optimally "fit" their habitats. Therefore, a "macromutation" sensu Goldschmidt would in theory not be viable because any feature that is not optimal, or at least almost optimal and that is not immediately directly related to survival and/or reproduction of the organism is purged from existence. However, there are clear empirical examples of "hopeful monsters" out there, many of them still living today, such as chameleons, as explained in detail in a recent paper written with two colleagues [66]. Chameleons are clearly "monsters" sensu Goldschmidt, e.g., their limbs have features that were described as "monstrosities"—more recently, as severe congenital malformations—in humans, such as zygodactyly and syndactyly. Still, they clearly were "hopeful," because at least for some time they were able to survive *despite* those "monstrosities," and because they then became able to use those "monstrosities" in a way that allow them to occupy specific niches in a very efficient way, for instance arboreal habitats.

This therefore shows us another major problem with the "mode" of evolution emphasized in Darwin's *Origin*, in

which Malthus' "struggle for existence" was considered to be *the* driving force of selection. This is because these and many other empirical examples show us, instead, that in at least some cases—e.g., when there are enough resources, or in ecologically-relaxed environments where there are not so many predators, as noted above—evolutionary changes—even neutral, or slightly detrimental ones—may prevail as long as the organism as a whole is "good enough" to survive and reproduce. From "evolution is optimal or sub-optimal" due to a suffocating "struggle for existence" to "evolution is good enough" is, in my opinion, one of the most profound recent changes of evolutionary thinking. It is so profound that most Neo-Darwinists are still very reticent about it, despite the vast amount of empirical data supporting it (see recent reviews by Diogo [30, 31] and Diogo et al. [66], and numerous references cited therein). In addition, the fact that Goldschmidt, as well as Lamarck and Baldwin, are rising from their graves also strongly contributes to further put in question the mainly gradualist "tempo" of evolution emphasized in Darwin's *Origin*. In fact, some authors had actually put in question Darwin's gradualism in the last decades of the twentieth century based on empirical evidence from the fossil record, particularly after Eldredge and Gould proposed their notion of punctuated equilibrium (see, e.g., [69–71]). Darwin's gradualism is now even under more scrutiny with the recent increasing recognition of the occurrence of "hopeful monsters" in nature, because such cases often involve at least some major transitions—e.g., those leading to the "monstrosities"—that occur relatively fast in geological time (e.g., [64–68]). This scrutiny is further increased with the current "rising from the grave" of Baldwin and Lamarck because major evolutionary changes may eventually be also faster in cases in which organisms are active players of evolution—particularly involving niche construction—and because epigenetic changes might facilitate life within those constructed niches, in particular if a few of those changes might be inherited without being coded in the DNA (e.g., [13–17, 55–61]).

Notion of Progress, "Higher" or "Favored" Taxa, Racism, Eurocentrism, and Misogyny

Ruse (e.g., [24–27]) has written extensively between the links of Darwin's works and two of the oldest and most obsessive traits of humans: the search for purpose and the notion of progress. Apart from Ruse's excellent works, there are literally hundreds of other books, and thousands of papers, on this subject, and I have also written about it extensively recently (e.g., [29–34, 64, 65]), so I will not discuss it in detail here. What is particularly interesting is how the notion of *progress* was also—together with the notion of purpose, as explained above—so prominent in Darwin's writings, while his ideas of natural selection should in theory have contributed to finish it. The notion of progress in nature was also already clearly seen

in the “pre-evolutionary” ideas of Aristotle, which were framed within the context of a *Scala Naturae*—“ladder of nature” or “great chain of being”: from “lower” organisms to animals, and then to humans, at the top [72]. Ruse’s 2018 [27] book also clearly shows that, as the notion of purpose, the notion of progress is still very much alive in science, in fact probably stronger than ever, because it began to be particularly prominent in the eighteenth century, the Age of “Enlightenment” that so much influenced Darwin. Importantly, Ruse emphasizes the parallel between the use of this notion in science—as Darwin and his followers so often did and continue to do—and religious thinking [27: 63]: in “the Age of Enlightenment ... thought and hope were actualized in the form of a formidable challenger: progress! No less end-directed, this was a philosophy of history that took the responsibility and control away from God and put it firmly in our hands ... (however) to be honest, the two philosophies (Providence and progress) were frequently not all that different, and at times it is difficult to distinguish their ends.” For those that would state, again, that today scientists do not really follow the notion of progress, that this is just an issue of the past and we are therefore just referring to “strawman” examples, Ruse clearly states [27: 103, 106]—further providing an example of the “progress-religious belief” link—that “many of today’s leading evolutionists are quite open about their *beliefs* in biological progress ... what is (even more) striking is how most evolutionists more or less take biological progress for granted—for all that they are prone to deny it when in public—and go on to argue from there.”

The crucial question is: if within Darwin’s idea of natural selection organisms are mainly adapted to their *local* habitats, at a *specific time* in history, why would he still refer so often to *general* “progress,” “favored or preferred races,” or to “higher taxa” as concepts that would apply to all geological eras and regions of the globe? He clearly did so in the *Origin* [21], from the very subtitle of the book—see below—to its very end, which finishes with a conclusion that clearly suggests “that, in the long run, natural selection would lead to the evolution of higher types of organization” [47: 219]. As noted by Ruse [27], this is perhaps one of the main criticisms that historians of science do of Darwin’s works, because it is a clear example of how not only his theories may be wrong, but may as well be self-contradictory (see also, e.g., [73]). Or, very likely, some of these contradictions might be actually the results of the contradictions between the theories that he really wanted to put forward, based on the actual evidence he observed, and his own beliefs, which led him to produce his other “theories.” Ruse [24–27] noted that Darwin recognized these inconsistencies in some parts of his books: for some reason, he was just unable to finish once for all with the teleological notions of purpose and progress, either because it was just too revolutionary for his epoch to do so—as noted above these notions are still prevalent in humans today—or

because he was actually personally inclined to accept them (e.g., [74]). As brilliantly summarized by Ruse [27: 90], “one feels a little as if Darwin is like Moses—he led his children to the Promised Land but never got there himself.” I would argue that, however, contrary to the case of Moses, in the case of Darwin most of his followers also continue to not be able to get to the Promised Land, that is, in this context, to liberate themselves from the long-standing chains of teleological, purposeful, and progressive thinking. It is actually remarkable that the tendency to idealize Darwin and his works has led most biologists to neglect the fact that Darwin’s works do include various crucial theoretical inconsistencies, concerning not only such teleological notions but also many other fundamental issues. One of the more illustrative examples that this is finally starting to change, although very—too—slowly, are Delisle’s books [5: 147; 6], which stressed that “the first to challenge Darwin was Darwin himself in the *Origin* ... the reader willing to go beyond Darwin’s rhetoric encounters a book displaying at least five independent sets of issues or pictures while some are squarely incompatible with one another, others are less than clearly related to each other.”

Coming back to Ruse [27], some of the arguments used by Darwin, and by some subsequent scholars that tried to deny that his works had such crucial theoretical inconsistencies, involved using the notion of “arm races.” If a predator A and its prey B are co-evolving, and they respectively acquire “better” evolutionary “weapons” to hunt and to not be hunted, respectively, then one could explain how both A and B could get “better” with time. However, this is a sloppy argument. First, even if that was the case, A and B would just be better at hunting B and not be hunted by A, respectively: they would not be “better” as a whole, evolutionary. Life is much more than a predator A being able to hunt or not hunt B—predators often have many preys, as preys have many predators, as well as endless other types of ecological interactions as, e.g., competition, cooperation, taking care of their progeny and/or building nests if that applies, and so on. It would be like saying that humans living 3 million years ago were “better” as a whole just because they were better at escaping to a single predator, like leopards. So many other crucial aspects were relevant for humans at that time, several of them being likely evolutionarily more important than just escaping leopards.

And that is precisely what makes the argument particularly sloppy, because most of the cases in which Darwin refers to “progress” or “higher clades,” or “favored races,” he is not even referring at all to preys or predators. Instead, the “highest” of all cases for Darwin concerns human beings—what is another clear case of how Darwin had his own biases and prejudices, as we all have: what a coincidence, that someone from a species living in a planet within millions of other species, states that *his* species is *the* “highest” one. As summarized by Ruse [27: 88], “Darwin was deeply committed to the cultural ideology of progress and to the belief in biological

progress, something that ends not just with human beings but with Europeans, preferably English capitalists.” In fact, there are profound historical links between the Age of Enlightenment, the notion of progress, the Industrial Revolution, capitalism, and the notion of individual selfishness that was so prominent in Darwin’s ideas. For instance, “Adam Smith was important here (regarding the notion of progress), with his ideas of the importance of a division of labor and of the Invisible Hand making a virtue of individual selfishness” [27: 88]. Or, as put by Landau [20: 41], who explains how many elements of Darwin’s works, particularly *The Descent of Man*, are similar to those used in narratives and tales used in folklore and myth: “the principle of natural selection, or ‘struggle for existence, remains the chief agent of evolution ... it also explains events according to their consequences or ‘final causes’ ... (it) may appear to operate in a teleological fashion, as though directed toward some overall design or purpose ... Darwin ... confesses that he does believe human evolution has been toward a preferred and higher state.” As she further noted (p. 42), in Darwin’s *Descent*, as in other writings on human evolution such as those of Huxley or Haeckel, “like most narratives, the story of human evolution is subject to an intrinsic ‘teleological determinism’: elements are present not as they occur but as they contribute to the outcome of the story.” I think this is precisely the major flaw of the reasoning of many scholars, including that of Bowler’s 2013 “*Darwin Deleted*” [47] when they refuse to deny that Darwin’s theories and metaphors provided easy ammunition for the type of subsequent narratives on selfishness, racism, and misogyny that became so popular in the West. Yes, such narratives existed in the West before Darwin. But what was unique—and should never be neglected—with Darwin, is that the most eminent and influential biologist of all times not only provided “scientific” evidence to support them, but did support them explicitly in his published scientific works, to the point of even including them in the original title of his most important book, the *Origin* [21]. In fact, nowadays when scholars refer to Darwin’s 1859 book [21], they almost always refer to its title only as “On the origin of species by means of natural selection”—perhaps as a conscious, or unconscious, effort to idealize Darwin and try to disconnect his works with the rise of scientific racism and of eugenics in the last decades of the 19th and first decades of the 20th centuries (see, e.g., [32])? In fact, the full title was actually “On the origin of species by means of natural selection, or, the preservation of favored races in the struggle for life.”

As will be discussed below, Darwin was seemingly “less racist” than many Westerners were at the time—e.g., he came from a family opposed to slavery and was appalled by the cruel treatment he saw meted out to slaves in South America on the Beagle voyage [47]. Still, he clearly and explicitly defended and “scientifically supported” racist and particularly Eurocentric ideas in his works, often using very powerful

metaphors. Therefore, at least one needs to acknowledge that in this regard he was particularly uncareful—clearly contrasting of how careful he was about other aspects of his life, including the huge amount of time he took to precisely write and publish the book that ironically includes such uncareful statements and metaphors. Specifically, by being aware of how heated the discussions on racism, slavery and colonialism were at the time, both at a scientific and societal level, and particularly by being against slavery, it does at the least seem uncareful to not realize that, by explicitly “scientifically” supporting racist and Eurocentric ideas he would provide easy ammunition for racist and/or pro-slavery arguments. It is like Newton not only using his mathematical calculations to “scientifically” support that there are “favored” races or that woman are “intellectually inferior” (see below) but also stating this explicitly over and over in many parts of his *Mathematical Principles of Natural Philosophy*, including its subtitle. Or, to put this in a modern context, as if the currently most renowned, influential researcher on climate changes would explicitly state, over and over, in his most prominent scientific book, that “there is no global warming.” What can be better for a racist, misogynist or global-warming denier to be able to state that even the most renowned, “objective scientific expert” on the matter clearly stated, based on empirical “scientific” data, that whites are superior, women are inferior, or global warming is a lie?

Of course, I am not blaming directly Darwin for *each and every* occurrence that happened subsequently to him regarding racism, misogyny, eugenics, including Hitler and so on—that would be completely unfair and unrealistic. I am just saying that it is also unrealistic to argue that Darwin’s life and works had *nothing* to do with the subsequent rise of scientific racism and eugenics, and particularly to argue, as in Bowler’s *Darwin Deleted* [47] that racism, eugenics, and so on probably would be even much worse in a world without Darwin. The *facts* show that at least Darwin had likely *something* to do with this—e.g., that Darwin *did* write what he wrote, that scientific racism and eugenics *did* rise after his writings, and that the Nazis, or the members of the KKK, or other white supremacists *did/do* use what he wrote and in particular metaphors that he helped to propagate such as the “survival of the fittest,” “struggle for existence,” or “favored races.” I can understand that scholars could discuss whether Darwin was or not uncareful when he wrote what he did, or whether racists could use the works of other scholars to support their views. However, there is *no* discussion that his ideas/metaphors *were used and continue to be used* by racists and white supremacists: to deny this is just denying facts. To give just one example, among endless others I could provide here, David Duke, former “Grand Wizard” of the KKK explicitly wrote [75: 110, 640] that “Charles Darwin ... demonstrated that principles of heredity combined with what he called, *Natural Selection*, had developed the exceptional abilities of mankind

itself ... his masterpiece, *Origin of Species* has a subtitle that expresses his whole idea in a nutshell: *The Preservation of Favoured Races in the Struggle for Life*—preserving the Caucasian race is but a precondition for continuing its evolution to a higher level. As put by Bowler [47: 257], “evolutionism ... offered a plausible (scientific) explanation of why some races might not have advanced as far as others up the scale leading from the ancestral ape most of the Darwinians endorsed this way of thinking”—as did Darwin himself—“with the notable exception of Wallace.” Or, as put by Wetherington [42: 149], “the idea that progress is a natural condition of the social order did not await Darwin for its expression ... it was present at the Enlightenment ... (Darwin’s) natural selection simply gave it a sense of scientific authenticity.”

Another clear example concerns Darwin’s personal encounters with, and ideas about, non-Western people, which are deeply related with discussions on the links between “colonialism” and “progress.” For instance, as explained in detail by Ryan & Jetha [76: 163], in his travels Darwin recognized the clash between his capital-based society and his notion of selfishness-struggle for existence and what he saw as the natives’ self-defeating kindness, writing: “nomadic habits ... have in every case been highly detrimental ... the perfect equality of all the inhabitants will for many years prevent their civilization.” Looking for an example of the world’s most downtrodden “savages,” Malthus cited “the wretched inhabitants of Tierra del Fuego” who had been judged by European travelers to be “at the bottom of the scale of human beings.” When Darwin was in Tierra del Fuego, he agreed with Malthus, writing: “I believe if the world was searched, no lower grade of man could be found.” Captain Robert FitzRoy of the *Beagle* had picked up three Fuegians on an earlier voyage, and took them to England to introduce them to the “highest” of civilizations, and then he returned them to their own place so they would serve as missionaries. But just a year later, the huts and gardens the British sailors built for the three Fuegians were empty: Jemmy, one of the three, then appeared and told the crew that he and the other two had reverted to their former way of living. Darwin, puzzling surprised, wrote in his journal that he’d never seen “so complete & grievous a change” and that “it was painful to behold him.” Captain FitzRoy told Jemmy he could take him back to England, but Jemmy answered that he had “not the least wish to return to England” as he was “happy and contented” with “plenty fruits,” “plenty fish,” and “plenty birdies.” As a fascinating example of the lack of understanding of Europeans toward the way of life, aspirations, and priorities of the native people, Darwin could not comprehend how someone from the “lower grade of man” did not want to live a “highly civilized” life in London. So a way that Darwin used to try solving this puzzling case was to suggest—in his *Voyage of the Beagle*—that Jemmy’s unwieldiness to go back to London was

probably due to the presence of his “young and nice-looking wife.” Like many adaptationists continue to create just-so stories in order to support a priori assumptions based on wrong scientific ideas framed on the notion of purpose, Darwin created a just-so story in order to support a priori assumptions based on wrong scientific ideas framed on the notion of progress. That is, in the mind of someone as “civilized” as Darwin, who was *sure* that the whites living in England were a “highest,” more “advanced” group “favored” by evolution, what other reason could Jemmy have, except for something as “primitive” as his love for/desire of a “savage” woman?

In fact, the Eurocentric evolutionary ideas of Darwin, and of his Darwinian followers, are so prominent that even Bowler, in his 2018 book *Darwin Deleted* that is an example of idealization of Darwin as noted above, states [47: 249, 252]: “I must concede that Darwinism did become involved with the culture of imperialism, providing a source of extremely effective rhetoric ... the imperialists certainly used Darwinian terminology ... and in a few cases they were (even) genuine scientific Darwinists.” Further, (p. 259), “in the absence (as yet) of fossil hominids, modern savages were treated as equivalent of these primitive ancestors, and the physical anthropologists’ alleged evidence of small brains and apelike features in the “lowest” races was called in to confirm the link ... Darwin certainly contributed to this process in his *Descent of Man*, and in Germany Ernst Haeckel”—often associated to Nazi ideas—“built the idea that the human race show different levels of development firmly into his Darwinism.” Moreover, even when Bowler tries to minimize the links between Darwin/Darwinism and eugenics, he explains [47: 263–264] that it was Darwin’s cousin, Francis Galton, who began to argue for a “eugenic program, in effect a call to impose a mechanism of artificial selection on the human race ... in a civilized society, we do not restrict the ability of people to have children, which means that even those with the lowest mental and moral capacities continue to breed ... both Darwin and Galton worried that this might lead to degeneration.” This program became popular in Britain, “and sterilization programs were introduced in a number of American states ... the movement became particularly active in Germany, where the Nazis went beyond mere sterilization and began to exterminate those elements of society they wish to suppress.” In fact, as wisely noted by Landau [20: 50], one particularly striking aspect that is too often neglected in the literature is how “the real struggle in (Darwin’s) *Descent of Man* occurs not between animals and men but between humans of varying intellects.” For instance, Darwin explicitly wrote [77: 919–920]: “for my own part I would as soon be descended from that heroic little monkey ... or from that old baboon.—as from a savage who delights to torture his enemies, offers up bloody sacrifices, practices infanticide without remorse, treats his wives like slaves, knows

no decency, and is haunted by the grossest superstitions.” As Landau notes, “next to savages who are cruel and false, the European appears kindest and most faithful” [20: 59]. Furthermore, as she explains (p. 57–58), it is not only the indirect links between Darwin ideas, and familiar connections, with the eugenics movement: Darwin’s own writings strikingly—and disturbingly—resemble those used within that movement. For instance, in *The Descent* he writes [77: 501]: “with savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health ... we civilized men, on the other hand, do our utmost to check the process of elimination ... we build asylums for the imbecile, the maimed and the sick ... we institute poor-laws ... and our medical men exert their utmost skill to save the life of every one to the last moment.” Therefore, for Darwin, as a result, “the weak members of civilized societies propagate their kind ... no one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man ... it is surprising how soon a want of care, or care wrongly directed, leads to the degeneration of a domestic race; but excepting in the case of man himself, hardly anyone is so ignorant as to allow his worst animals to breed.” Calling the “imbecile, maimed and the sick” as “worst animals,” and stating that only very “ignorant” people would allow such “worst animals” to “breed,” i.e., to survive: if someone told me that this was an excerpt of Hitler’s *Mein Kampf*, it would be completely credible. But because it is written by the idealized, and often-venerated Charles Darwin himself, then clearly this cannot be as bad, or influential, at it would seem, it has to be simply a misinterpretation of his words, or, at the maximum, just ignored or overlooked as an “insignificant,” tangent flaw.

In Todes’ 1989 book *Darwin Without Malthus*, mentioned above, he explains [48: 10–19] that the struggle for existence “was (supposedly) ... most severe between the individuals of the same species, for they frequent the same districts, require the same food, and are exposed to the same dangers ... Darwin used the words “struggle” and “competition” interchangeably ... the metaphor “struggle-for-existence,” and in such phrases as “the great battle for life” and the “war of nature” contributed a certain rhetorical power to his argument.” According to him (p. 11), by sacrificing accuracy for eloquence, and proposing that within this struggle “death is generally prompt, and that the vigorous, the healthy, and the happy survive and multiply,” Darwin *did* give easy ammunition for eugenicists around the globe. Or, in the words of Corbey [78: 76], “the Darwinian perception of nature as competition provided new support to the age-old icon of a beastly, humanlike, and now preferably apish Other.” Similarly, Andreassen [79: 121] wrote that “Darwin’s arguments about the survival of the fittest became central to theories about racial hierarchies and human development ... many scientists began to see the different races

competing against one another; the stronger and more intelligent would thrive, while the weaker and less intelligent races declined ... racial Darwinism.” Of course, one can say that in many cases people can even use “good” ideas, or scientific facts, to support racist, or Eurocentric, or misogynistic ideas, anyway. But a crucial point that I want to make in this paper is that the problem with Darwin and many of his subsequent Darwinian and Neo-Darwinian followers is that those parts of their works used by people like Duke, Hitler, and other white supremacists—as well as by misogynists (see below)—are neither “good ideas” nor scientifically correct. Clearly, there are no “favored races” in evolution, nor humans or human-specific subgroups are “higher taxa,” nor is there a suffocating, omnipresent, omnipotent and never-ending struggle for existence in which only one—in particular the most selfish one, be it an individual, or a gene, as argued by Neo-Darwinists such as Dawkins—can survive. These are all both “bad” ideas, and wrong ideas, scientifically, period. Darwin was right in numerous parts of his writings, there is no doubt about it, but he was not right in all of them, and clearly not on those that concerned in particular the notions of progress or had to do with Eurocentrism, racism or misogyny.

This is particularly clear concerning his misogynistic ideas, and the way he “scientifically” supported them. While Darwin was arguably “less racist” than most Westerns of his time, he clearly seems to have been *even more* misogynistic than most of them, and his work *did* have a huge influence in the history of misogyny, all the way to the present time. This point, and the important fact that the “data” used by him to support his extremely misogynistic ideas were plain wrong scientifically, was made clear over and over in some of the most prominent books written in the last decades on primate and human evolution (e.g., [80]), and on the history of marriage (e.g., [81]), misogyny (e.g., [82]), feminism (e.g., [83]), and so on (see also, e.g., [76, 84–90]). However, as I noted in a recent paper, what is striking is that despite the fact that the scholars that studied these subjects in more detail completely deconstruct scientifically wrong stereotypes such as the “man-the-polygamous-active-provider” vs. “woman-the-monogamous-passive-asexual-being,” the combination of prevalent misogynistic tendencies of many other scholars and of great part of the society, together with the idealization of Darwin’s ideas, continues to lead to the use of old-dated scientific untruths to propagate such stereotypes [34]. As I discussed these subjects extensively in that paper, here I will just provide a very brief discussion of this subject, with some few relevant examples written by some of those scholars that have studied these subjects extensively.

For example, in *Biology and Feminism*, edited by Nelson [83: 32–33], it is written: “some feminists also argue that, contrary to the way he is generally portrayed by historians of science, there are several respects in which Darwin was

decidedly not “swimming upstream”—that is, he was not critically taking on prevailing sociopolitical or scientific views ... he was ... assuming the gender stereotypes of his day ... in addition, some feminists and others point out that Darwin’s model of natural selection—which involves waves of competition for scarce resources, and “winners and losers”—paralleled then current arguments for capitalism. Darwin also “assumed ... current sociopolitical beliefs about race differences ... although an Abolitionist, he appealed to differences between “the races” in brain size and intelligence ... many (if not most) Darwin scholars recognize that the claims Darwin makes about sex/gender, sex, and racial differences ... are in fact unsupported assumptions ... characteristic of Victorian England.” Darwin’s writings were used as supposedly “objective” scientific support for ideas such as that men want to have sex with many women to have as many kids as possible while women mainly evolved to have sexual relationships with a single partner because they are pregnant for nine months, thus having sex not so much because of having pleasure but as an exchange for food or other items that may help to raise their kids [34]. For instance, within this framework, and also within a typical adaptationist circular reasoning, there are literally hundreds of papers about the “puzzling question” of why women have orgasms at all (e.g., [91, 92]). Pavlicev & Wagner [91: 326] summarize which are still the widespread views on female orgasms: “the evolutionary explanation of female orgasm has been difficult to come by ... the orgasm in women does not obviously contribute to the reproductive success, and surprisingly unreliably accompanies heterosexual intercourse ... two types of explanations have been proposed: one insisting on extant adaptive roles in reproduction, another explaining female orgasm as a byproduct of selection on male orgasm, which is crucial for sperm transfer.” These discussions on puzzling “female” orgasms are mainly based on a priori assumptions that are in turn based on incorrect evolutionary ideas, many of them coming directly from Darwin, that were contradicted by studies on non-human primates, on human hunter-gatherer groups, on social psychology and neurobiology studies of Westerners, on physiological studies, on historical works, and so on (e.g., [2, 80–90]).

First of all, let us analyze the evolutionary idea that men would tend to be more polygamous than women because men can “optimize” their number of children by having many women, while women, when pregnant, have to wait at least 9 months to have another child. Apart from being based on the misogynistic fallacy of using polygynous (one male, various females) primates such as gorillas as a model for humans, this idea is also based on the capitalist fallacy of “more is better.” That is, it assumes that the “adaptive optimization” logic is always to have the higher number of descendants. As put by Landau [20: 45], in Darwin’s *Descent* it is argued that “success, in the long run, is measured by numbers of offspring.” Apart from the fact that our closest

relatives, the chimpanzees, have a “multimale-multifemale”—not a polygynous—type of sexual organization (e.g., [83]), such a reasoning is in itself paradoxical. This is because Malthus, who influenced Darwin so much, actually stated that a main problem of humanity would be overpopulation, leading to the “struggle for existence” that was so crucial in Darwin’s theory. In human history, there were many cases of collapses of civilization that were very likely mainly, or at least partially, related to overpopulation, which is also a problem faced by our planet nowadays (e.g., [93, 94]). This also reflects a crucial problem with the way that Darwin, and particularly some of his subsequent so-called Darwinians and Neo-Darwinians followers, see evolution: mainly involving individual survival or reproduction, and therefore selfishness. In this specific case, under this paradigm, for an individual human, it would indeed be “better” to have as many children as possible. But in the long term this often may lead to overpopulation, overuse of resources, war and so on, and therefore be “bad” for the group. Accordingly, there are numerous examples of human societies that were and/or are polyandrous (one female, various males), and many of them explicitly do so to avoid their “collapse” (e.g., [80–90, 95, 96]). Within the many cases, I could refer to, I will mention one that I learned when traveling to the Canary Islands and read about the Guanches, their aboriginal inhabitants. When the Spanish came to these islands, they reported that the Guanches took the political decision to change from a multimale-multifemale model to a polyandry model with at least 5 husbands for a single wife in order to control population growth and avoid wars because of the scarce natural resources of the islands (e.g., [97, 98]). As many other parts of the globe have scarce natural resources, why would we assume that a polygynous model would be our “natural tendency,” or universally “favored” in human evolution? This was a wrong “idea” made and supported by, and for, men, including Darwin, based on misogynistic biases and prejudices (e.g., [34, 80–90]). Apart from these fallacies, these still predominant misogynistic ideas neglect a huge collection of data from other fields of science that clearly contradict them, e.g. that women actually have much more frequently multiple and body orgasms (e.g., [92, 99]), seem to experience more complex, elaborate, and intense orgasms (e.g., [100, 101]), and release more oxytocin during orgasm than men (e.g., [84]). Or that the clitoris has about two times more sensory receptors than the penis (e.g., [86]), that women outperform men in smell sensitivity tests regarding scents related to sexual arousal, and so on (for a recent review, see [34]).

To finish, I will cite a short but concise excerpt of Coontz’s 2005 excellent book *Marriage - a History* [81: 159–190] that puts this issue in historical context and further shows how Victorian ideas and Darwin’s “theories” about women’s “natural” asexuality and passiveness are

not only not applicable to all epochs of human history, but are plain scientific untruths that have contributed to a lot of harm and sufferance for women worldwide. She explains that “throughout the Middle Ages women had been considered the lusty sex, more prey to their passions than men ... even when idealization of female chastity began to mount in the 18th century ... few of its popularizers assumed that women totally lacked sexual desire ... virtue was thought to be attained through self-control; it was not necessarily innate or biologically determined.” However, in the nineteenth century a new emphasis—supported “scientifically” by ideas similar to those of Darwin—was given to “women’s innate sexual purity ... the idea that women were asexual beings ... encouraged women to internalize limits on their sexual behavior that sixteenth- and seventeenth-century authorities had imposed by force ... its result was an extraordinary desexualization of women.” For “many women brought up with the idea that normal females should lack sexual passion, the wedding night was a source of anxiety or even disgust ... in the 1920s, Katharine Davis interviewed 2200 American women, most of them born before 1890 ... fully a quarter said they had initially been “repelled” by the experience of sex ... even women who did enjoy sex with their husbands reported feeling guilt or shame about their pleasure, believing that “immoderate” passion during the sex act was degrading.”

Conclusions

1. Charles Darwin provides a very clear illustration of how strong is our human tendency to idealize—so many scientists continue to venerate him as a person or to defend all his evolutionary ideas or even the more extreme “adaptationist,” struggle for existence versions later postulated by several so-called “Neo-Darwinists.”
2. A main problem with Darwin and many of his subsequent followers is that those parts of their works used by adaptationists, racists, white supremacists and misogynists to support their ideas are neither “good ideas” nor scientifically correct.
3. The main here aim is not to criticize Darwin, but to call attention to the remarkable parallel between religious thinking and the inflexible—sometimes unfalsifiable—way in which many defend Darwin’s or Neo-Darwinist ideas, even in such cases when they are plain wrong.
4. For creationists that would use this paper to criticize evolutionists in general, I should note that I am above all criticizing the quasi-religious reasoning done by many scholars, so it would be a paradox—and also plain wrong—to use this criticism to defend the type of religious thinking of creationists. Actually, the fact that I, an evolutionist, am criticizing the quasi-religious

reverence of certain wrong ideas of Darwin and/or some of his followers by providing empirical data contradicting those ideas shows a major difference between evolutionary biology and creationists. Namely, we can change even our core evolutionary ideas in face of new empirical data, while creationists cannot, even when there is clear data that the earth is not the center of universe, that human embryos have several atavistic features that were present in our ape ancestors, that organisms were not “created” as they are now, and so on.

Acknowledgments I want to thank all the numerous colleagues with whom I have discussed these fascinating broader subjects. Special thanks to Viven Shaw and Ueso Montero, who did a very detailed review of an earlier version of this paper, and provided very useful comments, some of them literally included in the present paper, with their previous authorization.

Compliance with Ethical Standards

Conflict of Interest Rui Diogo declares that there is no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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