

Chapter 1

Introduction: In Search of a New Paradigm for the Development of Evolutionary Biology



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Abstract This Introduction raises a number of interpretative difficulties facing the standard view of the development of evolutionary biology. It challenges the central tenet of this view, the claim that the field has largely been organized around a fundamental divide, comprising, on the one hand, theories focusing on a strong selective approach and, on the other, theories embracing a weak selective one. It is argued that the main historiographic labels—Darwinism, Darwinian Revolution, Eclipse of Darwinism, Modern Synthesis, Extended Evolutionary Synthesis, Non-Darwinian Synthesis—are increasingly less clearly supported by historical, epistemological, theoretical, and empirical analyses. The co-optation of historians and philosophers under the rhetorical discourses of a limited number of influential evolutionists has, apparently, played a key role in the persistence of a static and uncritical historiography. This Introduction calls for a new and more consistent paradigm that would make sense of the overall development of evolutionary biology, one based on a realignment of the alliance between all partners pursuing research in this area.

Keywords Darwinism · Darwinian revolution · Eclipse of Darwinism · Modern synthesis · Extended evolutionary synthesis · Non-Darwinian synthesis · Selective theories · Rhetorical arguments · Co-optation

For several decades now, the field of evolutionary biology has been envisioned as organized around a profound and fundamental divide: theories relying on strong selective factors and those appealing to weak ones only. Of course, it is also believed that the first ones are in keeping with the true Darwinian spirit, unlike the other theories. On closer analyses—empirical, theoretical, epistemological, and

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historical—this divide proves to be largely illusory and is collapsing at a rapid pace, opening up an era devoted to the search of a new paradigm for the understanding of the development of evolutionary biology.¹ Theories favouring the agenda of strong selective factors are unquestionably legitimate (Alcock 2001, 2017; Dawkins 1976, 1996; Dennett 1995; Mayr 1983; Wilson 1975; Wray et al. 2014) but are both mainly the product of fairly recent developments and part of a minority view. The widely held assumption that the adaptationist programme (or “pan-selectionism”) finds its intellectual roots in Charles Darwin’s *Origin of Species* is not supported by recent analyses (Delisle 2014, 2017a, 2019).

As shown by several contributions in this volume,² “Darwinism” as a historiographic category is rapidly approaching a definition crisis.³ The concept of natural selection does not clearly mark out a distinction between *most* evolutionists from the nineteenth century onwards, even for so-called Darwinians, no matter how acrimonious debates might be today among evolutionists. For instance, Richard Delisle (Chap. 4) holds that Darwin could not have put natural selection in the driver’s seat of evolution as a core explanatory element, for the simple reason that Darwin severely restricted its action under a pre-established overall divergent view of life, reducing it to the explanatory role of an auxiliary hypothesis. Carlos Ochoa (Chap. 10) shows how George Gaylord Simpson reintroduced the notion of orthogenesis by the back door—although he officially opposed it in the name of a contingent evolution driven by natural selection—through the concept of parallelism. Georgy Levit and Uwe Hossfeld (Chap. 9) establish strong ties between Theodor Ziehen and Bernhard Rensch, both working under a monistic and law-like universe reducing, in the case of Rensch, natural selection to an important yet subordinate role (see also Levit et al. 2008). Mark Adams (Chap. 8) analyses how a score of scholars declined to commit themselves to a basic assumption presumably at the heart of the Modern Synthesis—the microevolution/macroevolution equation—depriving natural selection of its creativity for macroevolutionary events. They avoided making this assumption in various ways: (1) some scholars denied this equation (DeVries, Johannsen, Filipchenko, Goldschmidt, Guyénot, and J.S. Huxley); (2) others failed to take the question seriously (Fisher and Wright); (3) while the others recognized the lack of evidence for it (Severtsov and Rensch). In fact, scholars who supported such an equation often did it on the basis of a programmatic principle only, using various rhetorical strategies to hide their reservations (Haldane, Simpson, and Dobzhansky). Jitse van der Meer (Chap. 11) throws

¹The word “paradigm” in this chapter is used in its ordinary and non-technical sense.

²Of course, the opinions expressed here are only mine. The readers are urged to review all the chapters contained in this volume and judge for themselves. It would be impossible for me to do justice here to the many stimulating insights each author brings to it.

³I have argued elsewhere that the time has perhaps come to dispose of the label “Darwinism” altogether (Delisle 2017a: 157). It seems to me that this move is warranted, if only because at our current state of understanding, such a label conflates major issues rather than revealing them. For a similar conclusion, but based on a different argument, see also the comment of Mark Adams (Chap. 8, footnote 14).

more light on this state of affairs as it appears in Dobzhansky, finely analysing the various explanatory levels and mechanisms he jostled with, thus depriving natural selection of its sole and dominant role in evolution. Given these considerations, it is less and less clear what the Modern Synthesis really is.

If the views of Charles Darwin and of a number of so-called proponents of the Modern Synthesis are not quite as presented in the traditional historiography (see also Cain 2009a; Delisle 2008, 2009a, b), then what is “Darwinism” all about? The question raised by Lorenzo Baravalle (Chap. 15) in this volume seems to me most relevant: “Darwinism Without Selection?”. The intellectual space seems quite limited (Delisle 2017b), if non-existent, between, on the one hand, “Darwinians” who would deny the centrality of natural selection in evolutionary explanations and, on the other, “non-Darwinians” who use it in company with a number of other evolutionary mechanisms, as in the case of Henry Fairfield Osborn’s efforts to build a synthetic biology (Ceccarelli, Chap. 7). Have we been far astray in our understanding of the development of evolutionary biology? “Co-opting” historians of biology in the service of evolutionary biologists seems to have been part of the problem, in addition to the fact that scientists have actively engaged in self-promotional arguments (Adams, Chap. 8 and Schwartz, Chap. 12).⁴

1.1 The Domino Effect

The professionalization of the fields of history and philosophy of biology arose at the time when the “Modern Synthesis” was widely thought to have achieved a unification of evolutionary disciplines. Ernst Mayr (1980) and Stephen Jay Gould (1980a), for instance, characterized this synthesis as organized around two main explanatory components: (1) gradual evolution is explained by small genetic changes (variations) oriented by natural selection, a process leading to adaptation; (2) evolutionary trends and speciation events are macroevolutionary phenomena explainable solely in terms of the extension of processes and mechanisms occurring at the preceding microevolutionary level. On this view, natural selection holds a central explanatory role in evolutionary theory. Strangely enough, historians and philosophers uncritically bought into this self-serving narrative (Adams, Chap. 8), perhaps for reasons more sociological than scientific, under the implicit desire for a wider recognition of their newly acquired status among scientific disciplines.⁵ Thus was the historiographic category “Modern Synthesis” canonized, externally and artificially reinforced in the context of post-World War II ideological and religious pressures

⁴For years I was myself entirely co-opted under labels, such as “Darwinian Revolution” and “Modern Synthesis”. See also a somewhat similar admission by Mark Adams (Chap. 8).

⁵The co-optation of historians and philosophers by evolutionary biologists promoting the “Modern Synthesis” constitutes an essential research topic for future “critical” historians and philosophers.

in favour of a pro-science agenda in the United States (Adams, Chap. 8; Smocovitis 1999).

It would appear that, from this unassailable citadel, the other labels created to organize the development of evolutionary biology were either *interpolated* or *extrapolated*. The Modern Synthesis needed historical roots for both prestige and credibility, so Charles Darwin was placed in command of a “Darwinian Revolution”. Clearly, the argument went, natural selection was the core of Darwin’s theory. From there, it was easy enough to imagine a label for recalcitrant scholars who lived in a no-man’s land somewhere in between, called the “Eclipse of Darwinism”. The logic was pushed to its ultimate conclusion through the creation of a category for post-synthetic developments, defined more or less in opposition to the one incarnated by the Modern Synthesis. Depending on whether or not one sees himself or herself as departing radically from this older label, one might belong either to the “Extended Evolutionary Synthesis” or the “Non-Darwinian Synthesis”.

It is only in hindsight that one can tell how fragile this historiographic edifice was, having only the Modern Synthesis as a foundation. The issue being raised here is not merely whether or not the category “Modern Synthesis” should be kept intact, expanded, or replaced. The question might be more gripping, even existential: does history show us there ever really was a Modern Synthesis, as traditionally defined? Whatever happened between 1930 and 1960 in evolutionary biology, and once one goes beyond the rhetorical discourses, what is left at the conceptual level doesn’t appear quite as originally advertised. It remains to be investigated how to fill the void created by a reconceptualization of that time period. And this can only be achieved at the expense of rethinking the entire development of evolutionary biology. Keeping in mind that all the labels listed above originated from the starting point of the “Modern Synthesis”, one sees why removing such a central piece instigates in its wake a redefinition of others. Indeed, what would an “Extended Evolutionary Synthesis” look like if there had been no Modern Synthesis to extend in the first place? If Darwin’s image is the product of looking through the distorting lens of the Modern Synthesis, then what were Darwin’s real achievements? Finally, if the “Eclipse of Darwinism” was invented merely to fill the void between the “Darwinian Revolution” and the “Modern Synthesis”, what was such an interstitial moment really about?

It may be tempting to argue that it does not matter whether or not the “Modern Synthesis” had (or has) a historical reality, provided that the perception was (is) that it did (does) exist and that scholars behave(d) accordingly. Fair enough, as long as the issue is the analysis of the impact of rhetorical argument on science. Parenthetically, Ernst Mayr (1993: 32) had this to say of the Modern Synthesis in retrospect: “Historians (perhaps even Mayr and Provine) have overemphasized the unity achieved by the synthesis”. It does matter, however, whether or not the Modern Synthesis did exist for both historians and evolutionists currently thinking about the field. For the latter, there would be little point asking for greater diversity and tolerance of views if a part of that pluralism already existed in the past. One must be careful not to make a straw man of the “Modern Synthesis” and thus engage in a self-promotional narrative stressing the so-called novelties of recent views. In my

understanding, pluralism has prevailed throughout the history of the field to a degree sufficient to allow us to give credit to scholars of the past.

1.2 A New Alliance

As strange as it seems, the future of evolutionary biology may in part belong to a re-discovery of its past. The richness of the area since its inception—both in scholars and ideas—is plainly overwhelming and largely understudied (e.g. Amundson 2005; Esposito 2013, 2017; Gissis and Jablonska 2011; Laubichler and Maienschein 2007; Levit and Hossfeld 2017). The inspiration sought by contemporary biologists in pursuit of greater explanatory pluralism can be accelerated, I would argue, by the rediscovery of older ideas capable of reformulation. Just as no one can legitimately claim that solutions to all current and future problems are to be found in past proposals, neither can it be denied that re-engaging with them may lead to some fruitful inspirations.

There is something admirable about Ernst Mayr's (1982) and Stephen Jay Gould's (2002) way of doing science: they realized the necessity of also engaging with the past of their discipline. Of course, this comes with the inevitable risk of self-serving strategies. This is exactly what has happened. For instance, Mayr's (1982: 45–47; 1991: 40–42) attempt to read the development of evolutionary biology through the lens of “population thinking” is markedly tendentious (Greene 1992, 1999; see also Sepkoski 2019), as is Gould's (1980b) notion of a so-called constriction of the Modern Synthesis (Adams, Chap. 8 and van der Meer, Chap. 11; Cain 2009b; Sepkoski 2019). And things only get worse when historians and philosophers become co-opted by such arguments. Maurizio Esposito (Chap. 2) provides us with a long-overdue reflection on the conflicting and complementary agendas of the two camps involved (scientists and historians/philosophers).

Whereas historians and philosophers have been slow at questioning the traditional historiography, practicing biologists had to go through it alone when rereading the development of evolutionary biology, busy as they were undermining the traditional narrative and uncovering a concealed pluralism. Jeffrey Schwartz (1999; Chap. 12) does this for evolutionary biology in general. Ian Tattersall (1995; Chap. 14) is engaged in a similar quest with respect to the field of human evolution. Some of these studies take up the specific angle of reinterpreting the contribution of past scholars, as is done by Carlos Ochoa (Chaps. 6 and 10) with respect to William Bateson and George Gaylord Simpson (see also Ochoa 2017). For his part, Andrei Granovitch (Chap. 13) requires more intellectual space to account for other evolutionary processes. Perhaps the issue of a mythical Darwin created by recent scholars should be raised, a question that impinges on how and what should be taught about natural selection where wider audiences are concerned (Watts, Chap. 16). Indeed, natural selection's epistemological role in science was not equally agreed upon even among Darwin's contemporaries (Bellon, Chap. 3).

Just as Maurizio Esposito (Chap. 2) rightly stresses that scientists and historians-philosophers do not have identical agendas, it is hoped that *a new alliance* will be forged that will generate an overall narrative that is, at least, *consistent* throughout. Avoiding the co-optation problem raised above, a new motto might be “no submission, no contradiction”. We should not be naive about the difficulty of the task, but the aim of working our way toward a coherent and unified narrative by “moving across the aisle” seems to me a desirable goal.

1.3 A New Paradigm: Seeking New Historiographic Labels

More and more studies show that the development of evolutionary biology was never organized around a central and dominant narrative called Darwinism, as currently defined. Considering that natural selection was not a discriminatory factor between most scholars, it seems difficult to believe that the labels created from within the traditional historiography can justifiably remain unmodified. It may even be necessary to eventually replace them entirely:

The Darwinian revolution: Far from being a scholar who subscribed to modern evolutionism, Charles Darwin shared many uniformitarian commitments (steady-statism, to name but one) with contemporaries, such as Charles Lyell, Thomas H. Huxley, and Richard Owen, making him a less-than-ideal candidate for a torchbearer (Delisle 2019; Chap. 4). In addition, Darwin’s eclecticism with respect to evolutionary mechanisms matches those encountered among Darwin’s contemporaries and immediate successors (Levit and Hossfeld 2011; Chap. 5).

The eclipse of Darwinism: The eclecticism just mentioned spills over into later decades, with natural selection now being taken seriously by most evolutionists but only as one factor among others (Ochoa, Chap. 6 and Ceccarelli, Chap. 7; Delisle 2017a; Largent 2009; Levit and Hossfeld 2006).

The modern synthesis: Serious doubts have been raised about both the internal/conceptual coherence of such a synthesis and its external/contextual isolation from the rest of the evolutionary field, the label also serving strong sociological ends (Adams, Chap. 8; Ceccarelli, Chap. 7; Cain 2009b; Delisle 2008, 2009a, b, 2011; Levit et al. 2008; Smocovitis 1999; Sepkoski 2019).

Extended evolutionary synthesis or non-Darwinian synthesis: In light of the profound reassessment of the pre-1960 period currently underway, it is unclear to me what content should be attributed to these recent labels. It seems that only the piecing together of the emerging views concerning the pre- and post-1960 periods will allow us to give them any meaning.

The “mechanism-centered” approach exploited thus far as a way of organizing the development of evolutionary biology has proven far too restrictive to capture its essential features. This approach is also closely tied to a view that consists in reducing the complexity of the scientific enterprise to mere “theories” (see Chap. 3 by Bellon, who finds supports for his view in the analyses of Jane Maienschein

(1991) and Philip Pauly (2000)). It seems that we will have to cast our empirical, theoretical, epistemological, and ontological net wider. The next step in our collective inquiry, I suggest, lies in finding a new paradigm to make sense of that complexity.

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