Introduction

> The nature of physical things is much more easily conceived when they are beheld coming gradually into existence, than when they are only considered as produced at once in a finished and perfect state.
>
> John Dewey, quoting René Descartes, *Discourse on Method*

More than four decades ago, I wrote *The Darwinian Revolution: Science Red in Tooth and Claw*. For all that the eminent evolutionist Ernst Mayr chided me for the silliness of my subtitle, I remain very proud of that book. As might be expected, much of what I wrote then is seriously dated, I would like to think in major respects because of the work that book stimulated – work by myself and others. It has long been my hope that, as my career of over fifty years as a philosopher and historian of science draws to an end, I could write a serious revision of the book that helped launch my career.

This is that revision. Except it isn't really. Most importantly, the very intent of the earlier book has been changed, and this (not Mayr) is the reason for the change of title. Then, I wrote a straight history of science, trying to show what happened in the Darwinian Revolution. It was a much needed overview, much needed because of the flood of new information and ideas that had appeared in the twenty years since the history of science became professionalized. It was the book I wished I had had ten years before, when, as a young philosopher of science under the influence of Thomas Kuhn, I turned to the history of science. As one who, in childhood, prayed for wet weather so the order to go out and play was rescinded and I could finish reading *The Children of the New Forest* and move on to *The Secret Garden*, Darwin and his achievements were from a time and a land where it was always raining – leading me in a direction I have never regretted.

Now my commitment to philosophy has reasserted itself, and this book here is a history of ideas. By this I mean, writing in the tradition of Arthur Lovejoy

and Isaiah Berlin, I am using history to throw philosophical light on issues that engage us today. The book is deeply autobiographical. It is by no means simply a précis of work I have done in the past forty years. However, unashamedly, I will use already expressed ideas to push forward to my concerns now. Specifically, I shall ask about the relevance of Darwin's work towards an understanding of attitudes towards foreigners, especially immigrants; towards an understanding of the nature (if they exist) of racial differences, and how these (real or otherwise) affect society's attitudes towards African-Americans; towards an understanding of sexual orientation, whether it is a matter of nature or of choice; and, finally, towards an understanding of the nature and status of women. Recently, it has become evident that there is still huge prejudice against Jews. After I have discussed beliefs about foreigners and attitudes towards race, I add a short codicil addressing this issue. Overall, I shall look at Darwin's work against its background, at our thinking today and the extent it has been shaped by Darwin's work, and whether Darwin himself had any idea of the ways in which his findings and theories would be an integral part of our thinking today. The proof of the pudding is in the eating. Here, I will not defend my change of intent. The reader must judge whether the change was proper and whether I have succeeded in what I have set out to do.

I will say, however, that I write within a framework – more precisely, against a framework. In my earlier book, I acknowledged that, whatever the importance of Darwin's science, particularly in the *Origin of Species* and the *Descent of Man*, in respects he did not do what he set out to do, namely convince professional evolutionists of his own generation to adopt, as the chief mechanism of change, Darwin's cause: natural selection. I did not then see that this was a claim with supposed wider implications, namely that it is a mistake to think that Darwin led to an actual scientific "revolution." That he was rather one of many who contributed to the nineteenth-century change from a world of the miraculous origins of organisms to a work of the natural origins of organisms. In other words, while there was certainly a general non-evolutionary consensus before the *Origin*, and there was a general evolutionary consensus after the *Origin*, really Darwin had little or no role to play in the change. As they accept the literal resurrection of Jesus, the general public might accept the revolutionary nature of Darwin's legacy. Those in the know realize that neither claim withstands the critical eye. In the Darwinian case, given especially that Darwin's theory was already existing beliefs stitched together – in this respect he was certainly no rebel – talk of "revolutions" is pushing beyond the boundaries.

Typical of criticisms of the "revolutionary" claims for Darwin's achievement are the concluding words of James Secord at the end of his (deservedly)

prize-winning book on the pre-*Origin* evolutionary work *Vestiges of the Natural History of Creation* by the Scottish publisher Robert Chambers. Darwin is important, but not that important. Many of the claims promoting his importance are "implausible." Adding: "the Origin's main novelty, natural selection, was rejected by almost all readers in the first seventy-five years after publication" (Secord 2000, 516). Secord is but one of a number of voices that want to shrink the author of the *Origin of Species* down to size. He and the others are nothing to Peter Bowler, the eminent historian of evolutionary biology. The titles of three of his books tell the tale: *The Eclipse of Darwinism* (1983); *The Non-Darwinian Revolution: Reinterpreting a Historical Myth* (1988); and *Darwin Deleted: Imagining a World without Darwin* (2013). That tells it like it is! Bluntly: "There is now a substantial body of literature to convince anyone that the part of Darwin's theory now recognized as important by biologists had comparatively little impact on late nineteenth century thought" (1988, ix).

"Comparatively little impact on late nineteenth century thought"?! Although, primarily, I am telling the tale of Darwin and his accomplishments, I write against the *background* of this claim and I look at the evidence that leads to such a judgment. Since the *Origin* is – or claims to be – a work of science, let us be generous and assume that it is to this that people such as Bowler would have us turn. So let us pick up the challenge. However, not to make hasty judgments, constrained by the interests of Bowler and other Darwin belittlers, I shall also look at other areas of inquiry that might have felt the effects of the arrival of the idea of natural selection – philosophy, religion, literature. Also, since the titles and contents of Bowler's books certainly suggest that he is talking of the Darwin Revolution without temporal restrictions, I shall reject the assumption that one can make a clean division between "revolutionary" in the nineteenth century and "revolutionary" in the twentieth century. These topics and interests one might regard as the foreground of my discussion.

Let us turn at once to see if I have succeeded in what I set out to do.

1

Beginnings

Organicism

Plato's writings were cast in the dialogue form, usually with the philosopher Socrates as the main figure, talking, teaching, arguing with his disciples. Over the years, Plato increasingly used this dialogue form to introduce his own ideas, putting them in the mouth of Socrates. One such dialogue, the *Phaedo*, purports to tell of the last day of Socrates, before he is forced to drink poison, a punishment for filling his young admirers with all sorts of treasonable ideas. Plato has Socrates tackle the question of the possible chance nature of the universe, a problem of pressing importance to one about to die, having Socrates argue that truly all must be the product of a designing intelligence. "One day I heard someone reading, as he said, from a book of Anaxagoras, and saying that it is Mind that directs and is the cause of everything. I was delighted with this cause and it seemed to me to be good, in a way, that Mind should be the cause of all" (Cooper 1997: *Phaedo* 97, c–d).

In another dialogue, the *Republic*, Plato fit this idea into his overall metaphysical picture of reality. The main aim of this dialogue is to set up the ideal society, one that he thinks is based on our realization that this makes for the happiest form of life. The rulers – the "philosopher kings" – will be guided by their understanding of the nature of reality. This world of ours is the world of change, of becoming. It is not unreal, but it only reflects the world of ultimate reality, the unchanging world of the Forms. These are universals, standards, that guide and inform our world of experience. Dobbin is an individual horse. Dobbin is a horse, not a dog, because he "participates" in the Form of Horse. Fido, the family dog, participates in the Form of Dog. These forms are hierarchical, linked together through their relationship to the ultimate form, the Form of the Good. It is this that is in some sense the guiding intelligence. The equivalent in our world is the sun, which likewise has the role of linking all together and making possible continuation and thriving. First it illuminates:

> Light is the noble bond between the perceiving faculty and the thing perceived, and the god who gives us light is the sun, who is the eye of the day, but is not to be confounded with the eye of man. This eye of the day or sun is what I call the child of The Good, standing in the same relation to the visible world as The Good to the intellectual. (Cooper 1997, 508c–509a)

And then it is the sustenance, as one might say, that leads to growth: "And this Idea of Good, like the sun, is also the cause of growth, and the author not of knowledge only, but of being, yet greater far than either in dignity and power."

It is in a later dialogue, the *Timaeus*, that Plato argued for an organismic view of the universe – the organism was the *root* metaphor – with The Good being characterized as the "Demiurge." This Creator made the world an organism, so that it could be as good, as perfect, as possible. It is valuable:

> God desired that all things should be good and nothing bad, so far as this was attainable …. For which reason, when he was framing the universe, he put intelligence in soul, and soul in body, that he might be the creator of a work which was by nature fairest and best. Wherefore, using the language of probability, we may say that the world became a living creature truly endowed with soul and intelligence by the providence of God. (Cooper 1997)

Aristotle, Plato's student, was also an organicist, with a very different take from that of Plato. For a start, unlike Plato, he did not think that universals were entities existing in their own right, in a transcendent world of Forms. He thought rather that universals were more like templates, and they had existence only in the individuals of this world. Dobbin and Daisy were formed in the same pattern, and there is nothing beyond this. Again, Aristotle did not believe in an external Designer. He believed in something Godlike – the Perfect Being. This is not a physical being, but in some sense thought personified. "For that which is capable of receiving the object of thought, i.e. the essence, is thought. But it is active when it possesses this object." Hence, life "belongs to God; for the actuality of thought is life, and God is that actuality; and God's self-dependent actuality is life most good and eternal. We say therefore that God is a living being, eternal, most good, so that life and duration continuous and eternal belong to God; for this is God" (Barnes 1984: *Metaphysics*, 12, 1072b).

Famously, Aristotle divided causes into four categories (*Physics*, 194b16–195a3). Suppose we want to make a statue, for example of a British private – a "Tommy" – from the First World War (Reiss and Ruse 2023, 17) (Figure 1.1). You start with the *efficient* cause, the modeler or sculptor who actually made the statue. Then next you have the *material* cause, the substance from which

Figure 1.1 Statue of a British WWI soldier, a "Tommy."

it is made – metal (bronze) or stone (marble) or whatever substance. Then you have the *formal* cause, the pattern that Plato was trying to capture with his theory of forms. The model must look like a real British soldier. It would not be wearing a hat with a *Pickelhaube* for instance. And then, fourth, in a way the most important of all, you have the *final* cause. The teleological element behind your commissioning the statue. Why is it being made? The answer is simple. Future generations will be alerted to, and give thanks for, the sacrifices of such humble men and their comrades.

One of the problems with teleology, final-cause thinking, is that of the "missing goal object." If you hear someone hammering away, you can easily identify the efficient cause. It is a hammer striking a nail as it penetrates a plank being laid down as a floor. Material causes are iron and wood. Formal cause is the kind of house you are intending to build – a row house, semi-detached house, bungalow, or whatever. Final cause is the yet-to-be erected house. The final cause of the statue of the soldier, in the middle of the village green, is (as just noted) to remind us each time we pass by of the sacrifices made by so many young men in the Great War so that we might live in

harmony and peace. But what if, halfway through your building, you fail to get planning permission and you have to tear everything down? What if there is an accident when transporting the statue to the village, it is destroyed, and the parish simply does not have the money to replace it? They are going to have to be satisfied with a brass plaque. How can we speak of final cause when it never happens? Plato has a ready answer. The final cause is the thought of the house, of the statue. It is in fact a kind of mental efficient cause. There is no such easy way out for Aristotle. He has to say something like, there is a force, a tendency, directed toward the house or the statue. This exists now so is a kind of efficient cause, and it simply doesn't get to its end. The direction exists now.

Final causes must be saved. Final causes can be saved. So, we can still ask, meaningfully: Where do humans come in all of this? As you might expect, at the top! We are the animal equivalent of the mighty oak. Monad to man. We are the ultimate final cause. There is direction, from lesser to greater, from (and this is important) little worth or value to greater worth or value. Note that this is worth or value that is objectively "out there." It is not a judgment based solely on our preferences or desires. I am a passionate supporter of the Wolverhampton Wanderers soccer club, "the Wolves." Regretfully, these days this is rarely something based on objective value. To the contrary, Plato tells us: "God gave the sovereign part of the human soul to be the divinity of each one, being that part which, as we say, dwells at the top of the body, inasmuch as we are a plant not of an earthly but of a heavenly growth, raises us from earth to our kindred who are in heaven" (Cooper 1997, 90b). Likewise, Aristotle: "after the birth of animals, plants exist for their sake, and that the other animals exist for the sake of man … . Now if nature makes nothing incomplete, and nothing in vain, the inference must be that she has made all animals for the sake of man" (Barnes 1984, 1256b15–22). The unique bipedality of humans is also readily understood: "of all living beings with which we are acquainted man alone partakes of the divine, or at any rate partakes of it in a fuller measure than the rest." Hence, "in him alone do the natural parts hold the natural position; his upper part being turned towards that which is upper in the universe. For, of all animals, man alone stands erect" (656a17–13).

Although, as standing outside the Judeo-Christian tradition, technically Plato and Aristotle qualify as "pagans," the last thing that would have appealed to either would have been dancing stark naked save for Birkenstocks, around a campfire, out in California. (Socrates might have welcomed the chance, so long as his fellow dancers were attractive young men.) To the contrary, the seminal Christian thinkers – Augustine and Aquinas, particularly – were greatly influenced by the Greeks. This, despite the fact that neither read

Greek. Augustine got his understanding from the Neoplatonist Plotinus. Aquinas reaped the rewards of recent translations (into Latin) of original Greek texts, particularly those of Aristotle.

In his *Confessions*, Augustine's characterization of God could have come straight out of the *Republic*. Necessary: "For God's will is not a creature but is prior to the created order, since nothing would be created unless the Creator's will preceded it. Therefore, God's will belongs to his very substance." Outside space: "no physical entity existed before heaven and earth." Outside time: "Your 'years' neither come nor go. Our years come and go so that all may come in succession. All your 'years' exist in simultaneity, because they do not change; those going away are not thrust out by those coming in … Your Today is eternity." Likewise, the design and creation of the Earth.

> Even leaving aside the voices of the prophets, the world itself, by the perfect order of its changes and motions, by the great beauty of all things visible, claims by a kind of silent testimony of its own both that it has been created, and also that it could not have been made other than by a God ineffable and invisible in greatness, and ineffable and invisible in beauty. (Augustine 396, *Confessions,* 53)

Ours is a world of great value, coming from God. "And God saw everything that he had made, and, behold, it was very good" (Genesis 1:31). Humans, one hardly need say, are "very, very good." "Thou sayest not, 'Let man be made,' but Let us make man. Nor saidst Thou, 'according to his kind'; but, after our image and likeness" (Augustine 396, *Confessions*, 13).

As one influenced by Aristotle, Aquinas tended more to an internal reading of final cause, but the message was the same. Their very functioning shows that living things are of great value and humans of the greatest value. For a Christian, faith will always outrank reason. Remember the story of Thomas, who was scolded for demanding evidence that the man before him was indeed the crucified Christ. But reason is crucially important. Nicely backing Aquinas's conviction that reason does point to God is the fact that Aristotle embraced a geocentric view of the universe (with Earth at the center). This was very much in line with what Aquinas wanted to believe. The Earth is not just another planet, but (literally) the center of the universe, where all the action takes place. "The heavens are moved by God, and they in turn affect what happens down here on Earth" (Aquinas 1947, *Compendium Theologiae* I, 4).

> All motion is observed to proceed from something immobile, that is, from something that is not moved according to the particular species of motion in question. Thus we see that alterations and generations and corruptions occurring in lower bodies are reduced, as to their first mover, to a heavenly

body that is not moved according to this species of motion, since it is incapable of being generated, and is incorruptible and unalterable.

Mechanism

Back in the time of the Ancient Greeks, there were those who were unimpressed by the organic metaphor. They saw the world as meaningless, in the sense that there was no organizing force, internal or external. No values. Everything was the result of one thing happening after another. One set of particles, "atoms," existing in otherwise empty space, the "void," reconfiguring themselves driven by blind law. Given enough time, given enough combinations, and things would begin to work. Even before Socrates, the atomists – Leucippus, Democritus, and a little later Epicurus – were denying final cause and putting everything down to efficient cause. This got its fullest expression in the work of the pre-Christian Roman poet Lucretius (1950). Laying things out in his *De Rerum Natura* (*On the Nature of Things*), he made the case that all was a product of chance, with no direction.

> At that time the earth tried to create many monsters
> with weird appearance and anatomy –
> androgynous, of neither one sex nor the other
> but somewhere in between; some footless, or handless;
> many even without mouths, or without eyes and blind;
> some with their limbs stuck together all along their body,
> and thus disabled from doing harm or obtaining anything they needed.
> These and other monsters the earth created.
> But to no avail, since nature prohibited their development.
> They were unable to reach the goal of their maturity,
> to find sustenance or to copulate.
>
> (Sedley 2007, 150–53, *De rerum natura* V 837–848)

Then, from grotesque figures – three legs, one coming in the middle of the back, no mouth or eyes but several pairs of ears, and more – slowly functioning creatures started to appear.

> First, the fierce and savage lion species
> has been protected by its courage,
> foxes by cunning, deer by speed of flight.
> But as for the light-sleeping minds of dogs, with their faithful heart,
> and every kind born of the seed of beasts of burden,
> and along with them the wool-bearing flocks and the horned tribes,
> they have all been entrusted to the care of the human race, …
>
> (V 862–867)

No final causes, only efficient causes. Eyes just appeared, and then they were put to use. To think otherwise is to get things backwards.

> All other explanations of this type which they offer
> are back to front, due to distorted reasoning.
> For nothing has been engendered in our body
> in order that we might be able to use it.
> It is the fact of its being engendered that creates its use.
>
> (V 832–835)

Expectedly, especially given the coming of Christianity, none of this convinced. It was at most a curiosity – an example of how not to use one's reason. No matter how many typewriters, monkeys do not produce Shakespeare.

Then, around 1500, things started to change: With the Renaissance came a whole new appreciation of the thinking of the past, especially pre-Christian thinking. Writings such as *On the Nature of Things* were hauled out and studied in their own right. Paralleling the Renaissance was the Reformation, when Martin Luther, followed by Jean Calvin and Huldrych Zwingli, broke from Rome and started the Protestant challenge. There are many ways of categorizing this major break, but above all it was a move from the overintellectualized Catholic form of Christianity – epitomized by the theology of Aquinas – to a more literal form of religion. A religion, based on the Bible – *sola scriptura* – undergirded by faith rather than reason. Famously, or perhaps notoriously, Luther said: "Reason is a whore, the greatest enemy that faith has; it never comes to the aid of spiritual things, but more frequently than not struggles against the divine Word, treating with contempt all that emanates from God" (Luther 1914, 51, 126, 7). This was not a critique of organicism as such, but it was a philosophy that did not regard organicism as God's way of thinking, as one might put it.

Third and most important of all was the Scientific Revolution, from the heliocentric universe of Copernicus's De revolutionibus orbium coelestium (*On the Revolutions of the Celestial Spheres*) (1543), to Newton's theory of gravity, Philosophiæ Naturalis Principia Mathematica (*Mathematical Principles of Natural Philosophy*) (1687). More than just raw science, it was a change of *root* metaphors, from the organism to the *machine*.

> At all times there used to be a strong tendency among physicists, particularly in England, to form as concrete a picture as possible of the physical reality behind the phenomena, the not directly perceptible cause of that which can be perceived by the senses; they were always looking for hidden mechanisms, and in so doing supposed, without being concerned about this assumption, that these would be essentially the same kind as the simple instruments which men had used from time immemorial to relieve their