Chapter 1
From the Darwinian to the Ethological Revolutions: An Ongoing Process

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Abstract Like Darwin's works and theories, the studies and discoveries produced by ethology (a research area of which the great naturalist was the first promoter) inspired not one, but *two* scientific revolutions. The second is still in progress. As with the *first Darwinian revolution*, some of the theoretical, social and ethical implications of the *first ethological revolution* have long been distorted, partly even by its own promoters. It has been arbitrarily used to support forms of behavioural determinism according to which all aspects of animal and human minds and activities are substantially regulated by hereditary mechanisms that are scarcely modifiable through experience, education, culture and socio-environmental stimuli. One of the goals of this book is to demonstrate that this form of ethological mechanicism and social biologism can now be refuted with the theoretical and methodological, empirical and experimental tools of biology and ethology themselves. To this aim the present chapter contributes through a critical review of the two Darwinian revolutions, of the first ethological revolution, and of some of their interpretations that had a wide echo. It also introduces an analysis of some aspects of the second, ongoing ethological revolution, and of contemporary evolutionary studies, which are further examined in the following sections of the book, showing that developments in both these areas are converging towards a post-mechanistic model of animal behaviour and a post-genocentric explanation of evolutionary processes. In this chapter I try to show that, with respect to these developments, the *Darwinism of Darwin* is demonstrating a fruitfulness, a resilience, and an attitude to frame phenomena that at the time of its formulation were unknown, far superior to that of all the "*neo-Darwinian*" models which predominated in evolutionary biology after Darwin. That is to say that, at least since August Weismann's *Germinal Selection* (Weismann 1896), to Jacques Monod's *Le hasard et la nécessité* (Monod 1970), Darwin's Darwinism, although focused on the concept of natural selection, implied an explanatory pluralism and a series of (albeit critical and cautious) openings to the possibility of "Lamarckian" forms of inheritance rejected by subsequent neo-Darwinist models in defence of a supposed Darwinian "orthodoxy" only to be once again re-evaluated by contemporary epigenetics. In the following pages I attempt to summarize the outcomes both of the two Darwinian and the first ethological revolutions, highlighting their nature as flows of ensuing scientific-cultural events, the implications of which are in many respects still at stake, open-ended and ongoing. The scientific revolutions discussed

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in these pages are in fact only mere stages of a long, single, internally conflicting and composite revolutionary process that leads from Darwin's proto-ethology to contemporary ethology.

1.1 Introduction

Over the last sixty years many scholars and disseminators have referred to the concept of a "Darwinian revolution", but Patrick Tort, one of the most authoritative historians of Darwin and Darwinism has since the 1980s pointed out that it is more appropriate to talk about *not one, but two Darwinian revolutions.*[1]

In this essay I welcome Tort's suggestion and draw on his extensive reconstruction of Darwin's research path and the social processes that influenced his reception. Nevertheless, I will advance some criticisms of Tort's interpretation of the "second Darwinian revolution" and the risks of an *idealization* or a "monumental" reconstruction of the "*civilization*" process that in my opinion, it presents.

Like any other scientist and human being, Charles Darwin was of course not immune to the ideological conditioning and social prejudices of his time and social environment. Thus his theories are not lacking in limits, inadequacies, fluctuations or ambiguities.

However, among his contemporaries disseminating and renewing "transformism", he was at once the most sober, radical, coherent and far-sighted. A man inclined to subscribe to an optimistic faith in progress typical of his time, but also one of the most lucid scholars in glimpsing crucial issues arising from the social and theoretical implications of the genealogical perspective.

In a nutshell, as Karl Marx wrote to Ferdinand Lassalle in 1861, the first Darwinian revolution, consisting in the detailed exposition of the theory of natural selection contained in *The Origin of Species*, gave "a mortal blow to teleology" (Marx in Marx and Engels 1975–2004, 41: 246–247), making explainable the origin of all the living species without resorting to finalistic principles.

With his second revolution, of which the works *The Descent of Man* (1871) and *The Expression of Emotions in Man and Animals* (1872) were the heralds, Darwin obtained at least three important results:

[1] Curiously, the wide diffusion of the concept of a "Darwinian revolution", recorded in the last sixty years, took its cue in 1959 from the title of a biography of Darwin, written by the historian Gertrude Himmelfarb (1959), which radically opposed to the theory of natural selection and tried to refute it. Since then, the formula "Darwinian revolution" has been taken up by numerous scholars and advisers, appearing in the titles of many volumes and articles, predominantly but not exclusively aimed at emphasizing the scientific relevance and the still current aspects of Darwin's theories and studies. I will limit myself to recall: Michael Ruse (1979), Patrick Tort (1983, 1992); *Journal of the History of Biology*, 38 (1) 2005, entirely devoted to this theme with contributions pro and against Darwin written by many well-known scholars, and David Sloan Wilson (2019).

- the abolishment of the traditional metaphysical man-animal dichotomy, having shown that almost all mental capacities for millennia considered exclusive to man are also widespread in other animal species;
- the foundation of a new field of research: the comparative study of animal expression, behaviours and abilities, which also includes the human species, and their evolutionary history;
- a critique and an overcoming of the *ethological determinism*, improperly referred to as a "social Darwinism" (Tort 1999), which had become very widespread in the previous decade.[2] Darwin rejected the Spencerian belief that human moral and social traditions were the product of a natural selection that only preserves what is really "useful", proposing the alternative hypothesis that, in the history of human customs, *education and social control* have supplanted and replaced "natural selection", becoming largely autonomous from it (Darwin 1871: 404).

Of course, both Darwinian revolutionary turns left some problems open. Undoubtedly, however, as a whole, Darwin's work opened a new phase in Western thought, helping to demolish prejudices rooted for centuries and, in some cases, millennia.

In fact, the Darwinian revolutions produced the effect of reconnecting humans to other animals and to their natural history, introducing a change no less radical than that caused by the Galilean revolution, reconnecting Earth and sky.

Daughters of the Darwinian ones have been the two ethological revolutions that crossed the twentieth century:

- The first goes from the birth of classical ethology founded in the 1930s to human and cognitive ethology, which arose in the Sixties and Seventies.
- The second, still in progress, is the transition to a post-genocentric and post-anthropocentric turning point that in the last three decades has led to a new "philosophy of ethology", to important developments in cultural and cognitive ethology, and to the emergence of new areas of research such as behavioural and cultural epigenetics.

As is documented in the concluding essay of this volume, these changes, inherent to behavioural sciences, converge with the concurrent developments in evolutionary studies. Both indeed move towards a vision of evolution that is not only characterized by external selection and genetic mutations, but also by an organisms' active search for more suitable living conditions in driven by epigenetic, behavioural and cultural inheritance forces of evolutionary processes.

Both in evolutionary and ethological studies, evolution is today conceived as a selective process in which organisms are protagonists, and animals are considered,

[2]For a critical approach to "social Darwinism" and an analysis of its multifaceted character, see: La Vergata (1999, 2001, 2005). La Vergata shows how social Darwinism became a pseudo-scientific justification of different ideological positions. Among these, a prevalence was granted to those supporting the "elimination of the unfit", providing biologistic and pseudo-naturalistic justifications to political cynicism and to economic exploitation of men and nature, but other brands of social Darwinism existed, such as "a liberalist Social Darwinism, a statist-conservative one, a militaristic one, and then one pacifist, one socialist, one anarchist" (La Vergata 2005: 21).

not as Cartesian "machines" or Dawkinsian genetic "robots", but as sentient and intelligent beings who learn from experiences, transmit them, and actively transform their environments, orienting their ontogenetic and phylogenetic history.

The scientific revolutions discussed in these pages are actually stages of one, ongoing process: a single, long, revolution, internally conflicting and composite like any revolutionary process.

Developments are ongoing because of the immense scope of the yet to be studied phenomena concerned and the ethical and social implications they bring about, too. In fact, we now have a possibility that was previously not available: conducting an empirical, experimental, theoretical and historical *refutation of both anthropocentrism and gene-centrism*, using instruments offered by developments in the very same biological and behavioural sciences.

While we discover phenomena unsuspected until a few decades ago, such as the existence of millenary and/or secular cultural traditions in other species,[3] or the complexity that animal thought can reach, we also live in an age characterized by the daily devastation of ecosystems in which all wild animal species live perpetrated by an anthropic development guided by a single logic: that of immediate profit. Enormous industrial apparatuses linked to intensive breeding of animals for meat production significantly contribute to pollution, foolish consumption and environmental catastrophes. These phenomena thus pose new important ethical, social and ecological challenges.

As shown in greater detail in the following essays of this volume, these are historical passages that call upon both human and natural sciences to undertake paths of critical re-foundation of their own educational and research methods, calling for epochal changes overcoming the traditional bipartition between humanities and life sciences, creating scientific and professional training courses offering skills that are transversal to these two blocks.

1.2 Darwinian Revolutions and Their Emancipatory Effects

At the end of *The Origin of Species*, Darwin wrote: "When the views entertained in this volume on the origin of species, or when analogous views are generally admitted,

[3] As already clarified in the third chapter, various sites and finds, discovered in the last two decades, attest to the existence of very ancient animal traditions. In 2007, in Côte d'Ivoire, a coconut crushing site that had been used by local chimpanzee populations for no less than 4300 years was discovered (Mercader et al. 2007). The use of stone tools has also been observed in some anthropoid monkeys and, in 2016, a site for crushing cashew nuts, used by local communities of striped cebi (Sapajus libidinosus) for over 700 years was found in Brazil, in the National Park of Serra da Capivara, (Haslam et al. 2016). Moreover, in 2014, an article by Catherine Hobaiter and her collaborators, published in PLoS Biology, for the first time documented a phenomenon of transmission of a cultural innovation consisting in the invention of a sponge made with leaves and mosses among a group of wild chimpanzees (Hobaiter et al. 2014).

we can dimly foresee that there will be a considerable revolution in natural history" (Darwin 1859: 484).

He was well aware that his revolution in natural history would trigger a domino effect in the whole domain of sciences, challenging beliefs rooted in a millenarian tradition and forcing a drastic redefinition of the distinction on which the whole Western system of knowledge was based: that between *natural sciences and humanities*.

Darwin was of course not the first to refute the belief in the fixity of species, to conceive living beings as products of an historical process and to affirm that man descends from other animals. The same road had already been taken by Diderot, Buffon, Saint Hilaire, Erasmus Darwin and other, more or less renowned scholars since the seventeenth century. Thanks to Lamark's theory and Spencer's from the 1850s, an evolutionary perspective was rather common for the first decades of the nineteenth century. Furthermore, in parallel with Darwin, Wallace had also independently conceived a theory of natural selection.

Darwin's approach was, however, unlike other any previous evolutionary models. His was immediately perceived as subversive by the cultivated classes of that time. Other evolutionists spoke of "vital forces" or of an "essential irreducibility" of human mind to its material components. Herbert Spencer, the most notorious among them, hypothesized an allegedly necessary "law of progress", operating at each and every level of reality (Spencer 1857). "A panoply of concepts that traditional Christianity could accept in compromise, for they permitted a Christian God to work by Evolution instead of Creation" (Gould 1977: 24–25). In fact, such models, although rejecting some traditional religious dogmas such as the fixity of the species and the theory of "separate creations", still re-launched and strengthened other important aspects of the Western traditions, among which the teleological (and at times explicitly theological) approach to the studying of natural phenomena and the anthropocentrism re-launched by the image of Man as the maximum height of evolution. The difficulty to attempt, in this historical phase, a passage from models that were clearly suspended half-way between innovation and tradition to a rigorous genealogical approach is testified by the fact that Alfred Russel Wallace himself, the joint discoverer of natural selection with Darwin, made ample concessions to Christian dogmatism, describing the human mind as "the only divine contribution to the history of life", and human evolution as a process led by a "superior intelligence" (Wallace 1870: 360).

Darwin took a firm position against him on this ground, although he himself had not been completely immune to some lexical concessions to the religious orthodoxy. In the final chapter of *The Origin*, for example, there is a reference to the moment when "the first creature [...] was created" (Darwin 1859: 488), though the Creator's possible role is confined to the appearance of the earlier living forms, in direct opposition to the traditional hypothesis of the "separate creations".[4]

[4]One of the explicit goals set by Darwin in *The Origin of Species* was to demonstrate the unsustainability of the dogma of separate creations, i.e. of the conviction, based on biblical sources but debated at length in the sixteenth and seventeenth century, that each living species had been called into being by God through a separate act of creation. Such a doctrine is of course irreconcilable

However, aside from this terminological concession to creationism in relation to *the origin of life on Earth*, a topic that was not covered in the work, Darwin's theory explained the existence of all present species, including humans, as deriving from one or a few common progenitors through a process of selection and conservation of the variants which were most adaptable to the environment. The strength and weakness, simplicity and intricateness of the Darwinian concept of "natural selection" derives precisely from this fact: it is presented by the author as a principle that is both *negative*, i.e., privative, and positive, i.e., cumulative., thus being a principle capable of giving rise to new useful solutions. Natural selection is the gradual elimination of the less suitable, but also the "*accumulation and strengthening of advantageous variations*" (La Vergata 2001: 208).

In short Darwin's theory represented an explanatory model that, for the first time, did not resort to making any allowances for the intervention of divine forces or mysterious progressive tendencies in inherent biological and human evolution.

Exactly for this reason, as Marx and Engels pointed just a few months after the publication of *The Origin*, Darwin's approach inflicted "a fatal blow to teleology" (Marx in Marx and Engels 1975–2004, 41: 246–247).[5]

As Friedrich Nietzsche (1868) and Ernst Haeckel (1868) reiterated a few years later, Darwin, with his theory of "natural selection", had invalidated the assertion made by Kant in section 75 of the *Critique of Judgment*, according to which: "This is so certain that we can boldly say that it would be absurd for humans even to make such an attempt or to hope that there may yet arise a Newton who could make comprehensible even the generation of a blade of grass according to natural laws that no intention has ordered" (Kant 1790 [2005]: 185). In other words, Darwin paved the way to a radical *secularization* of the problem of the descent of living species and man. Human history was reunited with animal history, producing a paradigmatic change no less dramatic than the Copernican revolution which had reunited sky and Earth.

After Darwin, not only the traditional (implicitly or explicitly) theological and teleological presuppositions of natural sciences, but also the anthropocentric prejudices on which human sciences had been founded for millennia, and the whole traditional philosophical field, from the theory of knowledge to ethics, was profoundly and radically problematized. The investigation of man's "spiritual" activities, emotions, feeling and knowledge, as well as of human expressiveness and language, took a different direction from that moment onwards. Without Darwin, many milestones of Western culture would have simply not existed: from Nietzsche and Freud's revolutionary approaches to the exploration of the subconscious and the problem of "discontents of civilization", to the birth of new research fields like classical, human,

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with Darwin's genealogical perspective, according to which all existing species derive from few common progenitors.

[5]The passage is taken from a letter written by Marx to Lassalle (January 1, 1861). Writing on the same topic to Engels, a few days earlier (December 19, 1860) Marx had noted: "Although it is developed in a crude English style, here is the book that contains the natural-history foundation of our point of view" (Marx in Marx and Engels 1975–2004, 41: 231–232).

cognitive and cultural ethology with the inclusion of non-human animals, or a part of them, among subjects considered to have an intrinsic ethical value.

For his part Darwin himself, in the course of his entire scientific activity, assigned a central place to the problem of the origin of animal and human "mental faculties", trying to construct a genealogical theory to explain the processes leading from the appearance of the earliest organisms to the development of the human species with their species-specific features.

Still as a young naturalist, since 1838, he conceived in his Notebooks (Darwin *Posthumous* 2009) the ambitious project of a theory capable of explaining both the origins of the *anatomical*, *morphological* and *physiological* features of living beings and the appearance and transformations of the *behavioural* and *mental* animal and human traits, freeing these research domains from theology and teleology.[6] This polemic motivation was at the origin of an extensive research project, which he later abandoned, but continued to provide a general framework for his later studies.

While studies of morphological, anatomical and functional differentiation between species were integrated twenty years later in *The Origin of Species*, the behavioural parts were incorporated in Chapters 3, 4, 5 and 21 of *The Descent of Man* (Darwin 1871) and in *The Expression of Emotions in Man and Animals* (Darwin 1872), these are now rightly considered forerunner texts of modern ethology. At least from a general theoretical perspective, it is with these studies that Darwin completed his revolutionary enterprise, obtaining an extremely shocking triple effect for the culture of the time, proving that:

(a) it is indeed possible to explain the evolution of living organisms, from its first steps to the appearance of man without resorting to any extra-natural, teleological, or aprioristic factor;
(b) the so-called "superior" abilities that were traditionally exclusively attributed to man are at least in part found in other animals and depend on organs and apparatuses that we share with many other species.
(c) the theory of natural selection does not imply that human social behavior is determined by hereditary factors in a non-modifiable way, because it is fully compatible with the finding that, in human history, social environment and education have gradually become more powerful selective factors than external environmental selection.

1.3 Social Darwinism as a "Conservative Revolution"

He who proclaims a new idea never gets away with it. Moreover, if this idea is the Darwinian doctrine of evolution, which, since the second half of the nineteenth century has become a

[6] In a letter to Wallace in 1867 Darwin wrote: "I want anyhow to upset [the] idea [...] that certain muscles have been given to man solely that he can reveal to other men his feelings. I want to try & show how expressions have arisen" (Ch. Darwin to A.R. Wallace, [12–17] March [1867], in Burkhardt and Secord 2005: 141).

> field for recurring polemics (the periodical character of which calls for deeper analysis) for the simple fact that it challenged a body of dominant conceptions, one faces a twofold risk: either having it repressed it in its entirety, or having it reabsorbed within that very system of representations it had intended to overcome and demolish. (Tort 2000: 19)[7]

How was the critical and revolutionary potential of Darwinian theory channeled and controlled? In which of the ideological trends associated to that period was the reception of Darwinism, at least partially, reabsorbed? On which *internal* elements of the theory did such attempts leverage and which explicit Darwinian positions instead had to be arbitrarily twisted or misrepresented in order to achieve these results?

There is no doubt that some theoretical elements that Darwin assumed in *The Origin of Species* derived from the classics of liberal and liberalist thought. The concept of evolution as a gradual ascending progress, very appealing during the Victorian age and already asserted as a scientific certainty by Lamarck and Spencer, was certainly present, though restrained in Darwin's work. Nevertheless, it is honoured in the concluding pages of the *The Origin of Species* where Darwin wrote: "Hence we may look with some confidence to a secure future of equally inappreciable length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection" (Darwin 1859: 489). But most of all, from a classic of the late seventeenth century liberalist literature, Malthus's *Essay on the Principle of Population* (Malthus 1798), Darwin drew a model which assumed an important role in his theory of natural selection: the model asserted that the human population, in the absence of obstacles, tends to increase more rapidly than the livelihoods it is able to produce, due to its geometrical increase (1–2–4–8–etc.), whereas the latter increased arithmetically (1–2–3–4–etc.). On the basis of some aspects already found in Malthus, Darwin extended this principle to all living species and concluded that an insufficiency of resources would ineluctably induce a "struggle for survival" among individuals of the same species and between antagonist species.

The observations made as a naturalist during his voyage on the Beagle, the studies on artificial selection carried out by livestock breeders and farmers and the works of Adam Smith, another classical exponent of liberal thought, all suggested to Darwin the idea that this struggle could gradually lead to a "selection of the fittest".[8] An idea also supported by Spencer: a differential reproduction, favourable, within a species or population, or between competing species, to the individuals or species best at exploiting their environmental conditions. A process of adaptation that led to a slow modification of the species and to the advent of all past and present species out of a limited number of simple, primordial ancestors.

The concepts of natural selection and struggle for existence presented by Darwin in 1859 undoubtedly indicated the liberal optimism about the regulatory effects of a "free" competition for the hoarding of resources that was so widespread during

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[7]This and all the other quotations from essays that have not been translated into English, contained in this chapter, are my translations.

[8]Darwin adopted the expression "selection of the fittest" from Spencer, starting from the third edition of *The Origin*.

his times. It also favoured a utilitarian view of organisms, in which the behaviour that every living being has to follow, in order to remain alive, is "conceived as a variant of competitive, acquisitive, «egoistic» and calculating behavior that is attributed to «rationality» *tout court* by the liberal theorists of classical and neo-classical economics" (Cavazzini 2009: 5). However, Darwin's approach changed, at least in part in *The Descent of Man*, published eleven years and three months after *The Origin*.

In fact, in this work Darwin argued that the moral rules oriented to mutual solidarity and to support the weakest had evolved in human societies from forms of parental care and "social instincts" present in all the gregarious animals, to be later rewarded by natural selection having proved useful in strengthening the group (Darwin 1871: 166). In other words, according to the Darwin of 1871, in the most recent stages of human history, social selection has increasingly taken precedence over natural selection. It acts through the rules, traditions and educational processes and has become the main driving force of conservation or changes in customs and behaviour (Darwin 1871, I).

Assuming this hypothesis, Darwin distanced himself not only from Spencer, who had criticized public aid to the less well-off by justifying the system of competition between classes, nations, economic groups and individuals as an inescapable law of nature, but he also distanced himself from the positions of all the other main evolutionism exponents of the time, including his friend, T.H. Huxley who postulated a radical break between the moral sphere and the natural sphere. Neither did Darwin endorse the biologistic justifications of eugenics advanced by his cousin Galton (to which, however, especially in the final pages of *The Descent of Man*, Darwin made some concessions[9]), nor the racist and colonialist ideology of the German "mastiff" of Darwinism, E. Haeckel.

But despite this, the interpretation given by most of Darwin's contemporaries misunderstood the meaning and field of application of concepts such as "struggle for existence" and "selection of the fittest", arbitrarily extending their use to the analysis of human social history and economic reality. As Tort observes, "the mainframe of European, and later American, interpretations of Darwin after 1860 is always

[9]Although fiercely taking position against slavery and other forms of social discrimination and exploitation, Darwin was not entirely immune to eugenic concerns and not completely averse to the promotion of some positive and negative eugenic measures. For example, in chapter V of *The Descent of Man*, he writes: "We must bear without complaining the undoubtedly bad effects of the weak surviving and propagating their kind; but there appears to be at least one check in steady action, namely the weaker and inferior members of society not marrying so freely as the sound" (Darwin 1871, I: 169). He adds then on the same page, a few lines later, this consideration: "In all civilized countries man accumulates property and bequeaths it to his children. I know that they are children in the same country. But this is far from an unmixed evil; for the capital the arts could not progress; and it is chiefly through their power that the civilized races have extended, and now they are everywhere, their range, so to take the place of the lower races" (Darwin 1871, I: 169).

constant: themes such as competition, struggle for life, survival of the fittest, cumulative transmission of benefits, elimination of the less fit and negative selection are always underscored and applied to human societies" (Tort 2000: 19).

The model that inspired this so called "social Darwinism" was actually Spencer's evolutionary metaphysics and not Darwin's theory, anthropology or political convictions.[10]

At that time, the influence of this biologistic approach, which should be more correctly called "social Spencerism", became so pervasive, and widespread in so many different currents of thought and disciplinary fields that we could compare its success to a sort of "conservative revolution" *ante litteram*.[11] Through this process of interpretative distortion and theoretical flattening, Darwin's theories of natural selection were arbitrarily equated with the metaphysical principles of the gradual emergence of the fittest and of the gradual progress towards the best, which the Spencerism applied at a cosmological level.[12]

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[10]Of course, emphasizing the differences between Darwin and the social Darwinists (even those, such as Haeckel and Darwin's cousin Galton, who were closest to him) I do not intend to present Darwin as a man who was above all the prejudices of his time and cultural environment. As I tried to show, the mentality then dominant in Great Britain and Europe was variously reflected in the works of Darwin. However I find it necessary not to lose sight of the differences that allowed the Darwinian theory of descent with modifications, to impose itself against earlier contemporary and later genealogical models, for its superior scientific rigor, for the unprecedented attempt to do away with theology, metaphysics and teleology and, finally, for its internal consistence, its adherence to the observed phenomena and its explanatory power.

[11]As it is well known, between 1918 and 1932 the German culture was greatly influenced by some theorists explicitly referring to Hugo von Hoffmanstahl's idea of a "conservative revolution". They propounded the rediscovery of Germanic national traditions, an anti-modernism and an elitism of a romantic brand, keen on theories of racial discrimination, and the exaltation of the heroic and tragic element of life. Among the best-known exponents of this wave were the philosopher O. Spengler and the philosopher/writer E. Jünger. Culturally close to the ideologies of part of the nascent Nazi regime ideology, with which they initially collaborated, the main representatives of the "conservative revolution" remained marginal after Hitler's advent. They were close to some aspects of the theories of the fathers of "conservative revolution" and to other intellectuals, such as C. Schmitt, A. Moeller van den Bruck, M. Heidegger, Th. Mann, W. Sombart, M. Scheler and the philosopher-psychologist L. Klages.

[12]In the books *Progress, Its Law and Cause* (1857) and *A System of Synthetic Philosophy: First Principles* (1862), Herbert Spencer had theorized the existence of an evolutionary "law" of the "selection of the fittest", or "law of progress", operating as a universal principle at all levels of reality: cosmic, biological, social and moral. In fact, according to the author, evolution can gradually originate a growing amount of "happiness", and this "law" acts identically both in nature and in human societies. Economic and social differences, as the differences in development among different cultures, are to be intended as the outcome of differential adaptability at an individual and group level. On these grounds, and following Malthus, Spencer fiercely criticized the "Law for the Poor", or the earliest forms of social assistance in Britain, as well as the religious practice of charity, specifically addressing the taxing of the rich in order to alleviate the sorrow of the poor; he interpreted them as "obstacles" to the survival of the fittest (Spencer 1887). According to Spencer, in fact, it is from the death of the "unfit" that Evolution receives its ascending character and those who survive must in any case "be the chosen of their generation" (Spencer 1887).

In this sense, natural selection suffered a fate analogous to that which, a few decades later, was to fall upon the Nietzschean theory of the "Wille zur Macht", distorted by the promoters of the so-called "conservative revolution", and later by Nazism, in an exaltation of nationalism, an apology of expansionist policies and a political anti-Semitism that were foreign to Nietzsche.

Apologists of this tendency were, together with Herbert Spencer, a large number of European and American epigones of his approach (notable for his radicalization of the Spencerian doctrine was William Graham Sumner), according to whom the criterion of *laissez faire* should have ruled all aspects of social life and also provided a model for governmental policies. They believed, in fact, that only a free competition of forces would have led to a gradual elimination of the "unfittest" and to a world in constant progress towards the better. The Darwinian "struggle for existence" in which Kropotkin rightly saw both co-operation and competition among individuals and species, was transformed by this radically reductionist interpretation into an equivalent of Hobbes' "*bellum omnium contra omnes*".

Patrick Tort rightly emphasized the fact that Darwin, with his second revolution, distanced himself from Spencerism and various other forms of "social Darwinism" which had begun to spread after 1959. In fact, Darwin makes it clear in this work that, in his opinion, since ancient times and then in an increasingly incisive way in modern ones, behavioural, cognitive, social and "moral" human propensities have been conditioned and oriented *by a social selection and not by the natural one*, by "education" and social control, not by hereditary factors.

As Tort reiterates, from this point of view, Darwin's anthropology achieves almost a double revolutionary result: firstly, to abolish every metaphysical break between human and other animals, rejecting the hypothesis that to explain the origin of our mental and "moral" characteristics it is necessary to postulate the action of extra-natural factors, as Wallace stated. Secondly, to defend the hypothesis of a direct continuity between animal and human evolution, rejecting at the same time the hypothesis of a "simple continuity" between them, in which natural selection drives both natural and human history. This way Darwin arrived at an epistemological approach that recognized the (at least partial) autonomy of social development from natural selection, thus allowing credit for "the theoretical autonomy of the sciences of man and society without breaking the historical-material continuum between «nature» and «culture»" (Tort 2000: 53). It was a turning point, not less important than that marked by the theory of natural selection. However, in obedience to the historical "law" suggested by Tort (no great theoretical innovation escapes ideological distortion), even in this case the anti-deterministic revolution introduced by Darwin with *The Descent of Man* in some way paid its price to the ideological universe of the time.

1.4 Tort's Interpretation of the Second Darwinian Revolution

As I have already mentioned, in my opinion, the very important critical goal obtained by the second Darwinian revolution presents, already in its original exposition (Darwin 1871), and even in Tort's interpretation, the risks of a "monumental"[13] and idealized reconstruction of the process that they define as "*civilization*".

In a nutshell, Tort claims that according to the conclusions reached by Darwin in *Descent of Man*, "civilization" allowed human societies to gradually escape the laws of survival of the fittest, and therefore the eliminatory function carried out by natural selection in all the other species. In his opinion, in fact, within our species, social "instincts" and behaviours of mutual support had proven, in the long run, more advantageous than those exclusively based on mere individual competition and had consequently been favorably selected. Since then, those groups and individuals capable of promoting the values of "morality, "altruism" and solidarity in society were favoured. This allowed a transition towards a new social effect: assisting the weak instead of eliminating them. According to the thesis that Darwin exposes in chapter V and takes up in various passages of *The Descent of Man*, the attitude of mutual aid, already rooted in the social instincts of our ancestors, offered human communities that practiced it most *as an established custom* a greater cohesion and incisiveness and new opportunities in the struggle for survival.

According to this interpretation, the process of "civilization" (of which Western culture has been the epicentre and driving force) coincides with a gradual imposition of the tendency to extend solidarity to ever wider circles, and finally even beyond the borders of our species. This process created, according to Tort, the conditions for an overcoming or a "reversal" of natural selection, achieving the conditions to remove its eliminatory mechanism. In other words, "civilized" human societies benefitting from social solidarity have overcome the "struggle for existence" which requires the most disadvantaged to succumb, creating rules for coexistence in which "the weak are no longer eliminated (intending here all the individuals whose psychological, psychic or social condition would have condemned them to death under the hegemony of «natural» law, but are instead protected, cared for and defended" (Tort 2000: 25).

According to Tort it is in this reversal of the effects of natural selection that lies the key to human "civilization" and in its identification does "the key to Darwinian anthropology", which was bearer of a "second revolution", even more important than that introduced with *The Origin of Species*, because capable of escaping the traps of social biologism without failing in the rigor of the genealogical perspective.

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[13] I use here the adjective "monumental" in the sense that Nietzsche gave to it in the *II Untimely Meditation*, entitled *On the Advantage and Disadvantage of History for Life* (Nietzsche 1874). Nietzsche describes the monumental way of making history as a tendency to reconstruct the past, or determined epochs, in a celebratory way, removing all the aspects that do not give themselves to their idealization, and reducing the narration to a mythicization of some historical phases or characters in which "only a few embellished facts raise themselves up above, like islands" (Nietzsche 1874: Sect. 2. My translation).

Reaffirming that I consider Tort an undisputed master in his historical reconstruction and critical analysis of Darwinism, evolutionism, their reception and ideological implications, and I find his enhancement of the second Darwinian revolution useful and correct in numerous ways, I would like to summarize here some of the perplexities that his reconstruction of the "civilization" process arouses in me. First of all, I think it is appropriate to point out a gap, perhaps slight but not irrelevant, between what Darwin states in this regard in *The Descent of Man* and the generalizing form in which Tort sums up his position.

As a matter of fact, in the fifth section of *The Descent of Man*, Darwin stated that solidarity within the group has been one of the propulsive factors of human social evolution (Darwin 1871, I: 166) and has become a feature of "civilized" societies: "We civilized men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick; we institute poor-laws; and our medical men exert their utmost skill to save the life of every one to the last moment" (Darwin 1871, I: 168). However, he still recognizes that in many cases this form of solidarity has developed in co-evolution with the activity of war and the cultural dehumanization of other populations, as recent studies seem to confirm (Choi and Bowles 2007). In fact, Darwin stated that in a "primitive" situation "the tribes inhabiting adjacent districts are almost always at war with each other" and "the social instincts never extend to all the individuals of the same species" (Darwin 1871: 85). They are only addressed to community members and, according to the naturalist, for this very reason the greater internal cohesion and spirit of sacrifice of individuals, controlled by social mechanisms such as "praise and blame", offer more opportunities in competition with other communities, towards whose members no solidarity was expressed. It is thus not correct to assimilate this kind of behavior to a generic, and generally universal, principle of solidarity. But without a doubt, as Tort emphasizes, the interpretation of the civilization process as a gradual extension of the "circle of solidarity" is present in the Darwinian text. The great naturalist states, in the fourth chapter of the work, that feelings of sympathy and solidarity of human beings for their fellows have gradually grown "to extend to the men of all races, to the imbecile, the maimed, and other useless members of society, and finally to the lower animals,—so would the standard of his morality rise higher and higher" (Darwin 1871, I: 103).

According to Darwin, in the moral sphere "the elimination of the worst dispositions is always increasing" both in the "lower races" and in the "civilized nations" (Darwin 1871, I: 173). The main driving forces of this process overcoming the elimination of the less adapted have been and are, for him, "the approbation of our fellow-men—the strengthening of our sympathies by habit-example and imitation-reason-experience and even self-interest-instruction during youth, and religious feelings" (Darwin 1871, I: 173).

As I have already explained, it is precisely in this interpretation of the process of civilization that Tort identifies the turning point of Darwin's thought towards a "materialistic" and continuist, but at the same time non-mechanistic and non-biologistic conception of the relationship between organic and cultural evolution, natural and human social selection.

Without wishing to neglect the importance of the causal factors highlighted by Darwin and Tort, it seems to me that this kind of description of the process of "civilization" results inadequate or incomplete, precisely in identifying *the material causes and socio-economic selective pressures* that have oriented its development.

By this I mean that Darwin and Tort, presenting "civilization" as a process originated by motivations and changes of an almost exclusively ethical and intellectual nature, and characterized by a progressive strengthening of sympathy, empathy and altruism, leave in the shade a fundamental detail. The driving forces of that social process which the Western culture has called civilization, in fact, have been rather, in the first place, the brutal forms of exploitation of working classes imposed by the advent of capitalism and phenomena such as colonialism, slavery, imperialism, wars of conquest and the various forms of racial and sexual segregation that have marked the modern and contemporary era. Processes driven by economic and political interests *opposed* to those of mutual support, even if, from the time of forced evangelization of native Americans up to that of the armed "exporting" of democracy, humanitarian values have always been called into question *to ideologically cover* the pursuit of these interests. In short, in my opinion Darwin and Tort, intending "civilization" exclusively as a gradual progress of the spread of solidarity attitudes, propose an optimistic and unilateral, idealized and monumental reading of this historical and social process, purging it from all its "dark" sides.

This is the same dark side of "civilization" that Nietzsche wanted to bring out instead in his *On the Genealogy of Morality* (Nietzsche 1887). It will be enough here to mention only some passages of the second essay of the book in which the author, rejecting the hypothesis that altruistic behaviour developed spontaneously in conjunction with the progress of intellectual faculties and human moral sensibility, reminds us that "perhaps there is nothing more terrible and strange in man's prehistory than his technique of mnemonics. 'A thing must be burnt in so that it stays in the memory: only something that continues to hurt stays in the memory' – that is a proposition from the oldest (and unfortunately the longest-lived) psychology on earth" (Nietzsche 1887: II, 3).

It is not surprising to find a removal of these aspects and an optimistic-idealizing conception of the history of human customs in Darwin, because it was typical of the classical liberalism with which Victorian culture was imbued. But I confess my bewilderment at the fact that it may have been accepted by a very lucid critic of liberal ideology like Tort, and in an era like the early 1980s, in which the neoliberal winds embodied by Reaganism and Thatcherism were already dismantling the system of social rights and protections acquired by the masses in the previous cycles of social struggles.

In my opinion, it can and should be acknowledged that some trends and currents of modern Western culture, in various historical phases and especially in the epochal arc that goes from The Enlightenment to the social struggles of the 1960–1970s, *affirmed the possibility and the hope* for social forms founded on the Kropotkinian principle of mutual support to exist. Although they fought for this goal, this principle has certainly not become the basis of our associated life.

Unfortunately, this is demonstrated in a both brazen and tragic way by our epoch, in which all the so-called "civilized" nations barricade themselves as fortresses against the migratory waves *that they have provoked with their centuries-old predatory interference* in the African, Eastern, and South American countries. An era, indeed, in which all nations flout the same solidarity principles written in their constitutive national and international documents—such as providing aid to those in mortal danger and the reception for those who flee from conditions of humiliation, abuse and exploitation. Therefore, a historical phase in which all the States considered beacons and champions of "civilization" betray and disregard the aspiration that Tort seems to consider by them acquired and placed at the basis of social life: a social and institutional organization in which the "weak [...] are protected, cared for and defended" (Tort 2000: 25).

The global data concerning the variations in the concentration of wealth in the last centuries and decades also denounce a continuous widening of the gap between rich and poor. That is to say: an opposite trend to a progressive enlargement of the circle of human solidarity. Today, according to the data published by Oxfam (2019), the richest 1% of the planet holds almost half of the total net aggregate wealth (47.2%, to be precise), while 3.8 billion people, equal to the poorest half of the planet's inhabitants, can count just on the 0.4% of it.

As for the extension of ethical sensitivity beyond the boundaries of our species, it certainly represents an important phenomenon of our time. But the anti-speciesist movement, despite the generous forces it manages to mobilize, like environmental protection movements, today still only represents a small group going against the flooding river of a global society that is unfortunately responsible for a process of environmental devastation and mass extinction of animals and plants as well as an unprecedented level of exploitation of humans and animals.

Therefore, for the reasons summarized above, the paradigm drafted by Darwin and developed by Tort appears, from my point of view, a largely idealized reconstruction of "civilization" and its ethical, political, and socio-economic outcomes.

Paradoxically, this vision is intrinsically vulnerable to an ideological mechanism that Tort lucidly criticized on many occasions: the presentation of the *formal* equality of all citizens and of the principles of solidarity declared in the liberal-democratic constitutions and international treaties *as if* they were the real fulcrum of the social organization of the "civilized" countries and of their reciprocal relations. As if the private ownership of the means of production, and their use for private purposes by the ruling classes of every level that the current economic regime legitimizes and protects did not render an effective large-scale implementation of those solidarity principles structurally impossible. As if the capitalist economy had not yet been sufficiently proved to be able to create merely temporary (and never guaranteed in the medium or long term) improvement in the living conditions of the lower classes in one area of the world only at the price of intensifying or extending the processes of exploitation and social oppression in other areas of the globe.

The Kantian illusion that the spread of republican institutions would have led to a "progress towards the best", understood as the overcoming of war, social oppression

and minority status human beings and the implementation of a "perpetual peace" was demolished by the actual realization of these institutions.

Therefore, at least from my personal point of view, a society of solidarity described by Tort, capable of protecting the weakest rather than exploiting or abandoning them, appears today a very important goal for which it is necessary to fight and not consider an existing result.

1.5 The Debate Between Genetic and Environmental Determinisms and the Birth of Classical Ethology

From the early decades of the 1900s, the debate on the *origin and modifiability of human propensities* was marked by a contrast between evolutionary innatisms and environmental determinisms, "biologisms" and "culturalisms".

A complex of philosophical hypothesis and ideological doctrines focusing on an *evolutionary nativism*, grafting onto a furrow already traced by nineteenth "social Darwinism", contributes to offer a pseudo-scientific basis to the social exploitation of humans and animals, for colonialist policies, racist and anti-Semitic tendencies, with gender and social discriminations.

On the opposite front, the *environmentalist* one, two major schools were developing:

- American behaviourism, which attempts to offer a scientific foundation to "democratic" propaganda in the USA through an approach based on the practices of classic (and later, operating) conditioning.
- "Dialectical materialism", as interpreted in the Soviet Union and in some currents of contemporary Western Marxism.

Although different and indeed opposite in many ways, these two approaches had in common a rigidly "culturalist" position, based on the conviction that the social environment, if subject to a rigid top-down control, could produce radical and positive changes in human psychology and behaviour in the turn of few generations.

At an ideological level, this principle played in both American behaviourism and the "orthodox" interpretation of dialectical materialism a role similar to that of nativism in the racist and authoritarian ideologies of the Nazi and Fascist regimes: it legitimated extremely invasive practices of institutional intrusion in the life of individuals and society. The two major figures of American behaviourism (J. Watson, since 1912–1913, and B. F. Skinner since the 1950s) scientifically validated the attempt to develop a "technology of behaviour" through large-scale top-down programming of activities and human response, based on the conditioning methods. Their goals were ultimately not different from those of Lysenko, supported by Stalin from the 1930s to 1950s, and reflected, in turn, albeit in forms which were different from those dominant in extreme right-wing regimes, a project of totalitarian control of the masses.

From this point of view, the frontal opposition between the different schools of nativists and culturalists/instructivists[14] hid a profound structural resemblance. On the one hand evolutionary nativism served as a biologistic justification of social traditions and political authoritarianism, on the other, culturalism served to justify the "pseudo-democratic" (as Konrad Lorenz called it) stance of American liberalism and the "pseudo-dialectic" one (as Theodor Adorno tagged it) of Soviet Marxism. Contrasting theoretical models led to similar practical outcomes: the justification of an invasive, manipulative, totalitarian use of scientific knowledge against the most basic rights of the human beings.

Classical ethology was born as an independent scientific discipline, in the first decades of the twentieth century, in a cultural climate characterized by these rigid oppositions. How did ethological disciplines fit into this complex debate? What innovations did they bring to it?

At the beginning its pioneers were definitely oriented towards a nativist approach. Their innatism, however, unlike the philosophical one of Spencer, was based on a deep knowledge of the behaviour of many species of wild animals in their natural environment. In this respect, the ethological approach, based on field observation, revealed an unknown world that had always been before our eyes but rarely studied with the passion, diligence and attention necessary to understand it. Daughter or niece of the Darwinian one, the first ethological revolution marked the third decade of the twentieth century.[15]

"The key actors in the founding of ethology as a discipline were Konrad Lorenz and Niko Tinbergen. It was Lorenz who was primarily responsible for laying the field's early conceptual foundations in the 1930s" (Burkhardt 2005: 4). According to Lorenz, the first steps of ethology were the result of a transfer of "Darwinian" theories and methodologies from specific fields such as morphology and anatomy to the comparative study of animal behaviour (Lorenz 1978 [1981]: 3). In the first decades of their scientific activity, both Lorenz and Tinbergen mainly focused their research on the identification and study of the "innate" components of behaviours. In truth, in that phase, Lorenz had already discovered important phenomena of integration between biological heritage and learning, i.e., *imprinting*.[16] But, as he himself admitted, he

[14]I here intend instructivism as a not only pedagogical model, but also a political one (relating to the relationship between ruling classes and masses) focused on the role of the instructor conceived as a figure that must assume full control of what is to be learned and of the ways in which it is to be learned, aiming to design the very same personality of the learners, conceiving them as passive receptors of the conditioning programs they are subjected to.

[15]As I previously, the phase I call "first ethological revolution" embraces the arc of time that goes from the foundation of classical ethology which occurred in the 1930s, to the birth of human and cognitive ethology, between the Sixties and Seventies. The "second ethological revolution", still in progress to this day, goes instead from the post-genocentric and post-anthropocentric turning point started in the ethological field in the Nineties, to the profound critical revision of the lexicon, theoretical assumptions and methods of behavioral science that, in the last two decades, led to important developments in cultural and cognitive ethology and to the emerging of promising new research areas such as behavioral and cultural epigenetics.

[16]Imprinting is a kind of early learning that occurs in some "sensitive phases" of individual maturation; it is based on an "open program", or innate program for learning and involves an integration

was only later to grasp its real relevance and significance, possibly as a consequence of his debate with the behaviorists, the British ethological school and some behavioural scientists then operating in the United States such as Donald O. Hebb, Daniel S. Lehrman and Theodore C. Schneirla (Lehrman 1953). This confrontation, and the considerations it engendered, led Lorenz to write *Evolution and modification of behavior* (in English—1965), in which he developed:

- The seminal concept of "innate instructors", "open programs", or "*phylogenetically adapted teaching mechanisms*" (Lorenz 1965: 44; 80–81; 104; 1973 [1977]: 88–96);
- a "real self-criticism", i.e., a criticism of the original underestimation of the learning processes and of their importance, by himself and by the other pioneers of ethology;
- a methodological and theoretical critique of behaviourism;
- a criticism of the theoretical "compromise" which, in his opinion, some authoritative members of the British ethological school (such as Tinbergen and Hinde) had reached with behaviorism regarding the distinction between innate and learned.

Nikolaas Tinbergen concurred with Lorenz on the key stages of classical ethology and the definition of the concept of "instinctive behavior"[17] which played a key role in the theoretical framework of the new discipline. But moving to England, he modified his position in consideration of criticisms of Lorenz's nativism by Hebb, Schneirla, Lehrman and other scholars.[18] According to the "later" Tinbergen, most animal behaviours depend, even in their "elementary units", on both hereditary and learned factors, albeit in greatly varying degrees according to their evolutionary levels, so that the clear distinction between innate and learned behaviour is only to configure "two extreme, however real, cases" (De Crescenzo 1975: 122). According to R. Hinde's somewhat more radical position, all behaviours derive from an inextricable mixture of genetic and environmental influences, which makes it practically impossible to distinguish the innate from the learned. Hinde goes as far as to reject such a distinction, which he considered not only false, but also misleading and basically detrimental

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between innate and learned information. Its discovery was extensively discussed by Lorenz already in an essay written in 1935, Der Kumpan in der Umwelt des Vogels. This brought him, in the later Taxis und Instinthandlung, written with Tinbergen (Lorenz and Tinbergen 1938) to hypothesize that new motor patterns derive either from a recombination of different orders of hereditary motor units, or from the interlocking of short hereditary motor sequences with short learned sequences (the concept of *Instinkt-Dressurverschraenkung*).

[17] According to classical ethology, "instinctive behaviour" is defined by the correlation of four phases: appetitive behaviour (*Appetenzverhalten*), the flexible component modifiable through experience; the innate releasing mechanism (*IRM*, or *Angeboren ausloesmechanismus, AAM*), species-specific external stimulus; "hereditary motor co-ordination" or "fixed action pattern" (*Erbkoordination*), and "consummatory act" (*Endhandlung*), the latter coinciding with the execution of hereditary co-ordination, or its final part, and producing a discharge of tension.

[18] The first clear signs of this theoretical change are visible in Tinbergen (1955, 1963). The distancing from the Lorenzian positions appears clearer in Tinbergen (1965, 1968), touching themes inherent to human ethology, and to the polemics triggered by Lorenz's essay *On Aggression* (Lorenz 1963). See also De Crescenzo (1975: 119–131), Nisbett (1976: 158).

to comparative research on behaviour.[19] The largest part of these critiques to the innatism of the Austrian ethologists was, in most cases, dictated by common sense. They were intended to mark a distance from the "irrelational"[20] concept of instinct of the earliest Lorenz, i.e. from the idea that "instinctive behaviour" is resistant to the any influx from experience and is rigidly non-modifiable in its pattern and devoid of any relevant individual variations. This move also showed the English ethologists' intention to find a kind of reconciliation with the behaviorists, with whom they had been having a long-standing lively quarrel considered excessive, by many.

Nevertheless, Lorenz underlined that the denial of any distinction between innate and learned components of behaviour would be met with preventive censorship of any relevant scientific research, mainly dictated by "diplomatic" concerns, and opposed to the criticisms of his concept of "innate", advanced from several fronts, a series of countercriticisms.

According to Lorenz, the hypothesis that every form of behaviour of any organism, independently from its evolutionary status, is produced "in its elementary constitutive units" by an interaction between inborn components and learning processes can appear formally correct, because also the forms of individual modification of behaviour found among the simplest existing unicellular organism are already classifiable as learning. In fact, ethologists define them as forms of "*non-associative learning*" (Mainardi 1992: 49–50 and 66–68). But he underlined that these basic forms of learning, or "habituation and its counterpart, namely sensitization, are the only forms of adaptive modification of behaviour ever found in protozoa and in organisms with a diffuse nervous system" (Lorenz 1965: 30). That is to say that in unicellular organisms, characterized by a diffused sensitivity, it is possible to observe *only* non-associative forms of learning. From an ontogenetic standpoint this means that these organisms perform only hereditarily fixed action patterns throughout their entire life cycles. In other words, they can learn to vary the intensity of their reaction according to the frequency of an external stimulus, but cannot associate their reaction different stimuli (associative learning). Finally, from a *phylogenetic* standpoint, this means that, if life has existed for about three and a half billion years, as calculated on the basis of the most ancient organic fossils (stromatolites and microfossils), for most of this time (2830–2930 million years, or, from the appearance of the earliest organisms to the advent of the first metazoans) the survival of living beings has been *exclusively due to genetically fixed reactive and interactive motor patterns and habituation and sensitization processes.*

But his deep knowledge of animal behaviour allowed Lorenz to demonstrate that even among mesozoans, which are capable of very complex forms of learning,[21] it is possible to observe species-specific motor modules, the execution of which is poorly

[19] The divergences between Lorenz and the English ethologists, on the nature-nurture theme, touched many other points that are not considered here.

[20] On the earliest "irrelational" phase of Lorenz's theory of instinct, see De Crescenzo (1975, Chapter I–IV), Brigandt (2003), Burkhardt (2005, Chapter III).

[21] Among multi-cellular animals, already "in the phylum of the *plathelmynts, there is evidence of associative learning*" (Mainardi 1992; entry "apprendimento, capacità di": 53. My translation).

dependent on learned information. "There is not and there cannot be any argument", wrote the author in *Evolution and Modification of Behavior*, "about the fact [...] that a stickleback responds to the key stimulus 'red below' by performing the motor patterns of rival fighting and that a male stickleback is indeed red on the ventral side" (Lorenz 1965: 32). Indeed, even among mammals and birds, i.e. in those classes of animals in which individual and social learning play, beyond doubt, a central role, ethological studies have revealed the presence of rigid motor sequences (FAP: fixed action patterns) which, although presenting little individual variation, are clearly recognizable as species-specific, and are also performed by young individuals that have not yet been able to observe them in others.[22] The motor patterns of bone burial observable in dogs, those of hiding nuts carried out by squirrels, the catching and killing movements in various carnivores, the escape reactions in chicks and the alarm signals in many bird species fall into this typology.

According to Lorenz, the substantial independence of this kind of behavioural sequence from acquired information is demonstrable through an accurate use of the deprivation or "Kaspar Hauser experiment"[23] and through some observable processes which he had already described in the early 1930s. In fact, in many animal species, the prolonged absence of environmental stimuli capable of triggering some species-specific motor patterns engenders phenomena of the lowering of reaction thresholds, active search for stimuli or "vacuum activity" as in the case of segregated songbirds performing courting motor sequences while facing a corner of their cage (Lorenz 1978: Sects. 5.9, 5.10, and 5.11).

In short, although the English ethological school had undoubtedly made an important move in overcoming the early Lorenz's rigid instinctivism, the Austrian ethologist's counter-critiques showed that the obtained result—the affirmation that all behaviour is a mixture of innate and learned—was more of an academic compromise to extinguish the controversy between psychologists and ethologists within university departments and scientific meetings than a way to account for the knowledge acquired in the ethological field up to that time.[24]

However, Lorenz in turn had to admit that the first generation of ethologists, including himself, had simplistically opposed "the innate" to "the learned" and, in

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[22]In humans, for instance, long rigid motor sequences, classifiable as hereditary are found in the behaviour of infants (search for the breast suction, reflex of clinging to the maternal breast, swimming) but are almost absent in adults.

[23]The protocols of these deprivation experiments have undergone severe criticism. Lorenz himself in his 1965 essay raised several critiques of their unsound use (Lorenz 1965: 83–100). Criticisms focussed on the difficulty of rigorous application and possible traumatic consequences for subjects, particularly if experiments are invasively and inappropriately performed. Lorenz's remarks were mainly aimed to restrain their use to cases of real need and reduce the procedures, thus sparing the animal cognitive and emotive damage.

[24]The two major critiques examined in the book are the following: (1) innate and learned are only defined by reciprocal exclusion (Hebb 1953); (2) one cannot establish the innate character of a behavioural module beyond doubt as "it is never possible to exclude learning *in ovo* or in utero" (Lehrman 1953). Chapters 3 and 4 of the work are dedicated to the rebuttal of these critiques.

doing so, they "were neglecting a most important function of the majority of the phylogenetically adapted behaviour mechanisms: the function of teaching" (Lorenz 1965: 81). Or, as he specified later, the function of *teaching to learn, to encourage learning, to instruct behavioural programs made to receive further training from interaction between the intra- and inter-specific environment.* A very important discovery on which also the great biologist E. Mayr would have later reflected (Mayr 1974: 650–659) and that Lorenz himself would have valued as an important integration to his "Natural History of Human Knowledge" in the work *Behind the mirror* (Lorenz 1973).

1.6 Eibesfeldt and the Deterministic Approach of the First Human Ethology

Between the sixties and the seventies, human ethology began to establish itself as a specific research domain; its main spokesman was Eibl Eibesfeldt,[25] one of Lorenz's earliest and later best known collaborators.

Undoubtedly, Eibesfeldt gave a great impulse and contribution to both field research and the compilation of data related to human behaviour. He also had the merit of having taken (at least in part) his distance from some metaphysical and apologetic interpretations of aggression and biologistic justifications of war as those voiced since the 1960s by authors such as Desmond Morris, Robert Ardrey, Robet Fox, Lionel Tiger, Alain de Benoist.

However, despite clearly defining the field of ethology as the study of both the hereditary bases of behaviour and the processes of learning, Eibesfeldt *preserved and strengthened his master's innatist outlook.* This is clearly reflected in the theoretical framework of his wide-ranging research, mainly focused on the identification of the hereditary components of human social behaviour as well as in some of his public outings on problems related to peaceful coexistence between different human communities.

According to Eibesfeldt, "biological inheritance determines human behavior [...] in precisely definable parameters" (Eibesfeldt 1984 [1989]: 3), including a spontaneous appetence to aggression, the tendency of appropriating a territory and erecting barriers against intruders, the intolerance of coexistence with populations of different habits or "physical-anthropological" tracts, the "predisposition to submission" and "rank aspiration", a division of labour with assigned roles within the group respectively to females and males.

[25]The birth of the International Society of Human Ethology and the first publication of a journal specialized in this field dates back to 1978.

He re-proposed the hypothesis, already sustained by Lorenz and Ardrey, that there is in man, as in other animals, a *specific appetence* (*Appetenz*) *for aggressive behaviour*, and that if repressed it accumulates to the point of uncontrollably exploding.[26] In this perspective, innate human aggressive tendencies cannot be completely inhibited or eliminated through education. However, it is possible, through *ethos*, recreational activities, sports and engagement in social usefulness to channel them towards non-destructive forms of expression. Eibesfeldt argues that our aggressive propensities, originally depending upon self-preservative functions, are not to be assimilated with Ardrey's "murdering disposition" or "killer instinct" (Ardrey 1961), and nor Freud's self-destructive "death drive" devoid of any function useful to life, as already observed by Lorenz (Lorenz in Evans 1975: 53–55). According to these ethologists, in natural conditions aggressive behaviour plays an important role in the survival of human and animal species. Its "pathological" degeneration and exponential growth shown in modern human societies are to be understood, according to Lorenz and Eibesfeldt, as deleterious effects of inborn programs originally performing a positive function in the preservation of species. Effects due to the discrepancy between rapid cultural and technological development and slow phylogenetic evolution, or to the living conditions created by industrialization and to the manipulation of some inborn tendencies typical of our species *implemented by* economic potentates, demagogues, and political parties.

Distancing himself from those who had tried to present war phenomena as something "inevitable" and deeply rooted in man's "animal" nature, Eibesfeldt proposed a distinction between "aggression", which he considers "innate", and "war", instead representing *a product of human social history arising at a social level instead of an individual one* (Eibesfeldt 1984 [1989]: 402–422). In this perspective, if aggression is an inborn trait, war is certainly not: it is the "product of cultural evolution. Therefore, it can be overcome culturally" (Eibesfeldt 1984 [1989]: 421). Eibesfeldt agrees with Lorenz on the presence in man of an inborn inhibition against aggression and killing of conspecifics, and on its possible role as a factor in maintaining social equilibriums, where aggression is not enhanced by cultural factors. To his mind, therefore, the paradox of war is that "over the biological norm filter that inhibits destructive aggression in man as in other creatures; a cultural norm filter is superimposed that commands us to kill" (Eibesfeldt 1975 [1979]: 123). Peace among men, according to Eibesfeldt, is therefore possible, provided some of their drives are taken into account and balanced by adequate measures.[27] But the means he

[26] As pointed out by Alexander Alland jr. (Alland 1972: 41–42), the experiments reported by Ardrey (in which electrical stimulation of some cerebral areas elicits aggressive reactions) demonstrates that animals undergoing such treatment are capable of aggressive reactions, *not that these necessarily have a spontaneous, endogenous, and cyclical character*, as maintained by the author of *African Genesis* and *The Territorial Imperative*. Such aggressive reactions in this kind of experiments are, in fact, obtained through the very use of external stimuli, albeit directly applied to the brain, without the mediation of the sensory organs.

[27] Although opportunely marking the difference between his own view and Ardrey's thesis of the "asocial and homicidal essence of man", Eibesfeldt seems to re-introduce some elements of a

proposes in order to secure peaceful relations among individuals and communities appear rather traditional, almost reactionary: hierarchy and rank, within the social group, barriers and safety distances among different ethnic groups (Eibesfeldt 1984 [1989]: 314–320). We are here taking into consideration one of the points on which Eibesfeldt's approach was more exposed to accusations of "racist implications": from his point of view, "cultural and religious diversity" conjures with different "physical and anthropological characters", making an integration and pacific coexistence between different human communities difficult, if not outright impossible. Consequently, Eibesfeldt thinks that immigration, in these cases, is always a cause of social tension and conflicts, inevitably triggering processes of marginalization and self-marginalization, because it is perceived as an authentic "invasion".

To both Eibesfeldt and Lorenz the hierarchic order also has an innate foundation in our species: "The human disposition to form rank orders is based on our primate heritage [...]. Obedience and readiness to become subordinated are as innate in humans as striving for rank" (Eibesfeldt 1984 [1989]: 314). The Austrian ethologist also dedicates a similar analysis to "territorial" behaviour, which he considers, in man as in other species, to have a hereditary basis: "Human groups occupy territories and demarcate themselves territorially [...]. Within its own region a group claims privileges above those of others and therefore is dominant. Within group territories there are subgroups (such as families) and individuals laying claim on their small zones, marking them accordingly" (Eibesfeldt 1984 [1989]: 339). Eibesfeldt concludes that territoriality may be assumed to be "a phylogenetically acquired trait", however, he "basically" agrees with Rada Dyson-Hudson and Eric Alden Smith stating that it is something much less binding than a "genetically fixed trait", in the sense of "a fixed action pattern" (Eibesfeldt 1984 [1989]: 334). In fact, in marking his distance from Ardrey, Eibesfeldt remarks how inappropriate it would be to refer to a "territorial imperative", and how "ethology has never equated territoriality and fixed-action patterns!" (Eibesfeldt 1984 [1989]: 334).

Contemporary ethology has in many respects abandoned the substantially deterministic and genocentric approach, characteristic of the conceptual framework of classical and first human ethology, and later took to the extremes by two fathers of sociobiology as Edward O. Wilson and Richard Dawkins.

But as it will be shown in the next chapter, in the seventies, Konrad Lorenz himself was to become the main promoter of a profound theoretical renewal of Darwinism and neo-Darwinism, centered on the belief that every adaptation is a *cognitive process*, that every organism plays in this process an "extremely active" role, and that the whole process of phylogenesis can be understood as a cognitive increase, a process of accumulation, differentiation and transmission of information useful for survival which integrates embodied and acquired information, genetic and social components.

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biologistic justification of war phenomena when he includes among the "innate tendencies" of our species, not only defensive aggressiveness and exploratory trends, but also a "typical motivation to fight and dominate, especially in the male", or when he suggests a parallel between "exploratory aggression, with which children and young people test their social behavioral liberties" and some kinds of aggressive or expansionistic state policies: "Newly formed states use the same exploratory strategy in international relations" (Eibesfeldt 1984 [1989]: 396).

1.7 Darwin's Darwinism Reconsidered Today

In 160 years of probing, Darwinian theory has reached an unquestionable scientific maturity. Especially after its confluence with Mendelian Genetics which occurred during the first half of the twentieth century, it has allowed considerable developments in all the biological domains, and in every field related to the understanding of living beings, revealing unsuspected horizons even to the reconstruction of human proto- and pre-history. From a theoretical and explanatory point of view, Darwinism to this day constitutes a fertile conceptual nucleus that in the last fifty years has inspired ever-new formulations and issues, without appearing atrophied or obsolete. Moreover, the need for a critical revision of the theory that allowed to overcome the most mechanistic and deterministic aspects of *Neo*-Darwinian Synthesis has been emerging for several decades: ongoing research which today takes shape in several attempts to reach a "post-modern" or "extended" synthesis of the theory of descent with modifications (Jablonka and Lamb 2005; Pigliucci and Müller 2010).

As mentioned, this reworking of the Darwinian and Neo-darwinist theories, still in progress both in the fields of behavioural sciences and evolutionary studies, is today leading towards a both post-genocentric and post-anthropocentric approach. The potential of Darwinian Darwinism as a scientific and cultural revolution, capable of shattering the disciplinary boundaries between natural sciences and humanities and of opening new roads toward the understanding of ourselves and other animals, finds, in my opinion, its best enhancement in this theoretic and methodological developments.[28] Yet in some areas of behavioural sciences such as evolutionary psychology and sociobiology, mechanistic and genocentric explanatory models still prevail despite the results of contemporary molecular, evolutionary and developmental biology having made them obsolete.

These ultimately determinist models aim at supporting the idea that there is a "human nature", understood as a set of psychic and behavioural predispositions fixed in a modular way (divided into behavioural modules or patterns independent from one another), that is the result of natural selection, is transmitted through genetic inheritance and remains therefore substantially impermeable to or hardly influenced by environmental, family, cultural, and social influences.

Leading exponents of this school of thought such as Steven Pinker, Marc Hauser, Jonathan Haidt believe that the development of personality and even of individual moral, political and religious tendencies are substantially guided by innate characteristics and that the living or training environment has little or no influence on them (Boyer 2001; Pinker 2004; Alford et al. 2005; Hauser 2006; Haidt 2012). As we have already seen, although having been proposed by scholars who like to call themselves Darwinists or "ultra-Darwinists", this thesis is the exact opposite of that advocated by Darwin himself in *The Descent of Man*. Above all, this thesis is now rendered anachronistic by developments in areas of research such as behavioural, social and cultural epigenetics that are based on statistical, historical, empirical and

[28] With them I will deal a little more extensively in other two essays of this volume.

experimental data. The latter in fact show that not only environmental stimuli and personal experiences, but also the habits and experiences of immediately preceding generations trigger processes of methylation and demethylation, or deactivation and reactivation of the genes which influence the development of important attitudes such as the propensity to explore and establish social bonds, the degree of exposure to stress, or the mental ductility (Jablonka 2013, 2014, 2017).

Unsettling developments for every form of genetic determinism, which also attest to their distance from those who, like Weissmann and Dawkins, Pinker and Hauser, imagined hereditary material as something largely impermeable to external influences, and the natural selection of genetic variants as the *only* law regulating biological evolution, and the critical foresight of Darwin.

The latter is wisely collected in the few sentences with which Darwin concluded the introduction of *The Origin of Species*: "I am convinced that natural selection was the main cause, but not the only one, of modifications" (Darwin 1859: 5), and with the same pluralistic spirit, in the Chapter V dedicated to the "laws of variation", he admitted that some "Lamarckian" factors (climate, nutrition, habits, use and disuse of organs) had their weight in the differentiation of varieties and species (Darwin 1871: 211).

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