Correction to: Origin's Chapter VIII: Darwin for and Against Hybridism

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Correction to:
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Due to an unintentional oversight, the printed version of this chapter did not include some of the bibliographical references used in its preparation, as well as some clarifications that should have appeared on chapter along with the final paragraph. The same has been included in this corrected version.

Missing bibliography which should be listed in the References (pp. 317–320):

Beatty, J. (1985). Speaking of species: Darwin's strategy. In D. Kohn (Ed.), *The Darwinian heritage* (pp. 265–282). Princeton University Press.

Darwin, C. (1872). On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life (6th ed.). John Murray.

Darwin, C. (1876). The effects of cross and self fertilisation in the vegetable kingdom. John Murray.

Ginnobili, S. (2013). On the origin of «that thing you call "species"». In P. Lorenzano, L. A.-C. P. Martins, & A. C. Regner (Eds.), *History and philosophy of life sciences in the South Cone* (pp. 173–184). College Publications.

Olby, R. (2009). Variation and inheritance. In M. Ruse & R. Richards (Eds.), *The Cambridge companion to the "Origin of species"* (pp. 30–46). Cambridge University Press.

The updated version of this chapter can be found at
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M. Elice Brzezinski Prestes (ed.), *Understanding Evolution in Darwin's "Origin"*,
History, Philosophy and Theory of the Life Sciences 34,
https://doi.org/10.1007/978-3-031-40165-7_26

Reznick, D. N. (2009). *The Origin then and now: An interpretive guide to the Origin of species*. Princeton University Press.
Secord, J. A. (1985). Darwin and the breeders: A social history. In D. Kohn (Ed.), *The Darwinian heritage* (pp. 519–542). Princeton University Press.
Smocovitis, V. B. (2009). Darwin's botany in the *Origin of species*. In M. Ruse & R. Richards (Eds.), *The Cambridge companion to the "Origin of species"* (pp. 216–236). Cambridge University Press.

On p. 309:

On the general place of Chapter VIII in Darwin's Origin, reference should be made to the work of Olby (2009), Reznick (2009), and Smocovitis (2009).

> Chapter VIII is thus part of the set of Chapters VI, VII, VIII – in which Darwin gives answers to the possible difficulties and objections that could be raised to his theory (Olby, 2009; Reznick, 2009; Smocovitis, 2009).

On p. 309:

The problem related to the "definition" of the species should be complemented by the reference to Reznick (2009) and Beatty (1985), and to the discussion of the latter by Ginnobili (2013).

> One of these questions involves issues around the "definition" of the concept of species, that is, of what a species is (Reznick, 2009; Beatty, 1985). However, it is worth noting that in this context the term "definition" is used in a rather loose way of giving operational criteria, methods, or ways to distinguish species from varieties, i.e., to determine the extension of the concept of species, meaning how it can be determined what are the objects that fall under the concept of species, and how a species differs and is related to varieties, and not in the strict logical sense of providing necessary and sufficient conditions for the application of the concept of species (Ginnobili, 2013).

On p. 309:

To the mention of Darwin's discussion of the role that sterility plays in the so-called species problem, reference to Olby (2009) should be included.

> As a part of his general argument against the view that "species were immutable productions, and had been separately created" and in favour of the conception that "species undergo modification, and that the existing forms of life are the descendants by true generation of pre-existing forms" (Darwin, 1866, p. xiii), Darwin explores in Chapter VIII the role that sterility plays in the so-called species problem (Olby, 2009).

On p. 311:

On Darwin's relationship with breeders, hybrists, and naturalists, reference to Secord (1985) should be added.

> As we shall see, in Chapter VIII, "On Hybridism," and along *Origin*, Darwin refers to authors against and for the theory of speciation through hybridization as well as of both traditions or schools – that of animal and plant breeders, or horticulturalists, and that of species hybridizers, or hybridists – and to other naturalists and botanists (Secord, 1985).

On p. 314:

Regarding Darwin's contemporaries who thought of each species as the product of a special act of creation and that all species were absolutely reproductively isolated from one another, reference to Reznick (2009) should be included, but differing from him in that not all contemporaries thought alike.

> Recall that, on the one hand, although many, but not all, of "Darwin's contemporaries thought that each species was the product of an act of special creation and that all species were absolutely reproductively isolated from one another" (Reznick, 2009, p. 190) – including Natural Theologists and some hybridists in the broad sense – this was not so for those who held a theory of speciation through hybridization, that is, hybridism in the narrow sense.

On p. 314:

> On the other hand, either the assumed sterility of hybrids (Kölreuter) or the gradual decreasing fertility of hybrid crosses (Gärtner) in contrast to the fertility of variety crosses (whose progeny is called "mongrels" by Darwin) were considered the Creator's (for Natural Theologists) (Olby, 2009) or Nature's (for Kölreuter and Gärtner) way of preserving the fixity of species.

On p. 314:

> Darwin "needed to explain why species, which, according to his theory, had descended from each other, usually could not interbreed" (Smocovitis, 2009, p. 230), given that, on the one hand, sterility or difference in fertility was not a property to be explained by natural selection, since it is not "a specially acquired or endowed quality, but is incidental on other acquired differences" (Darwin, 1859, 245), as already mentioned in Section 1. And on the other hand, the standard explanation of why species did not interbreed, namely, "that barriers to hybridization existed" (Smocovitis, 2009, p. 230) to "prevent the confusion of all organic forms" (Darwin, 1859, p. 245), "was [. . .] not a viable explanation" (Smocovitis, 2009, p. 231) for him.

On p. 314:

After establishing the fundamental distinction between the sterility of species crosses and hybrid crosses (Darwin 1859, 245–246), Darwin presented a brief overview "of the varied and complex patterns observed" (Smocovitis, 2009, p. 230) in the phenomena first of sterility and fertility of species crosses and then of hybrid crosses (Darwin 1859, 246–253) (Reznick, 2009).

On p. 314:

Darwin relied extensively on the insights and experimental studies of horticulturalists, plant and animal breeders, and hybridists (Smocovitis, 2009).

On p. 314:

Darwin compared his point of view with that of them, and used his interpretation of their experimental results, together with the results obtained by "the third most experienced hybridizer [. . .] Hon. and Rev. W[illiam]. Herbert" (Darwin, 1859, pp. 249–250), to oppose their views (Reznick, 2009).

On p. 315:

Darwin's conclusions of his overview are, besides that sterility is affected by "close interbreeding" (1859, p. 248) and is "capable of being removed by domestication" (1859, p. 254), "that some degree of sterility, both in first crosses and in hybrids, is an extremely general result; but that it cannot, under our present state of knowledge, be considered as absolutely universal" (1859, p. 254; this last citation also appears in Reznick, 2009, p. 196).

On p. 315:

These conclusions, which would show that "different species can sometimes interbreed and [. . .] produce" fertile hybrids, would go against those who defend the doctrine of special creation and would constitute an argument "that species cannot be defined as discrete units separated by absolute reproductive barriers" (Reznick, 2009, p. 196) and there were no clear lines between varieties, incipient species, and species.

On p. 315:

However, contrary to Gärtner's proposal, Darwin makes the following points (see Reznick, 2009, pp. 196–198).

On p. 315:

> Darwin indicates that there are more Gärtner's "rules," but the ones he has already discussed are sufficient to prove his own view (Reznick, 2009, p. 198).

On p. 316:

> There, Darwin also emphasizes that he "did not consider [. . .] hybridization itself to be the source of the resulting variation" (Olby, 2009, p. 38), either in general or in the vigour and fertility of the offspring of hybrids. Rather, the changes in conditions of life play in it a fundamental role.

On pp. 316–317:

The last paragraphs of the text, concerning Darwin's critique of hybridization as a theory of evolution, transcribes and paraphrases three paragraphs of Lenval A. Callender's well-known article, already referred to on p. 310, "Gregor Mendel: An opponent of descent with modification" (Callender, 1988, p. 49), as follows:

> Thus, as argued by Callender (1988), though Darwin accepted the existence of hybrid forms of plants completely fertile and relatively stable, he thought that absent other sources of variation, hybridization itself "could not account for the evolution of species" (Callender, 1988, p. 49). The main reason – which Darwin develops in other parts of the Origin as well as in other texts – is that hybridization "presupposes already existing differences", thus giving rise, once again, to the question of the origins of such differences (Callender, 1988, p. 49). By trying to explain, then, evolutionary change based on crossings without variation, Callender refers to Darwin's words: "we thus only push the difficulty further back in time, for what made the parents or their progenitors different?" (Darwin, 1868, v. II, p. 252, apud Callender, 1988, p. 49). In the case of the evolution of pigeons, for example, Darwin wrote, in a passage also cited by Callender and expanded here:
>
> ---Great as. . . . enormous crop? (Darwin, 1859, p. 23)
>
> That is, "*the fundamental objection to the doctrine of 'evolution' solely by means of hybridization* [. . .]: one is inevitably confronted either with an infinite regress or [with] some version of the doctrine of Special Creation" (Callender, 1988, p. 49; emphasis added). And either possibility is, according to Darwin, untenable.

On p. 317:

At the end of the text and as a conclusion, the following paragraph should be added:

> To summarize the conclusions of this chapter and explain its subtitle, while Darwin acknowledges the importance of "hybridism in the broad sense",

i.e., hybridism as the tradition that studies hybrids ("[t]he offspring of the union of two distinct species", Darwin, 1872, p. 435), he clearly rejects "hybridism in the narrow sense", i.e., hybridism as a theory of the origin of new species by hybridization, and defends his own theory, as he reaffirms elsewhere ("the whole subject of hybridism is one of the greatest obstacles to the general acceptance and progress of the great principle of evolution" Darwin, 1876, p. 27).