The Slaughterhouse and the Smiling Fields. On Pain and Beauty of Nature Between Newton and Darwin

Rossi Monti, Martino

11

THE SLAUGHTERHOUSE AND THE SMILING FIELDS: ON PAIN AND BEAUTY OF NATURE BETWEEN NEWTON AND DARWIN

MARTINO ROSSI MONTI

1. A new universe

In the course of the 17th century, legions of devout European naturalists, philosophers and theologians struggled to reconcile the new image of the universe brought by the scientific revolution with the familiar notion that the world, in all its beauty and order, was the product of the infinite wisdom of a benevolent God. In this period, the ancient idea of the cosmos as the outcome of a divine, providential and intelligent design underwent a significant and long-lasting revival. However, the universe of the moderns was no longer that of the ancients. Faced with the gradual dismantling of the "closed world", the intrusion of change in the supposedly unchanging heavens, the potentially infinite enlargement of an "irregular" cosmic space and the disclosure of infinitely small living worlds thanks to the microscope, some had reacted with shock and terror while others felt enthusiasm and others still had shifted from the former feeling to the latter. The ancient and medieval idea of beauty as order and symmetry was intimately connected with the belief in an immutable, orderly and finite universe. However, this conception proved sufficiently strong to adapt, resist and survive the irruption – in the skies as much as on earth – of the irregular, the boundless or, in a word, the sublime. In some cases, the idea proved elastic enough to coexist with the sublime or even incorporate it (Nicolson 1959; Giacomoni 2019).

For a long time, different images of the universe collided or intermingled in complicated ways. Outside the field of astronomy, a

number of philosophers, poets and writers – from Giordano Bruno (1548-1600) to Bernard Le Bovier de Fontenelle (1657-1757) – made of use of the astronomers' discoveries to construct an image of the universe in which the earth or the solar system did not enjoy a privileged position, but were lost in an infinite space possibly containing an infinite number of inhabited worlds. The spectre of chance or iron necessity loomed large. Against these views – and against the cosmology of René Descartes (1596-1650), accused of assigning too much autonomy and explicatory power to matter – Isaac Newton (1642-1727) and his followers upheld a newly restored conception of an orderly universe ruled not by blind necessity, but by simple and uniform laws designed by an intelligent and omnipotent being. "This most elegant system of the sun, planets, and comets", Newton famously wrote, "could not have arisen without the design and dominion of an intelligent and powerful being" (Newton 1999, 940).

Initially, the prevailing strategy for demonstrating the existence of God was to stress the mathematical and mechanical order he had impressed on the cosmos. Later, especially during the 18th century, the attention gradually shifted to the natural world, in concomitance with new developments in the fields of biology, zoology, botany and natural history. The study of nature was raising new questions concerning the organisation and behaviour of living matter in all its diverse manifestations, questions that purely mathematical and mechanical approaches seemed unable to answer.[1] The astonishing variety and abundance of life forms had to be reconciled with the order and regularity supposedly governing natural phenomena. The aim of "natural theologians" – often naturalists as well as clerics – was to harmonise science and religion. A chorus of voices repeatedly insisted on the structural perfection and purposefulness of living organisms – insects were a favourite case in point – as evidence of the existence of a providential plan (Casini 1962, 108-117; 1969; Harrison 1998, 171-175). This pious way of looking at nature also encouraged direct empirical observation and led to an increase of knowledge of the natural world (Eiseley 1958; Gillespie 1987). In fact, rather than speaking of theologians appropriating the science of the time for their own apologetic purposes, one should speak of "science" itself striving to demonstrate the existence of a wise and providential God (Roger 1963, 243). Natural enquiry, in this sense, had become a "form of worship" (Gaukroger 2006, 152). To an extent, scientific theories and theological assumptions influenced and shaped each other (Brooke 2014, 290-306).

[1] Cf. for example Clarke (1705, 119-120).

In this context, the conviction that nature was a stable, harmonious and wisely administered whole – in short, the idea of an "economy of nature" – was re-formulated in many different ways and became an inertial intellectual habit that persisted up to the late 19th century and beyond. Far from extinct from our world, this attitude profoundly conditioned the reception of Darwin's theory of evolution and provided many of its adversaries *and* followers with an apparatus of "coping arguments", so to speak (La Vergata 1990).

In this paper, I will first touch upon the relationship between beauty and pain as articulated in this quite vast and heterogeneous literature, illustrating the various strategies adopted to either rationalise, minimise or deny the existence of suffering in nature. In the second part, a number of "dissenting voices" will be recalled, whose protests against these apologetic attempts gained increasing impetus. Finally, I will briefly sketch the impact of Darwin's ideas in the context of these debates.[2]

2. A happy world after all

I will start with a text that Charles Darwin (1809-1882) had avidly read in his youth: William Paley's *Natural Theology*, first published in London in 1802. The book does not strike one for its originality, since Paley – an Anglican priest – heavily relied on his predecessors. However, Paley's clarity and especially his detailed and passionate descriptions of animals and plants made for a captivating read. In his exposition, Paley deploys a series of arguments and vivid images to demonstrate that a benevolent design pervades nature and its laws. It is no wonder that the book was a great success and was reprinted many times. In the tradition of Newtonianism, God is presented, in his relationship with the universe, as the divine analogue of a watchmaker. Beauty and order can be seen in the universe as a whole as well as in the variety, structure and appearance of living beings; they manifest themselves in the arrangement of planetary systems as much as in the mechanical wonders of the wings of a hummingbird. The appearance of beauty and order across nature is seen as indicative of a grand plan and as a spectacle devised by God specifically

[2] For reasons concerning space, footnotes and references have been reduced to a minimum. This essay makes no claim of originality. For more information on some of the topics addressed here, see Landucci (1986), Ehrard (1994), Fonnesu (2006) and, most of all, La Vergata (1990), which is still the best study on the problem of pain and evil in the context of the European discussions surrounding the "economy of nature" in the period 1650-1900. The complete neglect of this debate in Bourke (2014) represents a serious flaw.

for man to admire. This idea applies also to forms of beauty not subservient to a particular function, such as the coloured irises of certain animals, whose apparent gratuity is in fact "displayed" only to elicit our "sentiments" of admiration for the Creator of these wonderful works of art.

Particularly incisive is Paley's depiction of the happiness of all living beings. "It is a happy world after all", he writes. He continues: "The air, the earth, the water, teem with delighted existence. In a spring noon, or a summer evening, on whichever side I turn my eyes, myriads of happy beings crowd upon my view". In the "sportive motions" and "gratuitous activity" of new-born flies, as well as in the restless flight of bees among flowers, Paley detects only "joy", "exultation", "cheerfulness" and "enjoyment". The alacrity of the motions of myriads of insects of different species "carries with it every mark of pleasure". The same goes for the playful excitement of schools of fish jumping out of the water. Like children, the young of all animals appear to derive pleasure from the simple and often purposeless exercise of their limbs and bodily skills. Old age, too, has its "dozing" joys (Paley 1802, 490-493).

To the objection that his account might be partial and selective, Paley typically recurs to statistical arguments: every case described so far "is the case of millions", and *at this very moment*, he assures, countless animals are pursuing their pleasures and enjoying their pastimes. Besides, if we look at the "average of sensations" across the natural world, we must conclude that "happiness is the rule, misery the exception". The very excitement and curiosity with which we receive the news of some misfortune or calamity, he argues, demonstrates that these are far from ordinary events and that good predominates over evil (ibid., 496-497). In Paley's view, the very *ordinariness* of good make us oblivious to its existence. In line with a well-established tradition, nature offers to its contemplator a consoling, edifying and fundamentally innocent spectacle.

To get a taste of the impact of Darwinian ideas on such a reassuring picture of nature, it is sufficient to fast forward one century and listen to what Catholic writer Gilbert Keith Chesterton (1874-1936) had to say in his biography of the poet Alfred Tennyson (1809-1892):

> Man had been engaged, through innumerable ages, in a struggle with sin. [...] But in this struggle he had always had nature on his side. He might be polluted and agonised, but the flowers were innocent and the hills were strong. [...] Tennyson lived in the hour when, to all mortal appearance, the whole of the physical world deserted to the devil. The universe, governed by violence and death, left man to fight alone, with a handful of myths and memories. Men had now to wander in

> polluted fields and lift up their eyes to abominable hills. They had to arm themselves against the cruelty of flowers and the crimes of the grass.[3]

Chesterton was describing a reaction shared by many. A few years later, naturalist and "co-discoverer" of natural selection Alfred Russell Wallace (1823-1913) wrote:

> A very large number of persons of many shades of opinion and various degrees of knowledge are disturbed by the contemplation of the vast destruction of life ever going on in the world. This disturbance has become greater, has become a mystery, almost a nightmare of horror, since organic evolution through the survival of the fittest has been accepted as a law of nature.[4]

The cruelty of nature, however, was certainly not a novel theme. Tennyson himself had famously written about "nature, red in tooth and claw" *before* the publication of the first edition of the *Origin of Species* (1859).[5] So why did Darwin's ideas – assuming they can be reduced to such desperate pessimism – cause so much shock? Why had it become impossible for many to ignore what Darwin himself had called "the immense amount of suffering" in the world?[6] How was this issue dealt with before Darwin, when it was addressed?

3. Inconveniences

Let us begin with William Paley's views about pain and suffering.[7] No doubt pain exists, he admits, but, again, we must always look at the

---

[3] Chesterton (1903, 6-7). Quoted in Lovejoy (1909, 93).

[4] Wallace (1910, 369). Cf. also what the dramatist George Bernard Shaw (1856-1950) wrote in 1921 about Darwinism: "It seems simple, because you do not at first realize all that it involves. But when its whole significance dawns upon you, your heart sinks into a heap of sand within you. There is a hideous fatalism about it, a ghastly and damnable reduction of beauty and intelligence, of strength and purpose, of honor and aspiration" (Shaw 1961, 33-34). Partially quoted in Richards (2002, 515-516).

[5] *In memoriam A.H.H*. (1849), in Tennyson (2014, 399).

[6] Darwin (1877, 307).

[7] Traditionally, bodily pain and psychological suffering fell under the label of "physical evil" as distinguished by "moral evil" (deliberate sinful acts) and what was called "natural" or "metaphysical" evil or "evil of imperfection" (the original

general picture, not the particular cases. The structure of the world, the mutual adaptations of the animal forms and functions, together with the astonishing perfection and coordination of their parts and organs – the examination of the eye is a cure for atheism, he writes (Paley 1802, 35) – are evidence of a plan devised by a benevolent God. Evil "no doubt" exists, but it is never the "object of contrivance", as this would turn God into a torturer. For instance, teeth are designed to eat, not to ache; "no anatomist ever discovered a system of organisation, calculated to produce pain and disease" (ibid., 502).[8] Rather, pain and evil are the unintended side effects of the fact that particular purposes – such as seeing – are achieved by adapting the materials of construction, so to speak, to the general, fixed and ultimately beneficial laws of nature established by God. Contrivance, Paley writes, "is the refuge of imperfection". But if this picture is true, then why did an omnipotent God resort to "convoluted" and potentially flawed "mechanisms" instead of achieving the same ends with simpler means? Paley's answer is that God decided to "limit" his power so that he could exhibit his wisdom through such mechanisms:

> It is only by the display of contrivance, that the existence, the agency, the wisdom of the Deity, *could* be testified to his rational creatures. This is the scale by which we ascend to all the knowledge of our Creator which we possess, so far as it depends upon the phenomena, or the works of nature. [...] Whatever is done, God could have done, without the intervention of instruments or means: but it is in the construction of instruments, in the choice and adaptation of

---

imperfection of all finite creatures). Pain was commonly conceived as connected to both moral evil (as punishment for sin) and metaphysical evil (because suffering is inseparable from limitation and imperfection); alternatively, it was seen as one of the necessary side effects of the *general laws* established by God. Moral evil, in turn, was normally explained through metaphysical evil, since a distorted use of free will was implied by mankind's creatural imperfection. See, for example, King (1731, 73, 116-117, 296), Clarke (1705, 218-221) and Leibniz (1710, 131-133). Cf. Paley (1802, 529-530). For the philosophical and theological debates on these issues between the 17th and 18th centuries (from Descartes to Kant), see Paganini (1980, 135-174), Landucci (1986), La Vergata (1990), Ehrard (1994), Nadler (1994), Brogi (2006, 58-79) and Fonnesu (2006).

[8] When discussing the action of natural selection, Darwin refers to this passage approvingly in the *Origin* (1859, 201), only to then insist on the disturbing presence in nature of "less perfect" contrivances produced by the same natural selection.

> means, that a creative intelligence is seen. It is this which constitutes the order and beauty of the universe.[9]

Contrivance is here assigned several functions: to explain away evil, to attenuate God's responsibility and to exhibit his wisdom – and it is perhaps significant that Paley omits goodness from the list of divine attributes testified by such displays.

However, this is not the only argument to which Paley resorts in order to rationalise the presence of pain and suffering in the world. In fact, he draws from the whole repertory of traditional justifications put forward by his predecessors, often combining different perspectives and strategies. Faced with the spectacle of death and particularly of animals "devouring" each other, readers are invited to consider that without death there would be no life, that violent death is the quickest, the most merciful and the least painful, that chasing a prey and escaping capture are pleasurable activities and that animals do not live in fear of death since they are not reflective enough to anticipate it. Destruction and fecundity, for Paley, are two sides of the same "compensatory scheme": they keep the world always "full" and maintain the correct "proportion" between different species of animals. In other words, they play a *conservative* role. Very importantly, such a scheme always operates for the advantage of the species (or the "whole"), not for the individual. In fact, any species, if left undisturbed, would multiply indefinitely and fill the earth or the ocean – with catastrophic consequences. Therefore, "all superabundance supposes destruction, or must destroy itself" (ibid., 507-516). In other words, death and destruction play an indispensable and *positive* role in the economy of nature.

Paley also provides other classic justifications for the existence of "bodily pain" and its providential connection with the "means of destruction" that we see in nature: pain "teaches vigilance and caution" and "excites" actions required for self-preservation. Besides, suffering, sickness and all kinds of misfortunes can positively affect the moral development of the sufferers, serving to the formation of character (ibid., 531, 564).[10] He also relies on a number of metaphysical assumptions that are typical of the doctrine of the "chain" or "scale" of being (Lovejoy 1957), which he combines with the image of the universe as a great and wonderful machine (an image whose historical roots are different from

[9] Paley (1802, 41-43).

[10] To these benefits Paley adds also the pleasure that comes from the "alleviation" of a strong pain (1802, 532), an experience which he faced directly, according to his biographer, since he is said to have completed his work in between attacks of pain caused by a disease that eventually proved fatal (in Paley 1837, xxxi-xxxii).

those of the idea of the chain of being). It is worth listing some of these assumptions: *existence*, in this view, is always better than non-existence; *variety* of life forms is always better than uniformity; and different degrees of *perfection* are always preferable to equal degrees of perfection. As a consequence of these assumptions, some beings are seen as less perfect than others, but each has its proper place in the scale of being and cannot complain since this hierarchical structure of reality reflects the wisdom and goodness of the Creator (Paley 1802, 529). In this view, imperfections are either apparent or justifiable on the basis of the perfection and the beauty of the whole.

In this extremely popular way of looking at nature and the universe, beauty was constantly associated with terms like order, variety, abundance, fitness, usefulness, contrivance, adaptation, symmetry, harmony and synonyms. In 1705, the theologian Samuel Clarke (1675-1729), for example, wrote in his Boyle Lectures that the "*variety*, *order*, and beauty, and *wonderful contrivance* and *fitness* of all things in the world, to their proper and *respective* ends" were all evidence of the existence of an intelligent original cause.[11] The infinite power and goodness of God manifested themselves – as was commonly argued in accordance with what Arthur Lovejoy has called the "principle of plenitude" – in the actualisation of all possible and conceivable kinds of beings, that is, in the overabundance of inanimate and animate things and in their immense variety.[12] In fact, for some, the vertiginous depths disclosed by telescopes and microscopes had contributed to reinforce the belief in this principle. Who knows, reverend John Ray (1627-1705) had asked in 1691 in his extremely popular *Wisdom of God manifested in the works of Creation*, how many tiny life forms and how many planets and stars are out there waiting to be discovered?[13]

For variety and multiplicity not to degenerate into chaos, however, order and balance were required. In this case, to be stressed was mostly the *compensatory* role of "contrivance". The issue became particularly sensitive after the publication of Thomas Malthus' *Essay on the Principle of Population* (1798), whose argument about the *disproportion* between population growth and the availability of resources posed a grave threat to the idea of a stable, benevolent and providential order of nature (La Vergata 1990a). For those who believed in such order, the laws and wisdom of God regulated all things in extremely complicated but always purposeful and harmonious ways. Balance was achieved through a system

[11] Clarke (1705, 118). Cf. Ray (1735, 20).
[12] Lovejoy (1957). Cf. Yeo (1986); Barsanti (2005, 24-32).
[13] Ray (1735, 19-25). Cf. Shaftesbury (2000, 307-309).

of compensation based on what was often called the "war of nature". In other words, the equilibrium of nature was *preserved* through death and mutual destruction. These apparently negative aspects were often the object of extensive – and sometimes quite tragic – scrutiny, whose final outcome, however, was always a reassuring picture of a universe ruled by a benevolent God. A typical, and surely effective, rhetorical strategy was first to stress the tragedy in order to then minimise or relativize it and conclude on a positive, consoling note.

Just two years before the publication of Paley's work, the physician and naturalist Erasmus Darwin (1731-1802, grandfather of Charles), faced with the depressing spectacle of vegetable life constantly "plundered by locomotive animals" and of stronger animals devouring weaker ones, had exclaimed in his *Phytologia* (1800):

> Such is the condition of organic nature, whose first law might be expressed in the words, "Eat or be eaten!" and which would seem to be one great slaughterhouse, one universal scene of rapacity and injustice! Where shall we find a benevolent idea to console us amid so much apparent misery?

The usual arguments were promptly advanced: plant seeds and animal eggs cannot feel pain, plundering is pleasurable to the plunderer, a sudden death always interrupts violent pains, and the death of the slaughtered is less a "positive evil" than the "termination of good", since victims are mostly the weakest and the oldest, who are also the least sensitive to pain. As in other authors, these principles are extended to human violence and moral evil in general. The "organised matter" of thousands of dead bodies left to decompose on a battlefield will revive in "millions of microscopic animals, vegetables, and insects, and afterwards of quadrupeds and men", whose cumulative happiness is *perhaps* much greater than the misery of the soldiers. But Erasmus' vision gets even grander. All the geological strata and "calcareous mountains", formed by the gradual decomposition and solidification of the remnants of vegetable and animal life, are "monuments of the past felicity of organised nature" and therefore – it goes without saying – of the "benevolence" of God. Could we expect a different conclusion from a paragraph entitled "The happiness of organic life"?[14]

Between the 18th and the 19th century, across Europe, the idea that the equilibrium, harmony, order and beauty of nature were maintained

[14] Darwin (1800, 556-560). Cf. Darwin (1803, 129-171). See La Vergata (1990, 83-87).

through war and destruction circulated among naturalists more or less famous (and more or less devout) without undergoing particular changes, despite the often diverging views of those who adopted it. Even when it became impossible to ignore the evidence of the extinction of entire species from the face of the earth – a fact that threatened to destroy the belief in a stable and providential order of nature established for the good of the species – the idea of equilibrium through destruction proved sufficiently flexible to adapt to the new situation. A static order was simply replaced with a dynamic one.[15] As for natural theology, from John Ray to William King (1650-1729) to Paley to the so-called *Bridgewater Treatises* (published in the 1830s), there is hardly a work in which this idea is not propounded.

The general tone of these works could be serene or tragic, but the final conclusions were very similar. Even naturalist Carl Linnaeus (1707-1778), who had a strong sense of the cruelty and mercilessness of nature and of the severe inflexibility of its laws, believed that each thing was created in function of the other, and all for the benefit, pleasure and edification of man. The contemplation of nature, he wrote in 1748, is an "anticipation of future blessedness, a constant joy for the soul, and the beginning of that perfect consolation".[16] In other authors, such as the French naturalist Julien-Joseph Virey (1775-1847), the horror and cruelty of nature was celebrated as the means by which predators and parasites eliminate the weak, sick or superfluous individuals among other species. The laws of nature acted like the laws of Sparta, which mandated the suppression of the weak and malformed and the preservation of the strong and robust (Virey 1801, 38-82). This projection of military ideals onto the natural laws of compensation and balance was part of a larger and increasingly popular trend to interpret those laws in light of the old idea of the generative force of conflict, of the harmony resulting from contrast, and of the ennobling power of battle and the stimulating effect of deprivation and danger.[17] "Man," wrote naturalist William Smellie (1740-1795) in 1790, "if his attention and talents were not excited by the animosities of his own species, by the attacks of ferocious animals, and even by those of the insect tribes, would be an indolent, an incurious, a dirty, and an ignorant animal".[18]

---

[15] In fact, we find such a belief in authors as different as Buffon, Linnaeus, Lamarck and Cuvier; cf. La Vergata (1990, 209-278). See also Lovejoy (1957, 242-287).
[16] Linnaeus (1749, 453). Cf. La Vergata (1990, 57).
[17] Cf. La Vergata (1990, 64-68).
[18] Smellie (1790, 392). Cf. La Vergata (1990, 162-170).

Other authors, recalling the old Augustinian simile (which was in fact Neoplatonic), insisted that ugliness and irregularity served to emphasise, by contrast, the presence of beauty or contributed to the beauty of the whole, as when a painter enhances the beauty of the work by balancing shadows with bright colours or a composer introduces dissonances in his music in order to produce a higher harmony. From here, it was not a big step for the religious gaze to transfigure natural dissonances into "marvellous" examples of God's wisdom. Historian of science Jacques Roger has recalled the unsettling – but by no means isolated – reactions of two famous French figures before a horribly deformed child born in 1706 in Vitry. The poor child only survived two days, but his dissection revealed to the anatomist Joseph-Guichard Duverney (1648-1730) the unmistakable mark of the "design" of a wise and all-powerful intelligence. The Abbé Jean-Paul Bignon (1662-1743) criticised the naiveté of those who interpret "monsters" as evidence for the absence of providence rather than as "admirable proof" of it: their bodily structures, he wrote, are "so wonderful and regular in their apparent irregularity" that they should inspire admiration for "the wisdom and the omnipotence of the Creator of nature" as much as the "most regular" objects (Roger 1963, 405-407). The intellectual and emotional grip of their religious convictions had informed their way of looking at the world to the point of rendering them blind toward the deformity and suffering of creatures. Does not the same apply to countless other authors? Ultimately, death, pain, sickness, destruction and predation were literally *seen* by them as the signature of a benevolent and wise providence.

4. Dissenting voices

At least since the time of Epicurus (ca. 341-270 BCE) and Lucretius (ca. 99-55 BCE), some had raised their protests against this reassuring image of the universe. Before Immanuel Kant (1724-1804), Pierre Bayle (1647-1706) had delivered a massive blow to the argument of intelligent design and especially to all philosophical and theological attempts to reconcile the goodness of God with the existence of evil and pain in the world (Landucci 1986; Fonnesu 2006). After the Lisbon earthquake in 1755, Voltaire (1694-1778) had denounced, in a famous poem, the senseless misery of all living creatures (Voltaire 1877). Not surprisingly, this chorus of indignation was less populated and definitely less successful than the one intoned by the religious apologists (especially in Britain), as evidenced by the fact that Paley published his popular apologetic work after many such criticisms had been advanced. However, it became

increasingly difficult to silence the lucid and desperate cries of those dissenting voices. I will recall only a few examples:

> Look round this universe. What an immense profusion of beings, animated and organised, sensible and active! You admire this prodigious variety and fecundity. But inspect a little more narrowly these living existences, the only beings worth regarding. How hostile and destructive to each other! How insufficient all of them for their own happiness! How contemptible or odious to the spectator! The whole presents nothing but the idea of a blind Nature, impregnated by a great vivifying principle, and pouring forth from her lap, without discernment or parental care, her maimed and abortive children.[19]

In his *Dialogues Concerning Natural Religion*, published in 1779 (three years after his death), David Hume (1711-1776) unpacked and demolished one by one all the traditional justifications of evil put forward by natural theologians. No matter how purposefully interconnected the parts of the "great machine of nature" may appear to us, the universe is still full of contradictions, imperfections and misery: "one would imagine," he wrote, "that this grand production had not received the last hand of the maker" (Hume 1779, 216). Note, in the passage quoted above, the inversion of the perspective typical of the natural theologians' rhetorical strategy: instead of zooming out, so to speak, from the particular to the general, we are invited to zoom in from the apparent joyfulness of *universal* life to the diversified miseries of *particular* living beings – only to be returned with a disorienting picture of a mother cruel toward her offspring.

Fourteen years later, the political philosopher William Godwin (1756-1836, husband of Mary Wollstonecraft and father of Mary Shelley) followed a similar line of argument:

> Let us not amuse ourselves with a pompous and delusive survey of the whole, but let us examine parts severally and individually. All nature swarms with life. This may, in one view, afford an idea of an extensive theatre of pleasure. But unfortunately every animal preys upon his fellow. Every animal, however minute, has a curious and subtle structure, rendering him susceptible, as it would seem, of piercing anguish. We cannot move our foot, without becoming the

[19] Hume (1779, 219-220).

> means of destruction. [...] It may be said, with little licence of phraseology, that all nature suffers.[20]

Like Bayle, Godwin sees pain as an absolute, not relative evil. Who can say that "all is well" and "there is no evil in the world" in front of a man squirming "under the pangs of disease"? In opposition to the rashness of the optimists, we are invited to contemplate, case by case, all the evils of nature and of society. Those who dismiss the former are likely to do nothing when faced with the latter, for Godwin, because the doctrine of optimism blurs the differences between good and evil, virtue and vice, and makes one acquiescent to the status quo, unsympathetic toward the suffering of others and insensitive to injustice. If "pain, horrors and devastation" are seen as vehicles of kindness in the economy of the universe, there is no reason to think that they should be considered differently when administered by the hands of human beings (Godwin 1798, 455-460).

In Paul-Henri Thiry, Baron d'Holbach's *Good sense* (1772), the tone of the protest borders on outrage. I quote from an 1826 English translation:

> Do we see, then, that Providence so very sensibly manifests herself in the preservation of those admirable works, which we attribute to her? If it is she, who governs the world, we find her as active in destroying, as in forming; in exterminating, as in producing. [...] We are told of a pretended *scale of beings*. It is supposed, that God has divided his creatures into different classes, in which each enjoys the degree of happiness, of which it is susceptible. According to this romantic arrangement, from the oyster to the celestial angels, all beings enjoy a happiness, which is suitable to their nature. Experience explicitly contradicts this sublime reverie. In this world, all sensible beings suffer and live in the midst of dangers. Man cannot walk without hurting, tormenting, or killing a multitude of sensible beings, who are in his way; while he himself is exposed, at every step, to a multitude of evils, foreseen or unforeseen, which may lead him to his destruction. [...] During the whole course of his life, he is exposed to pains; he is not sure, a moment, of his existence, to which he is so strongly attached, and which he regards as the greatest present of the Divinity. [...] An infinite goodness can be neither limited, partial, nor exclusive. If God be infinitely good, he owes happiness to all his creatures. The unhappiness of a single

[20] Godwin (1798, 455-456). Cf. La Vergata (1990, 140-141).

> being would suffice to annihilate unbounded goodness. Under an infinitely good and powerful God, is it possible to conceive that a single man should suffer? One animal, or mite, that suffers, furnishes invincible arguments against divine providence and its infinite goodness.[21]

Another eloquent text, written in 1826 by Italian poet and philosopher Giacomo Leopardi (1798-1837):

> Go into a garden of plants, grass, flowers. No matter how lovely it seems. Even in the mildest season of the year. You will not be able to look anywhere and not find suffering. That whole family of vegetation is in a state of *souffrance*, each in its own way to some degree. Here a rose is attacked by the sun, which has given it life; it withers, languishes, wilts. There a lily is sucked cruelly by a bee, in its most sensitive, most life-giving parts. [...] That tree is infested by an ant colony, that other one by caterpillars, flies, snails, mosquitoes; this one is injured in its bark and afflicted by the air or by the sun penetrating the wound. [...] The spectacle of such abundance of life when you first go into this garden lifts your spirits, and that is why you think it is a joyful place. But in truth this life is wretched and unhappy, every garden is like a vast hospital (a place much more deplorable than a cemetery), and if these beings feel, or rather, were to feel, surely not being would be better for them than being.[22]

Rather than being an isolated phenomenon or an improbable "anticipation" of postmodern nihilism,[23] Leopardi's thoughts on nature and evil, as Antonello La Vergata has shown, belong to the context of the European discussions surrounding natural theology. Gradually, Leopardi became one of the fiercest enemies of the image of nature propounded by natural theologians. The idea that life is a good in itself was for him an illusion, and so was the impression of an idyllic, harmonious and peaceful nature. What each sentient being instinctively desires is not simply to be, but to be happy. However, such desire is destined to remain unfulfilled and therefore to generate unhappiness, since the order of things is not only indifferent, but also hostile to the desires of living beings. Being alive and suffering are, for Leopardi, *almost* synonyms. Human beings, as all other

[21] Holbach (1826, 25, 30, 32; as in many other editions, the work was wrongly attributed to the "atheist" cleric Jean Méslier, 1664-1729).
[22] Leopardi (2013, 4175-4177).
[23] Against these interpretations, see Paolo Casini's lucid remarks (2018).

creatures, do not come to this world to enjoy life, but only to perpetuate it. The true and only purpose of nature is the conservation of the species, not of the individual. Happiness is simply out of the question for both the species and the individual; it can only be hoped for, desperately. Evil, therefore, is not an *accidental* side effect of the order of things, but its *foundation*, its *essence*. There is no wise and benevolent design to celebrate, because nature is the enemy of its children, as evidenced, among other things, by the enormous and continuous waste of seeds and lives. Against the illusory belief in an astonishing mutual adaptation and harmony between the organisms and the environment, Leopardi stresses that "millions of plants or animals" are born in places where there is no food for them. Their death simply goes unnoticed. The only plants and animals that we encounter are those lucky enough to be born in favourable conditions. Leopardi's response to the optimists' chorus was a materialist ethics oriented toward compassion for the suffering of all living beings and a mutual solidarity against the blind forces of nature.[24]

But how optimistic was this chorus, really? At the time of Hume, as he himself observes, many theologians had started to "retract" their usual gloomy views about the misery and vanity of life on this earth, and to insist, "though still with some hesitation, that there are more goods than evils, more pleasures than pain, even in this life". For him, this change of strategy was motivated by a decline in the clerical grip on education and an increase in the human capacity to "form principles" and "draw consequences" from those principles (Hume 1779, 225). However, as we have seen, not all so-called "optimists" were as cheerful as Paley. In fact, as it has been argued, many of them, rather than insisting on the *unreality* of evils, were committed to demonstrating their *necessity*. Moreover, their arguments were often uncannily similar to those of the pessimists, so much so that Voltaire could write that their consoling message – "all is well" – was cried "in a lamenting voice" (Voltaire 1877, 474). In fact, as Arthur Lovejoy has written, "the more numerous and monstrous the evils to be explained, the greater was the triumph when the author of a theodicy explained them". It was in the abundance of evils, rather than in their scarcity, that many optimists found evidence of the goodness of the whole (Lovejoy 1957, 210-211). It remains true, however, that the emphasis on those evils served not so much to contrast the vanity of the present life to the bliss (or torment) of the afterlife – as typical of traditional Christian

[24] Cf. La Vergata (1990, 142-160); Girolami (1995); Brogi (2006, 169-176).

"pessimism"[25] – but, rather, to illustrate the order, beauty and happiness of this world and its laws.

To be sure, some of the arguments put forward by the "dissenters" simply overturned those of their adversaries – there is more misery than happiness, more disorder than order, pain is not relative, but absolute, and so on. The harshness of their tone was certainly a reaction to the pervasiveness of the theologians' consoling rhetoric. However, other arguments rested on the same premises established by natural theologians – the imperfection of all finite creatures, the war of nature, the pre-eminence of the species (or "the whole") over the individual and so on – but drew opposite conclusions from them, namely the absence of a providential plan and the tragedy of life. Why? How did these dissenters come to look at the same things with different eyes? Apart from personal idiosyncrasies, were their attitudes connected to the growing aversion toward pain and cruelty typical of what has been called the "age of sympathy" (Thomas 2018, 110-121; cf. Hanley 2015; Bourke 2014, 231-269)? These questions are easier to formulate than to answer. Atheism and scepticism toward religion certainly played a part. However, the theologians and naturalists' focus on the *present* state of things and their need to enumerate all sorts of evils – if only to exorcise them – might also be evidence of a changing sensibility.[26] Besides, religious devotion did not prove to be a necessary requirement for the intellectual neutralisation of the world's evils. Perhaps the real question is a more general one: what kind of ideological and emotional factors make it possible for human beings to transfigure, minimise or blot out the suffering of others?

5. A tremendous ambiguity

The complexity of the position gradually adopted by Charles Darwin regarding these problems, together with the numerous discussions that his ideas originated and continue to spark, are too large a subject to be addressed here. I will limit myself to a few remarks. Let us begin with a quote from the first edition of the *Origin of Species* (1859):

> We behold the face of nature bright with gladness, we often see superabundance of food; we do not see, or we forget, that the birds which are idly singing round us mostly live on insects

[25] Cf. Delumeau 1983; Brogi (2012, 13-27, 85).

[26] Another piece of evidence of this change could be seen in the growing uneasiness, in some theological circles, toward the doctrine of eternal torment in Hell (cf. Walker 1964, 29-32; Rowell 1974; Almond 1994, 97-100).

> or seeds, and are thus constantly destroying life; or we forget how largely these songsters, or their eggs, or their nestlings, are destroyed by birds and beasts of prey; we do not always bear in mind, that though food may be now superabundant, it is not so at all seasons of each recurring year.[27]

Again, as in the previous quotes, we are invited to go from the general to the particular, from the reassuring serenity of the bigger picture to the tragedy of individual lives. Already in March 1839, Darwin had written in a private note: "it is difficult to believe in the dreadful but quiet war of organic beings going on the peaceful woods and smiling fields".[28] Darwin had read Paley, but also Hume.[29]

The notion that the economy and harmony of nature were based on death and mutual destruction was of course familiar to the readers of the *Origin of Species*, and so were some of Darwin's reassuring arguments that he put forth to attenuate the horror and cruelty of natural life. In fact, the *Origin* ends with the grandiose image of a plurality of the "most beautiful and most wonderful" life forms evolved "from so simple a beginning". The production of "higher animals", Darwin writes, follows "directly" from "the war of nature, from famine and death".[30] However – and here the contrast with the views of the optimists was absolute – the equilibrium, stability and conservation of nature were nothing but the *temporary* effects of the *same* causes that generated precariousness, transformation and extinction. Darwin's nature was simultaneously cruel and benevolent, generous and stingy, beautiful and tragic. There was no such thing as a stable, preordained equilibrium in the economy of nature, and species were no more safeguarded than individuals. Extinction was rapid and irreparable; variations and speciation were slow, full of dead ends and devoid of purpose. Organisms were not the perfect and stable manifestation of a benevolent design, but the incomplete, imperfect and always revisable results of a process that left behind a hecatomb of individuals or species who "did not make it". In other words, *Darwin had disconnected suffering and the war of nature from the idea of intelligent design* (La Vergata 1990, 518-520). What some had called the "great slaughterhouse" of nature was no longer a side effect or a necessary counterpart of a benevolent plan, but the *engine* of the evolutionary

---

[27] Darwin (1859, 62).
[28] Darwin (1987, 429 = *Notebook* E, 114).
[29] Darwin read Hume's *Dialogues Concerning Natural Religion* in September 1839 (Darwin 1985, 458). Cf. Alter (2008).
[30] Darwin (1859, 489-490).

process. This conclusion certainly contributed to the horror and shock epitomised in the words of Chesterton quoted earlier. What Donald Fleming has called the "tremendous ambiguity" at the heart of Darwin's position could not be escaped; since natural selection proceeds by pain, suffering, frustration and unfulfillment, then "any good that comes *of* it, comes *by* evil" (Fleming 1961, 229).

The consequence of this fundamental ambiguity was that, for Darwin, nature and its laws could no longer be interpreted as sources of edification and moral teachings, nor could they be seen as the product of a benevolent design. Aesthetic attitudes were also affected; the "beauty" of nature could no longer be contemplated with a light heart. Pain and suffering might well have an evolutionary *explanation*, but that does not mean they can or should be *justified* (let alone minimised or denied). Darwin's growing "confusion" and oscillations in this matter are revealing. In his *Autobiography* (written in 1876), just a few lines after cautiously expressing his confidence in the prevalence of happiness over misery across the living world, and having emphasised the advantages of pain and pleasure for survival, Darwin proceeds to attack the popular idea that suffering serves for the moral improvement of mankind. In fact, he writes:

> the number of men in the world is as nothing compared with that of all other sentient beings, and these often suffer greatly without any moral improvement. A being so powerful and so full of knowledge as a God who could create the universe, is to our finite minds omnipotent and omniscient, and it revolts our understanding to suppose that his benevolence is not unbounded, for what advantage can there be in the sufferings of millions of the lower animals throughout almost endless time? This very old argument from the existence of suffering against the existence of an intelligent first cause seems to me a strong one; whereas [...] the presence of much suffering agrees well with the view that all organic beings have been developed through variation and natural selection.[31]

Perhaps we should not be surprised that a few pages later, recalling the theistic beliefs he entertained at the time of writing the *Origin of Species*, Darwin declares himself "content" to remain – as regards the "insoluble"

[31] Darwin (1958, 90). In Richards' (2002, 514-554) oversimplified account of Darwin's conception of nature, passages such as this one are completely ignored.

mystery of the beginning of all things – an *agnostic*.[32] Parallel to this disenchantment with theism was the gradual drying up of his aesthetic sense for the beauty of majestic natural sceneries (as opposed to his enduring enthusiasm for the particulars of nature[33]). It had probably become impossible for him to reconcile the religiously informed sentiment of the sublime with the awareness of the universal suffering of nature:

> In my *Journal* I wrote that whilst standing in the midst of the grandeur of a Brazilian forest, "it is not possible to give an adequate idea of the higher feelings of wonder, admiration, and devotion which fill and elevate the mind". I well remember my conviction that there is more in man than the mere breath of his body. But now the grandest scenes would not cause any such convictions and feelings to rise in my mind. [...] The state of mind which grand scenes formerly excited in me, and which was intimately connected with a belief in God, did not essentially differ from that which is often called the sense of sublimity; and however difficult it may be to explain the genesis of this sense, it can hardly be advanced as an argument for the existence of God, any more than the powerful though vague and similar feelings excited by music.[34]

Though often excluded from histories of "the sublime", Darwin's intellectual itinerary would have deserved some attention,[35] not least because he identified and eventually came to renounce the temptation that lies at the core of many theories of the sublime (and beauty): the temptation to base metaphysical convictions on the power of one's feelings. Darwin's enthusiasm for the "endless beautiful adaptations" of life forms,[36] however, survived, but had to coexist with the awareness of their non-providential and tragic background. As for his insights into the function and origin of beauty in the natural world and the "sense of beauty" in man and other animals – issues currently at the centre of a growing number of studies – these are too numerous and complex to explore here. I can only say that those insights seem to me to be governed

---

[32] Ibid., 94. Cf. Ospovat (1980); Kohn (1989); La Vergata (1990, 520-524); Casini (2009).
[33] Cf. Campbell (1976).
[34] Darwin (1958, 91-92). Cf. Fleming (1961).
[35] Darwin's name is absent, for example, in Nicolson (1959), Giordanetti and Mazzocut-Mis (2005), Kirwan (2005), Shaw (2006) and Brady (2013). On Darwin's conception of the sublime see Kohn (1996), Sloan (2001), Bradley (2011) and Larson (2013).
[36] Darwin (1958, 88).

by his rather unpopular belief in the humble origins of that which appears to us as great and noble, and to suggest that our sense of beauty may *also* bear "the indelible stamp" of our "lowly origin".[37]

The ambiguous and fundamentally uncertain message conveyed by Darwin's image of nature proved too unsettling to embrace for many of his contemporaries and successors. Apart from those who were simply horrified by Darwin's theory, a widespread tendency was to domesticate it into a familiar and reassuring worldview by updating the same arguments and rhetorical strategies deployed for centuries by natural theologians.[38] All was needed was to replace a *static* image of nature with a *dynamic* one: "evolution" was conceived as a triumphal march progressing through a heroic struggle. From necessary conditions for a present good, therefore, death, pain and destruction became necessary conditions for a future one. Not surprisingly, Darwin's disturbing insistence on the purposelessness and potential uselessness of individual variations[39] was conveniently neglected, and a great stress was put on an extremely simplified (and mostly pre-Darwinian) version of the concept of struggle for life. From this latter perspective, the cosmic evolutionary process had allowed the production of increasingly superior and higher beings, proceeding from the level of nature to that of society, until it had reached its final goal: civilised Western man. The religiously minded, of course, argued that this progression was all part of a divine plan devised from the very beginning. Alfred Russell Wallace, for example, was convinced that "whatever pain there is only exists for the grand purpose of developing a race of spiritual beings, who may thereafter live without physical pain, [...] for all eternity!" He could not believe that there were scientists who, like Ernst Haeckel (1834-1919) or Thomas Henry Huxley (1825-1895), preferred a godless universe in which pain existed perpetually and uselessly to one in which it was "strictly limited", while its benefits were eternal (Wallace 1910, 371-372).

The enduring neglect of the most unsettling aspects of Darwin's theory seems to point to a tendency ingrained in all of us. "We have no reason to fear," William Paley had written, "our being forgotten, or overlooked, or neglected" (Paley 1802, 579). The idea that the origin of everything might be purely accidental terrifies us, because, in the words of

---

[37] Darwin (1871, vol. 2: 405).

[38] La Vergata (1990, 429-513; on Wallace: 536-555); Burrow (2000, 42-52); Casini (2009). Cf. Moore (1979).

[39] Cf. Darwin (1958, 87): "There seems to be no more design in the variability of organic beings and in the action of natural selection, than in the course which the wind blows".

biologist Jacques Monod (1971, 44), "we would like to think ourselves necessary, inevitable, ordained from all eternity". The refusal to surrender to chance, imperfection and uncertainty, however, is not confined to more or less pugnacious brigades of creationists, but survives or re-emerges in different forms and contexts: in some of the explanations provided by evolutionary psychologists, in the enthusiasm of certain neuroscientists for the supposedly infallible perfection of the brain, in the belief, typical of environmentalist movements, in a stable, wise and loving natural order, or in the conviction, recently refreshed by Thomas Nagel (2012, 123), that there must be some "cosmic predisposition" behind the formation of life, consciousness, and value. It is no wonder, therefore, that the uncomfortable presence of pain and suffering has been so often minimised, rationalised or domesticated into a religious or secularised scheme of salvation. In this scenario, natural beauty continues to appear to many as a safe haven or as the source of some ultimate meaning. May I dare to suggest that the need for reassurance and consolation can form a significant part of our supposedly disinterested contemplation of the beautiful?

Bibliography

Almond, P.C. 1994. *Heaven and Hell in Enlightenment England*. Cambridge: Cambridge University Press.

Alter, S.G. 2008. "Mandeville's Ship: Theistic Design and Philosophical History in Charles Darwin's Vision of Natural Selection." *Journal of the History of Ideas* 69, 3: 441-465.

Barsanti, G. 2005. *Una lunga pazienza cieca. Storia dell'evoluzionismo*. Torino: Einaudi.

Bourke, J. 2014. *The Story of Pain. From Prayer to Painkillers*. Oxford: Oxford University Press.

Bradley, B.S. 2011. "Darwin's Sublime. The Contest Between Reason and Imagination in 'On the Origin of Species.'" *Journal of the History of Biology* 44, 2: 205-232.

Brady, E. 2013. *The Sublime in Modern Philosophy. Aesthetics, Ethics, and Nature*. Cambridge: Cambridge University Press.

Brogi, S. 2006. *I filosofi e il male. Storia della teodicea da Platone ad Auschwitz*. Milano: Franco Angeli.

Brogi, S. 2012. *Nessuno vorrebbe rinascere. Da Leopardi alla storia di un'idea tra antichi e moderni*. Pisa: ETS.

Brooke, J.H. 2014. *Science and Religion. Some Historical Perspectives* (1991). Cambridge: Cambridge University Press.

Burrow, J.W. 2000. *The Crisis of Reason. European Thought, 1848-1914*. New Haven: Yale University Press.
Campbell, J.A. 1976. "Nature, Religion and Emotional Response. A Reconsideration of Darwin's Affective Decline." *Victorian Studies* 18, 2: 159-174.
Casini, P. 1962. *Diderot "philosophe"*. Bari: Laterza.
Casini, P. 1969. *L'universo-macchina. Origini della filosofia newtoniana*. Bari: Laterza.
Casini, P. 2009. *Darwin e la disputa sulla creazione*. Bologna: Il Mulino.
Casini, P. 2018. "Leopardi, Stratone e il nichilismo." *Rivista di filosofia* 3: 431-458.
Chesterton G.K. 1903. *Tennyson*. London: Hodder and Stoughton.
Clarke, S. 1705. *A Demonstration of the Being and Attributes of God*. London: W. Botham, for J. Knapton.
Darwin, C.R. 1859. *On the Origin of Species by Means of Natural Selection*. London: John Murray.
Darwin, C.R. 1871. *The Descent of Man, and Selection in Relation to Sex*. 2 vols. London: John Murray.
Darwin, C.R. 1887. *Life and Letters*. Vol. 1. Edited by F. Darwin. London: Murray.
Darwin, C.R. 1958. *The Autobiography of Charles Darwin 1809-1882*. Edited by N. Barlow. London: Collins.
Darwin, C.R. 1985. *The Correspondence of Charles Darwin*. Vol. 4. Edited by F. Burkhardt and S. Smith. Cambridge: Cambridge University Press.
Darwin, C.R. 1987. *Darwin's Notebooks, 1836-1844: Geology, Transmutation of Species, Metaphysical Enquiries*. Edited by P.H. Barrett et al. Cambridge: Cambridge University Press.
Darwin, E. 1800. *Phytologia or the Philosophy of Agriculture and Gardening*. Dublin: P. Byrne.
Darwin, E. 1803. *The Temple of Nature; or, the Origin of Society*. London: J. Johnson.
Delumeau, J. 1983. *Le péché et la peur. La culpabilisation en Occident. XIII^e^-XVIII^e^ siècles*. Paris: Fayard.
Ehrard, J. 1994. *L'Idée de nature en France dans la première moitié du XVIIIe siècle* (1963). Paris: Albin Michel.
Eiseley, L.C. 1958. *Darwin's Century. Evolution and the Men Who Discovered It*. Garden City: Doubleday.
Fleming, D. 1961. "Charles Darwin, the Anaesthetic Man." *Victorian Studies* 4, 3: 219-236.

Fonnesu, L. 2006. "The Problem of Theodicy." In *The Cambridge History of Eighteenth-Century Philosophy*. Edited by K. Haakonssen. Vol. 2: 749-778. Cambridge: Cambridge University Press.

Gaukroger, S. 2006. *The Emergence of a Scientific Culture. Science and the Shaping of Modernity, 1210-1685*. Oxford: Clarendon Press.

Giacomoni, P. 2019. *Il nuovo laboratorio della natura. La montagna e l'immagine del mondo dal Rinascimento al Romanticismo*. 2nd ed. Milano: Franco Angeli.

Gillespie, N.C. 1987. "Natural History, Natural Theology, and Social Order: John Ray and the 'Newtonian Ideology'." *Journal of the History of Biology* 20, 1-49.

Giordanetti, P. and Mazzocut-Mis, M. (eds.) 2005. *I luoghi del sublime moderno. Percorso antologico-critico*. Milano: LED.

Girolami, P. 1995. *L'antiteodicea. Dio, dèi, religione nello "Zibaldone" di Giacomo Leopardi*. Firenze: Olschki.

Godwin, W. 1798. *Enquiry Concerning Political Justice and its Influence on Morals and Happiness*. London: G.G. and J. Robinson.

Hanley, R.P. 2015. "The Eighteenth-Century Concept of Sympathy from Spinoza to Kant." In *Sympathy. A History*. Edited by E. Schliesser, 171-198. Oxford: Oxford University Press.

Harrison, P. 1998. *The Bible, Protestantism, and the Rise of Natural Science*. Cambridge: Cambridge University Press.

Holbach, P.H. Thiry 1826. *Good Sense: or Natural Ideas Opposed to Ideas That are Supernatural; Being a Translation from the "Bon Sens" of the Curé Meslier* [i.e. d'Holbach] (1772). London: Richard Carlile.

Hume D. 1779. *Dialogues Concerning Natural Religion*. 2nd ed. London.

King, W. 1731. *An Essay on the Origin of Evil* (1702). London: printed for W. Thurlbourn.

Kirwan, J. 2005. *Sublimity. The Non-Rational and the Irrational in the History of Aesthetics*. London: Routledge.

Kohn, D. 1989. "Darwin's Ambiguity: The Secularization of Biological Meaning." *The British Journal for the History of Science* 22, 2: 215-239.

Kohn, D. 1996. "The Aesthetic Construction of Darwin's Theory." In *The Elusive Synthesis. Aesthetics and Science*. Edited by A.I. Tauber, 13-48. Dordrecht: Kluwer.

Landucci, S. 1986. *La teodicea nell'età cartesiana*. Napoli: Bibliopolis.

Larson, B. 2013. "Darwin, Burke, and the Biological Sublime." In *Darwin and Theories of Aesthetics and Cultural History*. Edited by B. Larson and S. Flach, 17-36. Farnham: Ashgate.

La Vergata, A. 1990. *L'equilibrio e la guerra della natura*. Napoli: Morano.
La Vergata, A. 1990a. *Nonostante Malthus. Fecondità, popolazioni e armonia della natura, 1700-1900*. Torino: Bollati Boringhieri.
Leibniz, G.W. 1710. *Essais de theodicée sur la bonté de Dieu, la liberté de l'homme, et l'origine du mal*. Amsterdam: Isaac Troyel.
Leopardi, G. 2013. *Zibaldone*. Edited by M. Caesar and F. D'Intino. New York: Farrar, Straus and Giroux.
Linnaeus, C. 1749. *Specimen de curiositate naturali*. In *Amoenitates academicae*. Vol. 1: 429-453. Leiden: Cornelius Haak.
Lovejoy A.O. 1909. "Some Aspects of Darwin's Influence Upon Modern Thought." *Bulletin of Washington University*, April, 85-99.
Lovejoy, A.O. 1957. *The Great Chain of Being. A Study of the History of an Idea* (1936). Cambridge: Harvard University Press.
Monod, J. 1971. *Chance and Necessity. An Essay on the Natural Philosophy of Modern Biology* (1970). Translated by A. Wainhouse. New York: Knopf.
Moore, J.R. 1979. *The Post-Darwinian Controversies*. Cambridge: Cambridge University Press.
Nadler, S. 1994. "Choosing a Theodicy: The Leibniz-Malebranche-Arnauld Connection". *Journal of the History of Ideas* 55, 4: 573-589.
Nagel, T. 2012. *Mind and Cosmos. Why the Materialist Neo-Darwinian Conception of Nature Is Almost Certainly False*. Oxford: Oxford University Press.
Newton, I. 1999. *The Principia. Mathematical Principles of Natural Philosophy* (1687). Translated by I.B. Cohen et al. Berkeley: California University Press.
Nicolson, M.H. 1959. *Mountain Gloom and Mountain Glory. The Development of the Aesthetics of the Infinite*. New York: W.W. Norton.
Ospovat, D. 1980. "God and Natural Selection: The Darwinian Idea of Design." *Journal of the History of Biology* 13, 2: 169-194.
Paganini, G. 1980. *Analisi della fede e critica della ragione nella filosofia di Pierre Bayle*. Firenze: La Nuova Italia.
Paley, W. 1802. *Natural Theology*. London: Wilks and Taylor.
Paley, W. 1837. *Works*. Vol. 1. London: George Cowie and Co.
Ray, J. 1735. *The Wisdom of God Manifested in the Works of the Creation* (1691). London: William Innys and Richard Manby.
Richards, R.J. 2002. *The Romantic Conception of Life. Science and Philosophy in the Age of Goethe*. Chicago: The University of Chicago Press.

Roger, J. 1963. *Les sciences de la vie dans la pensée française du XVIIIe siècle. La génération des animaux de Descartes à l'Encyclopédie*. Paris. Armand Colin.

Rowell, G. 1974. *Hell and the Victorians*. Oxford: Oxford University Press.

Shaftesbury A.A. Cooper, third Earl of, 2000. *Characteristics of Men, Manners, Opinions, Times* (1711). Edited by L.E. Klein. Cambridge: Cambridge University Press.

Shaw, G.B. 1961. *Back to Methuselah* (1921). London: Penguin Books.

Shaw, P. 2006. *The Sublime*. London: Routledge.

Sloan, P.R. 2001. "'The Sense of Sublimity': Darwin on Nature and Divinity." *Osiris* 16: 251-269.

Smellie, W. 1790. *The Philosophy of Natural History*. Edinburgh: for the heirs of Charles Elliot.

Tennyson, A. 2014. *Tennyson. A Selected Edition* (1969). Edited by C. Ricks. London: Routledge.

Thomas, K. 2018. *In Pursuit of Civility. Manners and Civilization in Early Modern England*. Waltham: Brandeis University Press.

Virey, J.-J. 1801. *Histoire naturelle du genre humain*. Vol. 1. Paris: Dufart.

Voltaire 1877. "Poëme sur le désastre de Lisbonne ou Exame de cet axiome: 'Tout est bien.'" In *Oeuvres complètes de Voltaire*. Vol. 9: 465-480. Paris: Garnier Frères.

Walker, D.P. 1964. *The Decline of Hell. Seventeenth Century Discussions of Eternal Torment*. London: Routledge & Kegan Paul.

Wallace, A.R. 1910. *The World of Life. A Manifestation of Creative Power, Directive Mind, and Ultimate Purpose*. London: Chapman and Hall.