

## The Vital Error. Where Evolutionary Biology and Genealogy Meet

MARCO PIASENTIER

### **Abstract:**

In *On the Genealogy of Morality*, Nietzsche sets up an opposition between the ‘naïveté of English biologists’ in their researches on the evolution of life and the complexity of a methodology able to record the singularity and the contingency of natural events without introducing any finality: genealogy. Nietzsche shares with the ‘English biologists’ the need to trace the explanation of living beings back to a naturalistic framework liberated from theology, but he questions their linear and progressive conception of evolution. This article explores these two competing biological accounts of life. The first is informed by the adaptationist paradigm, namely the theoretical framework of contemporary ‘English biologists’; the second is elaborated by combining the theories of the palaeontologist Stephen J. Gould with the work of Nietzsche, Foucault and Esposito on life and genealogy. If the former account introduces a positive normative ground – rendering biology a synonym for destiny – the latter runs the risk of being secretly inhabited by a negative normative ground, which prescribes an infinite demand for liberation and transformation.

**Keywords:** error, Esposito, evolutionary biology, exaptation, Foucault, genealogy, Gould, Nietzsche, normativity, Tarizzo.

In his famous essay dedicated to Nietzsche and history,<sup>1</sup> Foucault opposes genealogy to biology, maintaining that:

Genealogy does not pretend to go back in time to restore an unbroken continuity that operates beyond the dispersion of forgotten things; its duty is not to demonstrate that the past actively exists in the present, that it continues secretly to animate the present, having imposed a predetermined form to all its vicissitudes. *Genealogy does not resemble the evolution of a species* and does not map the destiny of a people (NGH, 76)

Genealogy questions every attempt at retrieving a linear development, but records the singularity and the contingency of events without introducing any form of teleology. The purity of the origin is dissolved by letting its non-originary character emerge. Borrowing a key term from the Italian philosopher Roberto Esposito, genealogy exposes the ‘originary in/origin’, the point of flight intrinsic to every origin, showing ‘that, far from belonging solely to itself, [the origin] splits from itself, divides into its own other, and thus in the other from its own’.<sup>2</sup>

Foucault sees a contrast between genealogy and evolution, because he equates the theory of evolution with a very specific understanding of it: ‘adaptationist programme’.<sup>3</sup> In this way, he contributes to reinforcing the widespread conviction that natural history progresses in a necessary and linear manner, while human history follows a contingent and non-linear path. Put in these terms, the distinction implies that, while evolution is supposed to be regulated by a normative principle, human history is a site of freedom independent from the necessity of nature. But is this really the case? Drawing on the research of the palaeontologist Stephen J. Gould - whose work constitutes one of the most important critiques of the reductionist and deterministic interpretations of the theory

of evolution - I will firstly demonstrate that *genealogy does resemble the evolution of a species* and, secondly, that the encounter between evolutionary theory and genealogy does not necessarily liberate the notion of life from a normative and teleological essence. The current genealogical account of life places the notion of error - in its double meaning of 'wandering' and 'mistake' – at the core of natural history. This notion introduces a negative normative force which animates the living beings and imposes on them a continuous work of contestation and transformation against any fossilization into a linear progressive path.

### *1. The Adaptationist paradigm*

Foucault was right in claiming that genealogy has nothing to do with the evolution of a species if one explains evolution according to the methodological principles of the adaptationist paradigm. This programme of research has taken three different forms that follow almost in chronological order from Darwin's proposal of his theory to the present time: social Darwinism, socio-biology, and contemporary evolutionary psychology. These three interpretations of the theory of evolution by natural selection share the idea that 'natural selection regulates everything of any importance in evolution, and that adaptation emerges as a universal result and ultimate test of selection's ubiquity' (*DF*, 2).

The adaptationist paradigm interprets all relevant attributes of organisms as adaptations for reproductive success. The analysis proceeds by dividing the organism in parts and attributing to each of them an optimal adaptive function. The entire history of life becomes one grand solution to problems in design; as the philosopher Daniel Dennett writes: 'biology is engineering'.<sup>4</sup> The comparison with a designed mechanism is more

than simply a metaphor, but becomes the research method by which to explain organisms and their evolution: just as we can ask about the purpose of any part in a human-engineered machine (“Why do cars have doors?”), so we can ask about the purpose of any trait in an organism (“Why do birds have wings?”). As a result, natural selection becomes a totalizing force aimed at creating good design and improving the adaptive functionality of traits, in order to increase the reproductive rate of the organisms. As Gould and Lewontin write: ‘an adaptationist programme has dominated evolutionary thought in England and the United States during the past forty years. It is based on faith in the power of natural selection as an optimizing agent. It proceeds by breaking an organism into unitary "traits" and proposing an adaptive story for each considered separately’ (*SSMPP*, 581).

If one assumes the most radical interpretation of these adaptive tales, two main consequences will follow. First, no room is left for non-adaptive traits: the engineering power of natural selection is supposed to shape the organism so that every trait has its adaptive purpose. Therefore, all the attributes of organisms have to be considered as adaptations for reproductive success. Second, every transgression of the current function imposed on a trait by natural selection can be easily interpreted as a violation of the order imposed by nature. With adaptationism, biology becomes a synonym of destiny and a strong normative dimension is introduced in nature. In its most originary and radical interpretation the adaptationist programme allows only the improvement of the functionality of adaptive traits and it considers every deviation from the original function a dangerous anomaly. For example, wings are made for flying (descriptive level), therefore they have to be used only for this purpose (prescriptive level). Since they are

animals among other animals, the same argument has to be applied to human beings. For example, the body and behaviour of women evolved for the caring of children (descriptive level), hence they have to take care of the infants (prescriptive level): if they do otherwise, their behaviours will be necessarily dysfunctional and unnatural, since the originary function of every trait has to be considered normative. The course of evolution will be a linear path where non-adaptive traits and organisms will be eliminated by natural selection and adaptive traits and organisms will progressively acquire a more complex and adaptive functioning.

Although the normative claims have been mitigated, an important part of contemporary evolutionary biology continues to follow the core argument of the adaptationist programme. In a seminal book on evolutionary psychology the philosopher of mind Stephen Stich and the psychiatrist Dominic Murphy explain mental disease, in particular depression, as the result of the discrepancy between the evolution of the human mind for a hunter-gatherer environment and the tasks imposed on it by contemporary societies. ‘The environment in which selection pressure acted so as to leave us with our current mental endowment is not the one we live in now. This means – Murphy and Stich continue – that any mental mechanism producing harmful behaviour in the modern world may be fulfilling its design specifications to the letter, in an environment it was not designed for’.<sup>5</sup> The difference between the current use of a trait and its historical origin is what creates its malfunctioning. Every trait therefore has a precise function and cannot be coopted for uses different from the originary one.

## 2. *Exaptation*

In 1979, Stephen J. Gould and Richard Lewontin published a paper entitled ‘The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme’. As the title already suggests, the article was aimed at challenging the ‘Darwinian fundamentalism’ derived from the improper use of the adaptationist programme in evolutionary biology. In opposition to this ‘fundamentalist’ interpretation of the power of natural selection, Gould and Lewontin argue that some traits are just the result of a clumsy and quirky evolutionary history. They illustrate their argument using an architectural analogy. They invite the reader to consider the relation between arches and spandrels in the design of cathedrals that have domes, such as San Marco in Venice. The spandrels – the triangular spaces formed by the intersection of two rounded arches – are necessary architectural byproducts of mounting a dome on rounded arches. The spandrels are therefore a necessary consequence of the structural demand for the architecture of the dome and serve no function in themselves. Similarly, the development of organisms typically leads to the existence of non-adaptive structural elements.

In cathedrals, spandrels usually contain a mosaic perfectly adapted to the available space. The painting is so harmonious that one is tempted to see it as the initial point in the understanding of the architecture of the cathedral. The adaptationist explanation would be: the mosaic is perfectly adapted to the space of the spandrels, therefore the spandrels are designed to allow the presence of the mosaics. On the contrary, the spandrels – a collateral and non-adaptive consequence of architectonic constraints – are ‘co-opted’ for allocating the mosaics, hence their apparent perfect adaptation.

Three years after the publication of the article with Lewontin, Gould wrote a

paper with the paleontologist Elisabeth Vrba in which he further developed the idea of the spandrel by introducing the scientific term 'exaptation'. With this paper – entitled 'Exaptation - A Missing Term in the Science of Form' – Gould and Vrba overcame the metaphorical example of the cathedral and proposed a scientific argument to demonstrate the utilization of an existing feature of an organism for a novel functional purpose. Adaptation refers to a feature that is 'built by natural selection for the function it now performs'.<sup>6</sup> For example, wings are made *for* flight, as the arches are built to support the dome. Exaptation refers to traits that are 'co-opted' for a function that contributes to fitness, no matter how they arose. Exaptations can be of two different types. The first one is 'a character, previously shaped by natural selection for a particular function (an adaptation), [which] is coopted for a new use-cooptation' (*EMTSF*, 5). For example, 'the Black Heron of Africa, like most modern birds, uses its wings in flight. But it also uses them in an interesting way to prey on small fishes: its fishing is performed standing in shallow water with wings stretched out and forward, forming an umbrella-like canopy which casts a shadow in the water. In this way its food can be seen' (*EMTSF*, 7-8). The wing *per se* is an exaptation in its current use for shading, and if one continues the genealogy, one will find that the feathers covering it arose in different adaptive contexts, and that they were thermic devices. If the first type of exaptation still takes into consideration traits that served a specific function, the second one concerns 'a character whose origin cannot be ascribed to the direct action of natural selection (a nonadaptation), [which] is coopted for a current use—cooptation' (*EMTSF*, 5). An example of the second type of exaptation is the 'thumb' of the giant panda. The diet of these animals is based almost entirely on bamboo which they eat in the following way: the giant pandas hold the

bamboo in their paws and strip off the leaves by passing the stalks between an apparently flexible thumb and the remaining fingers.<sup>7</sup> It is well known that the opposable thumb is a specific characteristic of humans. In fact, if one includes this apparent opposable thumb in the count of a panda's fingers it will be found that it has six. Gould explains this anomaly demonstrating that the panda's 'thumb' is not, anatomically, a finger,

it is constructed from a bone called the radial sesamoid, normally a small component of the wrist. In pandas, the radial sesamoid is greatly enlarged and elongated until it almost equals the metapodial bones of the true digits in length. The radial sesamoid underlies a pad on the panda's forepaw; the five digits form the framework of another pad, the palmar. A shallow furrow separates the two pads and serves as a channel way for bamboo stalks (*PT*, 22).

The sesamoid thumb of pandas is an exaptation of the second type: a non-adaptive trait coopted for the adaptive function of manipulating objects in feeding. In opposition with the adaptationist approach, one can see how some traits of living beings are merely the side consequences of structural constraints of the organism and have no selective value.

Despite the importance of Gould's notion of spandrels, an ambiguity still seems to remain hidden in his work. One could claim that the adaptationist analysis of the organism is not completely denied by Gould, but he questions its totalizing pretensions. The metaphor used in his paper on spandrels can help to elucidate the problem. In the example of the cathedral, the arches are the expression of an intrinsic function which - translated in the terminology of evolutionary biology - means that some natural traits have a fixed function, and that their existence and proliferation can be explained by their adaptive intrinsic value. In this sense, Gould's idea of evolution is still tied to an engineering process, with the only difference that his approach does not design all the traits of an organism.



It is also possible to proceed in a different manner by radicalizing the notion of exaptation and claiming that no trait evolved *for* a specific function. Going back to the metaphor of the cathedral, one can argue that the traits that are identified as arches have not evolved *for* the purpose of sustaining the dome, but they are exaptations as well. The engineering method is not resized but challenged at its theoretical core. No trait has an intrinsic function and therefore there cannot be a normative value embedded in it. Borrowing an expression from the philosopher of biology Robert Cummins, in this way it is possible to separate the ‘why-is-it-there’ question from the ‘what-is-it-for’ one.<sup>8</sup> Genealogy is precisely what allows a disconnection to be created, challenging the idea of a proper intrinsic function of a trait. The origin of a trait is necessarily non-originary, because it is the result of a process of cooptation, without a pure origin.

### *3. Evolution and Genealogy*

The critical gesture that Gould makes towards the adaptationist paradigm mirrors the objections proposed by Nietzsche against what he calls the ‘English biologists’.<sup>9</sup> When the German philosopher – in *On the Genealogy of Morality* – refers to these scientists, he has in mind mainly the work of Herbert Spencer and, more generally, the research of those who wanted to provide a naturalistic explanation of human behaviour, from its simpler to more complex expressions, such as morality. Nietzsche elaborates the genealogical method, first and foremost, to challenge their naïve approach, which is characterized by a lack of knowledge of the past that leads to an understanding of natural history as a linear and progressive process.

In his *The Structure of Evolutionary Theory*, Gould refers precisely to genealogy finding in it the logic intrinsic to his notion of exaptation. The meeting point between Nietzsche and Darwin is the idea of evolution as a contingent and non-linear path.

Genealogy is what allows us to distinguish between the historical origin and the current utility of a trait, letting the ‘originary in/origin’ of traits emerge. Even if Gould has elaborated the idea of exaptation independently from Nietzsche, he himself recognizes the similarity with the notion of genealogy proposed in *On the Genealogy of Morality* and quotes the following passage to show this affinity:

No matter how perfectly you have understood the usefulness of any physiological organ (or legal institution, social custom, political usage, art form or religious rite) you have not yet thereby grasped how it emerged: uncomfortable and unpleasant as this may sound (...) for people down the ages have believed that the obvious purpose of a thing, its utility, form and shape are its reason for existence: the eye is made to see, the hand to grasp (GM, 51)<sup>10</sup>

Nietzsche challenges the ‘English biologists’ precisely on their lack of distinction between the current use of a trait and its historical origin – between the ‘why-is-it-there’ question and the ‘what-is-it-for’ one – maintaining that the ‘naïveté of English biologists’ (GM, 33) lets them individuate the purpose of a trait (i.e. the eye to see) ‘and then innocently place this purpose at the beginning as *causa finendi*’ (GM, 50). On the contrary, ‘genealogy retrieves an indispensable restraint: it must record the singularity of the events outside of any monotonous finality’ (NGH, 76). The disengagement of the historical origin from the current function serves to establish ‘the ground of contingency and unpredictability in history – for any organ, during its history, undergoes a series of quirky shifts in function’ (SET, 1217). The spandrels of the dome were not intentionally projected to serve their current function, but they are a contingent and unplanned result. If one tries to find the idea of an engineer, one will find only an accidental origin determined by the architectonic constraints of the building. There is no originary decision

beyond their creation; their origin is non-originary. Two important consequences follow from this idea of natural history:

1. A critique of evolution as '*progressus* towards a goal' (*GM*, 51).
2. A challenge to any adaptationist claim about the normativity of a trait or behaviour.

The evolution of the life has been often interpreted as a continual progression towards a future that is better than the past. The most evident example of this reading is the usual iconography of the theory of evolution, where *Homo sapiens* is taken to be the higher result of a linear advance. The idea of a ladder of perfection enters into evolutionary theory again, through the back door. This latent idea of progress embedded in the theory of evolution has to be taken seriously, since it is not a reading external to Darwin himself, but can be easily found in many of his works:

The inhabitants of each successive period in the world's history have beaten their predecessors in the race for life, and are, in so far, higher in the scale of nature; and this may account for that vague yet ill-defined sentiment, felt by many paleontologists, that organization on the whole has progressed.<sup>11</sup>

Hence natural selection would favour an increase in complexity over time. For Darwin, selection seems to be a progressive force in evolution, as expressed in this other passage, where a definition of 'higher forms' is put forward:

The best definition probably is, that the higher forms have their organs more distinctly specialised for different functions; as such division of physiological labour seems to be an advantage to each being, natural selection will constantly tend in so far to make the later and more modified forms higher than their earlier progenitors, or than the slightly modified descendants of such progenitors (*OS*, 247-8)

In opposition to a progressive interpretation of the tree of life, Gould presents an interpretation of the evolution as a bush where placement in time does not coincide with judgment of worth.<sup>12</sup> He does not deny the existence of more or less complex organisms, but ‘the complexity of the most complex form alive tends to drift up over the generations, just because the point of origin of life is close to the physical lower bound’.<sup>13</sup> The present function of a trait cannot be interpreted in any sense as the result of a linear march towards improvement of complexity and design aimed at winning the ‘race for life’. As Nietzsche writes in his *On the Genealogy of Morality*:

The whole history of a “thing”, an organ, a tradition can to this extent be a continuous chain of signs, continually revealing new interpretations and adaptations, the causes of which need not be connected even amongst themselves, but rather sometimes just follow and replace one another at random. The “development” of a thing, a tradition, an organ is therefore certainly not its *progressus* towards a goal, still less is it a logical *progressus*.<sup>14</sup>

The second point, the question of normativity, can be further problematized thanks to Nietzsche and his understanding of deviation. The adaptationist paradigm obliges us to consider any deviation from the current function of a trait as a transgression, a deviant use. According to Gould, exaptations are adaptive traits that assume a new function or non-adaptive traits that become adaptive. Nietzsche allows us to further develop and radicalize the notion of exaptation by introducing a third option according to which a maladaptation can be coopted to serve an adaptive purpose. The Nietzschean idea of ‘ennoblement through degeneration’<sup>15</sup> that Esposito uses as a key concept in order to redefine the immunitarian paradigm expresses precisely this third option which can be summarized as *immunization by means of contamination, adaptiveness by means of*

*maladaptiveness.*

*Fountain* by Marcel Duchamp is probably one of most provocative and iconoclastic gestures aimed at subverting traditional artistic production. He took one of the most visceral products of modern industrial life - a urinal - and transformed it into a work of art. With this gesture twentieth century aesthetics learned that the act of creation has nothing to do with purity and nobility in the traditional sense, but the ennoblement can be reached through degeneration, immunization thanks to contamination, art through the serial products of the industrial world. Esposito clearly expresses this idea when he writes that ‘as only Nietzsche of the “great health” had glimpsed, biological normality doesn’t reside in the capacity to impede variations, or even diseases of the organism, but will be found rather in integrating them within a different normative material’(BBP, 191). Every object is constitutively *perspectival*, because it can be re-coopted, resignified in multiple ways. Every trait - as well as every object - is *lacking*, constitutively inhabited by a lack which becomes a point of flight, an excess that allows it to be coopted, resignified. The real risk does not lie in the disease of the organism, but in its incapacity ‘to face new risks, such as the atrophying of what is naturally imperiling about (life)’(BBP, 191).

#### 4. ‘Error’

The Nietzschean idea of ‘great health’, in which strength and health are defined through a lust for adventure and contamination, places at its core the ‘naturally imperiling’ essence of life. In a crucial text dedicated to Canguilhem and entitled ‘Life. Experience and Science’, Michel Foucault condenses his conception of life. The key term to explain it is

‘error’, in French *‘erreur’*. The etymology of the word comes from the Latin *‘error-oris’* which means both ‘wandering’ and ‘mistake’<sup>16</sup>. Foucault’s reference to the Latin origin of the term is clear when he writes that life ‘is destined to “err” and to be “wrong”’.<sup>17</sup> Hence, the term has to be understood as a deviation from truth. Against the hypostatization into a linear path, life risks itself in new unexplored directions, and therefore the anomaly determined by the deviation from an ordinary path becomes its essential characteristic, its most vital essence:

It has not been possible to constitute a science of living without taking into account, as something essential to its object, the possibility of disease, death, monstrosity, anomaly, and error (...) in this sense, life - and this is its radical feature - is that which is capable of error. And perhaps it is this datum or rather this contingency which must be asked to account for the fact that the question of anomaly permeates the whole of biology. And it must also be asked to account for the mutations and evolutive processes to which they lead (LES, 474 and 476)

The influence of Nietzsche resonates in the Foucauldian notion of ‘error’. The most dangerous illness is not the risk of contamination but precisely the opposite, namely the preventative withdrawal from its danger. Anomaly permeates life and it is what allows its transformation.

The Foucauldian idea of life as ‘error’ can be easily translated in Darwinian terms: anomaly is the random variation, which functions as the raw material on which natural selection exercises its selective power. ‘The possibility of disease, death, monstrosity, anomaly, and error’, has to be considered as a vital possibility, a chance to imagine new forms-of-life, new strategies of survival and reproduction. Error – the random excess of variation over selection – stops being a deviation from the linear and progressive path of evolution and becomes a key resource in the selective process of life.

If the ‘great health’ of the organism lies in its ability to coopt new traits, then illness is not the presence of non-adaptive or even maladaptive traits, but the lack of a normative force of the organism which, with Gould, one could call the cooptive force of the organism. It is not only the influence of Nietzsche which resonates in the text, but obviously also that of Canguilhem who maintains:

Life is in fact a normative activity. The normative, in philosophy, includes every judgment which evaluates or qualifies a fact in relation to a norm, but this mode of judgment is essentially subordinate to that which establishes norms. The normative, in the fullest sense of the word, is that which establishes norms. And it is in that sense that we plan to talk about biological normativity.<sup>18</sup>

The encounter between genealogy and evolutionary biology allows the bringing to light of two conceptions of life. The shift from the adaptationist account to the genealogical one can be described as the passage from the figureless figure of the traveller to the ‘wanderer’. In both cases life does not have as its aim any ideal and definitive type. Like a traveler or a ‘wanderer’, life belongs not to a place but to travel itself, it is characterized by a constant process of transformation, which does not tend to a final form; the lack of a final form to reach is what makes life a *blind* force that never commits itself to a stable destination. The Italian philosopher Davide Tarizzo clearly expresses this idea in his works dedicated to the modern notion of life. In a recent article on this topic he writes that:

Life is a secret force. What living beings conceal, what makes them, strictly speaking, live, is life itself understood as a force. (...) This force (...) is that which makes of each living being a Self focused on the continuous endeavour to affirm and reinforce itself (...) Every form-of-life is reduced to the precarious and

transient expression of a force-of-life, of a blind and eager will to exist.<sup>19</sup>

The 'secret force' of life is what Canguilhem would call 'an unconscious position of values'(NP, 126). The conservation and strengthening of life's norm-establishing becomes an end in itself. In Darwinian vocabulary the 'secret force' can be defined as 'the unconscious struggle among individual organisms to promote their own personal reproductive success – nothing else, and nothing higher' (DF, 3).

This secret force, the 'blind and eager will to exist' intrinsic to life is what – paraphrasing Foucault – maps the destiny of the living. The adaptationist paradigm imposes a positivistic normative ground on the animal kingdom, since life prescribes a linear path of optimization and strengthening; the journey of life has to be intended as a march towards progress, towards a perfection always to come. Despite the strong critique of the normative ground of adaptationism, the genealogical account of the living seems to be partially informed by a normative instance which from positive – even better positivistic - becomes negative and imposes a continuous work of contestation and transformation against any fossilization into a linear path. The nobilization of 'error' implies an inversion of signs - from a positive to a negative conception of life - which does not completely neutralize the normative horizon of the notion of life. The traveller becomes a 'wanderer' whose path is not the result of a constant optimization and calculation, but the outcome of the possibilities at hand. As Canguilhem writes, 'life is in fact a normative activity'(NP, 126). The possibility of a fixed trait has to be challenged since it would render the creative power of life incapable of establishing some other functions or values, blocking in this way its originary normative force. The normative force of life becomes its creative power of cooptation, where 'natural selection operates



as the creative force of evolutionary change' (*SET*, 139).

### 5. *The Gray Genealogy*

The encounter between evolution and genealogy seems, at the same time, inevitable and questionable. On the one hand, genealogy has its roots in the modern conception of life, since *On the Genealogy of Morality* is a text, first and foremost, dedicated to proposing a critique of the 'English biologists' and to developing a different naturalistic explanation of the evolution of behaviours and traits. On the other, the attempt at letting the contingency of natural history, its complete lack of purpose, effectively emerge, is vitiated by the introduction of an *élan vital* that transforms genealogy into what I would call a *blind vitalist teleology* which is no longer aimed towards the formation of a specific living form or towards organisms having specific traits. As Tarizzo maintains, the process of evolution is not guided towards the production of 'final forms', but it is still teleological because it tends towards the strengthening of a 'final force'.<sup>20</sup> Paraphrasing a Foucauldian expression, 'impatience for liberty',<sup>21</sup> we could say that the subject of life is characterized by an impatience for movement and transformation, an *impatience for life itself*. The essence of life becomes a force intended as the site of permanent openness and resignificability, an excess always overflowing its forms. It would therefore seem necessary to envision a notion of change without introducing terms such as 'error' and 'wandering', which remain negatively kept within a normative horizon. On the contrary, life – from a genealogical perspective – should be described without any reference to how things *ought* to be, but as a bare fact that does not convey any value or judgment.

Foucault opens his text on Nietzsche by writing that 'Genealogy is gray,

meticulous, and patiently documentary (...) on this basis, it is obvious that Paul Rée was wrong to follow the English tendency in describing the history of morality in terms of linear development'(NGH, 76). Paul Rée was Nietzsche's friend committed to proposing a naturalistic explanation of the origin of morality. He rejected metaphysical explanations of good and evil and elaborated an account of moral phenomena within the Darwinian framework in terms of natural causes. At the beginning of his confrontation with the theory of evolution, Nietzsche considered Rée the most interesting contemporary moralist but he would later go on to criticize him profoundly when he started realizing the problems of the methodology of the English biologists, on which Rée himself was relying. However, challenging the 'English tendency' and questioning the linear development of a trait or a behaviour does not seem sufficient to get rid of the vitalist essence of life. If one wanted to be consistent with the idea of genealogy as a grey and meticulous description, one would have to admit that the genealogical account of life has not yet been accomplished since an *élan vital* still animates living beings.

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## NOTES

<sup>1</sup> Michel Foucault, *Nietzsche, Genealogy, History*, in *The Foucault Reader*, edited by Paul Rabinow (New York: Pantheon Books, 1984), pp. 76-100, henceforward *NGH*.

<sup>2</sup> Roberto Esposito, *Bíos. Biopolitics and Philosophy* (Minneapolis: University of Minnesota Press, 2006), 75, henceforward *BBP*.

<sup>3</sup> Stephen J. Gould and Richard C. Lewontin, 'The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme', in *Proceedings of Royal Society Biological Sciences*, 205:1161 (September 1979) 581-598, henceforward *SSMPP*.

<sup>4</sup> Daniel C. Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (London: Penguin Books, 1996), 187.

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- <sup>5</sup> Dominic Murphy and Stephen Stich, 'Darwin in the madhouse: evolutionary psychology and the classification of mental disorders', in Peter Carruthers and Andre Chamberlain, *Evolution and the Human Mind: Modularity, Language and Meta-Cognition* (Cambridge: Cambridge University Press, 2000), 21.
- <sup>6</sup> Stephen J. Gould and Elisabeth S. Vrba, 'Exaptation-A Missing Term in the Science of Form', *Paleobiology*, 8:1 (Winter 1982) 5, henceforward *EMTSF*.
- <sup>7</sup> See Stephen J. Gould, *The Panda's Thumb* (New York: W. W. Norton, 1980), 22, henceforward *PT*.
- <sup>8</sup> See Robert Cummins, 'Neo-teleology', in *Functions: New Essays in the Philosophy of Psychology and Biology*, edited by Andre Ariew, Robert Cummins and Mark Perlman (Oxford: Oxford University Press, 2002), 157-172.
- <sup>9</sup> Friedrich W. Nietzsche, *On the Genealogy of Morality*, translated by Maudemarine Clark and Alan J. Swensen (London: Hackett Publishing Co., 2011), 33, henceforward *GM*.
- <sup>10</sup> Quoted in Stephen J. Gould, *The Structure of Evolutionary Theory* (Cambridge MA: Belknap Press of Harvard University Press, 2002), 1217, henceforward *SET*.
- <sup>11</sup> Charles Darwin, *On the Origin of Species*, edited by Gillian Beer (Oxford: Oxford University Press, 2008), 253, henceforward *OS*.
- <sup>12</sup> Stephen J. Gould, *Wonderful Life: The Burgess Shale and the Nature of History*. (New York: W. W. Norton, 1989), 38.
- <sup>13</sup> Kim Sterelny, *Dawkins vs. Gould: Survival of the Fittest* (London: Icon Books Ltd, 2007), 146.
- <sup>14</sup> Quoted in Gould, *The Structure of Evolutionary Theory* 1217.
- <sup>15</sup> Friedrich W. Nietzsche, *Human, All Too Human*, translated by R.J. Hollingdale (Cambridge: Cambridge University Press, 1996), 107.
- <sup>16</sup> *Collins Latin Dictionary & Grammar*, Dictionary based on the Collins Latin Gem (1957) by Professor D.A. Kidd (Glasgow: HarperCollins Publishers, 2006), 78.
- <sup>17</sup> Michel Foucault, 'Life. Experience and Science', in *Essential works of Foucault 1954-1984 V.2: Aesthetics, Method, and Epistemology*, edited by James Faubion, translated by Robert Hurley (London: Penguin Books, 2000), 476, henceforward, *LES*.
- <sup>18</sup> George Canguilhem, *The Normal and the Pathological* (New York: Zone Books, 1991), 126-127, henceforward, *NP*.
- <sup>19</sup> Davide Tarizzo, 'The Untamed Ontology', in *Angelaki, Journal of the Theoretical Humanities*, vol. 16, n. 3, September 2011, 54-55.
- <sup>20</sup> Davide Tarizzo, *La vita. Un'invenzione recente* (Bari: Laterza, 2010), 113.

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<sup>21</sup> Michel Foucault, 'What is Enlightenment', in *Essential works of Foucault 1954-1984 V.1: Ethics*, edited by Paul Rabinow, translated by Robert Hurley (London: Penguin Books, 2000), 319.