

Darwinian storied residence: an introduction to the work of Holmes Rolston III

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Abstract. A key issue of environmental ethics is to identify intrinsic objects of valuation within the natural environment. Such intrinsic natural values are fundamental prerequisites to frame moral obligations to nature. This paper gives a global perspective on Holmes Rolston's philosophy. By deploying the evolutionary history of life on earth, Rolston draws attention to the formidable creativity which drives it so that it *commands respect and admiration*. This paper contends that his work lies at the intersection of epistemology of natural sciences, moral philosophy and religious studies. The Darwinian model is used to define the main thematic concepts in Rolston's philosophy and, in greater depth, the general trend of his thinking.

Holmes Rolston III is University Distinguished Professor of Philosophy at Colorado State University and could well be referred to as the founding father of Anglo-American environmental ethics, a philosophical field of investigation which emerged in the early 1970s. Born on 19 November 1932 in Staunton, Virginia, Dr. Rolston is the son and grandson of Presbyterian ministers, whose name and faith he shares – the reason why he says he is the third of his line. As he recounted, the house in which he spent his childhood, in the heartland of the celebrated Shenandoah Valley, had neither electricity nor running water, but was uniquely instrumental in giving the young environmentalist his initial immersion in a luxuriant and wild natural countryside.

Dr. Rolston first studied physics and mathematics at Davidson College, North Carolina, but soon turned to biology. In 1953, he enrolled in a university course in Theology and Religious Studies which he began at the Union Theological Seminary of Virginia and completed at the University of Edinburgh, where he gained a Ph.D. in 1958, under the tutelage of Thomas F. Torrance¹.



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¹A highly significant tutelage as we shall see. T. F. Torrance (1913–2007) was probably the greatest British theologian of the 20th century. A prolific author, he was instrumental, inter alia, in the re-discovery of Oriental patristic literature and authored a landmark reading of Calvin's theology; a tireless translator, he was successful in introducing the thoughts of Karl Barth to the English-speaking world, in particular when he supervised the 13-volume translation of the monumental *Kirliche Dogmatik*; a self-taught ge-

In the following decade, while he served as minister of the Presbyterian Church, not far from the Appalachian mountains, in the company of his wife and two children, he continued studying, reading mineralogy, zoology, palaeontology, botany, ecology, and furthered his expertise in biology (both general and evolutionary) through personal research and courses at the University of Tennessee which he attended as an auditor. He also began to earn a reputation as an environmental activist when he militated in favour of the conservation of certain wild species indigenous to the Appalachians. His growing taste for philosophy led to enrolment in the University of Pittsburgh where he received a Master's degree in the Philosophy of Science in 1968. He obtained his first teaching post that same year at the Colorado State University in Fort Collins, where he taught during his entire academic career.

It is only rarely that a philosopher's academic training so precisely sets out in advance the theoretical framework for his thinking as it develops over the ensuing years. Dr. Rolston's written works represent an impressive collection of over two hundred articles and a half dozen books, all focused on the exact point where the epistemology of natural sciences, moral philosophy and religious studies intersect

nius, he made a decisive contribution to the study of the relationship between theology and the natural and physical sciences – thereby paving the way for Rolston's own work and those of Peacocke, Polkinghorne, Barbour, Wentzel van Huyssteen, et al., to which we shall return. For his work as a whole, Torrance was awarded the Templeton Prize in 1978, which Rolston also won in 2003. See his recipient's acceptance statement at http://www.templetonprize.org/pdfs/Templeton_Prize_Chronicle_2003.pdf.

with *environmental ethics*, Rolston's specific contribution to the renewal of the dialogue between science and religion initiated at the end of the 1960s by Thomas F. Torrance². This in itself is evidence of how difficult it is to sketch the outlines of a literary production which, to be fully understood, must respect this triple polarisation which makes it so valuable and original.

In scientific terms, Holmes Rolston is not only a remarkably well-informed reader of the latest advances of neo-Darwinian theory, but also a thinker who seeks to take fully into account the multiple contemporary ramifications of Darwinism in such diverse domains as socio-biology, behavioural ecology and evolutionary psychology. Darwinism, taken in the broadest acceptance of the term, defines the dominant paradigm determining the main thematic concepts in Rolston's philosophy and ecological theology and, in greater depth, the general trend of his thinking. Not that H. Rolston seeks to use this approach, as would Daniel C. Dennett or Richard Dawkins, as a "universal acid" to erode and dissolve generally accepted ideas and beliefs (religious ones in particular) which are incompatible with the lessons taught by the theory of evolution. On the contrary, he uses it to demonstrate that this type of scientific explanation of the natural world, which discovers in nature an order which is both rational and contingent, raises a certain number of borderline issues which are an encouragement to discover new and unexpected forms of rational order in a approach supplementing science.

Rolston's particular interest in the epistemological neo-Darwinian model for the elucidation of the history of life on earth, is that its effect is to blur irreversibly the boundary between the "nomologic" and the "idiographic" sciences³; between the study of factual sequences and concatenations and the study of the creation of a value system, as evidenced in a certain way by the existence of Darwinian anthropology

²A selective bibliography of Dr. Rolston's written work is listed at the end of this introduction. There is no exhaustive bibliography at this time, but the most comprehensive list is to be found at the end of the collective volume on Dr. Rolston: Ch. Preston and W. Ouderkirk (Eds.), (2007). He is generally held to be the founding father of environmental ethics in view of the impact of his article published in 1975 in the prestigious journal *Ethics* (Rolston, H., 1975), which defines – probably as no one else had done before – a programme for environmental ethics. Another factor was the creation (with E. Hargrove) of the publication *Environmental Ethics*. For comment on the multidisciplinary style of Dr. Rolston's work and on the make-up of the field of research of which it is a part, see Ian G. Barbour (2000) or H. Rolston himself (Rolston, H., 1987). As for the use of Darwinism in a theological and ecological perspective, see the recent and very exhaustive study by R. Attfield (2006).

³Following the distinction between *Naturwissenschaften* and *Geisteswissenschaften* first proposed by Dilthey and later systematised by Windelband and Rickert, later to become widely disseminated well beyond the neo-Kantian sphere. In Rolston's view, it is remarkable that this distinction was made at the very time when the Darwinian revolution made it more than ever ineffective.

and sociology; and also the methodological impossibility of eliminating from natural evolution all traces of any *narrative* content by reducing it to a random succession of causal sequences. There is certainly no cause to deny that contingency is the very root of life on earth since the onset of replication and the inevitable mutations which accidentally disturb the process of transmission of genetic information, but what is implied by the concept of "genetic information" itself must be ascertained:

An organism is "informed" about how to make its way through the world, how to cope in its niche. Past achievements are recapitulated in the present, with variations; these results are tested today and then folded into the future. Random mutation figures into a larger generative process; species generate and test new possibilities. The challenge is to get as much versatility coupled with as much stability as possible. This requires keeping past knowledge while exploring nearby areas for better adaptation. (Rolston, H., 2005b, p. 49)

The capacity to acquire, store and transmit new information radically distinguishes the process of life on earth from any geological process; unlike hydrological, climatological and orogenic cycles, the cycles of birth, life and death and genetic transmission benefit from the incomparable advantage of cumulative information. That is why evolutionary biology is *historical* through and through, as neither physics nor geophysics can aspire to be. Where little more than matter and energy existed, three billion years ago appeared a new state of matter, neither liquid nor gaseous – a *vital* state – which, through the working of genetic information and natural selection, generated some five to ten million animal species and the extraordinary diversity and complexity of life on earth. The process of life, considered at the macro- and mega-evolutionary level, is pervaded by a force of neguentropy and a power of creativity which the standard model of the synthetic theory of evolution cannot render. The emergence of life, biodiversity, the general propensity for growing complexity, are not the product of pure chance or of a miracle. They are rather the most probable consequence of evolution taking place not in a world of infinite possibilities, but in a world where chance plays its role amid natural constraints which are such that life inevitably would happen, diversify and become complex⁴.

⁴Rolston adopts a standpoint in an ongoing debate between the life sciences specialists, opposing on the one hand those who believe in radical contingency and that "The Universe was not pregnant with life, nor the biosphere with Man" (inter alia J. Monod, F. Jacob, S. J. Gould, S. Weinberg, M. Ruse) and on the other hand, those who believe in the theory of "mandatory" evolution (a process that must be seen as inevitable despite its indeterminate course) and who interpret contingency as generating complexity (Ch. De Duve, S. Conway Morris, S. A. Kauffman). Since the late 1980s, the terms of this debate have been reformulated in the context of a re-nascent dispute between science and religion – a dispute which has had a worldwide impact and very numerous implications (politi-

However, the “logic” of life does not take kindly to being reduced to a scanty set of natural laws to which initial conditions are appended. As Rolston says, no one can assume microbes as a premise and deduce trilobites as a conclusion:

I cannot give you an argument explaining all this history that has gone before – some logic by which there came to be primeval Earth, Precambrian protozoans, Cambrian trilobites, Triassic dinosaurs, Eocene mammals, Pliocene primates, eventuating in Pleistocene *homo sapiens*. (...) The theory neither predicts outcomes, nor, looking back after the outcomes are known, retrodicts why these events rather than thousands of other courses of events equally consistent with the theory failed to take place. (Rolston, H., 1986, p. 96).

All we can do at this point, is to tell a story – the story of life on earth – in such a way that the living epic is adequate to account fully for each individual life and each evolutionary line. Consequently, there is no sense, in Rolston’s view, in trying to *justify* the intrinsic value of a natural being, as though there could be a “logic” in the defence of the existence *per se* of spotted owls or lemurs. Both are specific forms of life which have managed to survive in their respective environments over time, over a long history which has enriched the history of life on earth. And that in itself should suffice to justify their existence.

This point is worth emphasising: if “demonstration” is taken to mean a necessary relationship between premise and conclusion without consideration of the attitude of subjects regarding these proposals, then attributing an intrinsic value to the entities of the natural world is not in fact demonstrated as such by Rolston himself⁵. The abundance of scientific

cal, philosophical and scientific) – opposing on the one hand Darwinians of strict obedience openly militating in favour of atheism (R. Dawkins and D. Dennett in particular, and more widely the Brights movement) and, on the other hand, the advocates of *Intelligent Design* who have never concealed their closeness to religious circles (W. Dembski and M. Behe in particular). Rolston clearly seeks to strike a course between these different standpoints: he supports a weakly teleological effect on the evolutionary process – thus supporting in part the advocates of *Intelligent Design* – but also emphasises that there is a part played by irrepressible novelty and unpredictable emergence which presides over the history of life on earth which must not be underestimated, in line with a thesis radicalised by the ultra-Darwinians.

⁵That being so, Rolston is in excellent company, because there is no evidence that Bentham ever justified the central proposition that “Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do”. – Jeremy Bentham, *The Principles of Morals and Legislation* (1789) Ch I.; nor Locke the notion that “The state of Nature has a law of Nature to govern it” (...) according to which “No one ought to harm another in his life, health, liberty or possessions”. (*Second Treatise on Civil Government*); nor Kant who is content to declare solemnly that “There is nothing it is possible to think of anywhere in the world, or indeed anything at all outside it, that can be held to be good without limitation, excepting only a good will” (*Groundwork*

information that Rolston calls on page after page in his complete works aims to prepare the ground on which environmental ethics can be built, on the basis that “We always shape our values in significant measure in accord with our notion of the kind of universe that we live in, and this drives our sense of duty” (Rolston, H., 1998, p. 143). The way in which the world seems *to be* (that which our natural and physical sciences teach us) delineates the horizon on which are outlined the ultimate aims determining what *must be*, perhaps not by logical implication but at least via some kind of abductive inference.

At this point, the general meaning of Rolston’s environmental philosophy becomes more accessible. By seeking to obtain the recognition of the presence of objective natural values whose intrinsic existence is not in any way dependent on the subject who evaluates, but are in fact present in the world, inscribed almost in the very substance of the world, where the mind encounters or discovers them rather than giving them to the world, Rolston seeks to reset human experience in this scene as constituting one of the types of values which has a moral content – the richest no doubt, but not unique – so that we may learn to recognise the (objective) value of what we in fact (subjectively) do not value. In doing so, we may determine a set of duties beyond our own preferences.

Environmental ethics thus defined, it is clear that for Rolston, the object is not human ethics applied to the environment, nor is it ethics applied to the use of resources, of costs and benefits, of damage and improvement as implied by the management of our natural environment, for both present and future generations, since this kind of ethic is unable to raise the issue of our relationship with nature other than in terms of prudent husbandry instead of with the respect that recognition of the existence of the world’s intrinsic values can command.

The fundamental problem encountered by environmental ethics adopting such a programme is to find out, on the one hand, how to determine what constitutes an intrinsic object of valuation within the natural environment, in terms which must be able to include objects of traditional moral concern (such as the individual members of some animal species), but also – if ethics is to be *environmental* – of the more unlikely entities (such as entire species, ecosystems, etc.); and on the other hand, how to base a certain number of moral obligations and, more generally, human obligations to nature, on the recognition of the existence of intrinsic natural values.

Rolston’s stratagem consists in deploying for its own sake, with quite an abundance of detail, the evolutionary history

for the Metaphysics of Morals, first section). This decisive point has been neglected, we believe, by some interpreters of Rolston’s work who thought they had detected at that level an extension of Kant’s ideas on the attribution of ends in themselves, whereas this interpretation does not have any textual support and is explicitly contradicted in numerous statements by the author emphasising that his position is not based on reason and is not logically necessary.

of life on earth as it was made intelligible through neo-Darwinism, while drawing attention to the formidable creativity which drives it so that it *commands respect and admiration*.

It is for this purpose that Rolston invites his readers to consider more carefully the reign of life (ranging from the most rudimentary plant forms to multicellular animals), while he teaches them to wonder at the treasures of organisation, self-regulation and functional substitution which are the ubiquitous evidence that there exists something which is akin to intelligence of life, a plasticity and a capacity for recovering its forms by a growing organism capable of healing its wounds, resisting death and reproducing itself. "Every genetic set is in this sense a (nonmoral) normative set, proposing what ought to be beyond what is." notes Rolston (Rolston, H., 1988, p. 257). Seen from that angle, to say that a natural being possesses an intrinsic value independently of conscious human attribution of such a value, is tantamount to recognising for that being the capacity to have its own agenda, inherent through genetic programming, which can be deployed and attained autonomously⁶.

But analysis and the feeling of wonder which is its correlate cannot stop there: a natural being is itself only because it is part of a whole, in that it is a member of a specific population that adapted through the evolutionary process to the ecological niche which it inhabits, which itself is closely connected to a larger biotic community within a network of ecosystems ranked in successive levels of integration. That being so, although natural beings individually construct their intrinsic value, the vital interests they defend are always those of their own existence and this value could be transferred so to speak from one level of integration to another, passing successively from the individual natural beings to the species of which they are members, and then from that species to all the species and the biotic communities which, at some point (in a synchronic perspective) and at all moments in the history of life on earth (in a diachronic perspective), are interrelated; and finally from these transhistoric biotic communities to the multiple abiotic components of the environment with which they are interdependent, up to and including nature as a whole.

When natural history is skilfully recounted, it should eventually inspire a feeling of respectful awe and admiration⁷ –

⁶There is in that context a "teleological centre of life", as stated by Paul Taylor. But, unlike again other interpretations of Rolston's philosophy, we believe that the similarities between the two authors end at that point, since Rolston never justifies (and makes no attempt to) the notion that a natural being values what is of benefit to its own existence, no more than he deduces from the "interests" that a natural being seems to be displaying that humans have any duty to that natural being.

⁷This is of course one of the main points of entry (but only one of many and not even the most original) to Rolston's ecological theology. The word he always uses to describe this sentiment is "awe", a word which traditionally designates in religious literature the won-

derment of the believer in the presence of the *mysterium tremendum fascinans et augustum*, which R. Otto renamed: the "feeling of the numinous". However, H. Rolston does not specifically refer to a religious experience: it is also aesthetic, in the tradition here of the aesthetic of the sublime, for which the object of admiration is given as the power of nature, in all its exuberance and fecundity. In a word, all that is "wild", contrasting with all that is domesticated, anthropized and contrived. The aesthetics of nature that H. Rolston defends – and it features very prominently in his thinking – is the aesthetics of the *swamp*, of those opaque and chaotic places where the crucible of creation can be glimpsed, much more than it is the aesthetics of a *landscape* and of a *sunset* (see Rolston, H., 2000). Rolston's ecological theology is essentially based on an interpretation of nature as a kenotic process – nature viewed as "cruciform" – thus adopting a relatively novel standpoint in the context of modern theology, as was ably demonstrated by Lisa H. Sideris (2003).

that paralysing sense of being overwhelmed by a superior creative power that envelops and assigns us our place in creation, in which the human species is simply a chapter in the odyssey of life on Earth:

Every species is a "display" or "show" (...) in the natural history book. These stories are plural, diverse, erratic, but they are not wholly fragmented episodes. The pressures of natural selection pull them into roles into their communities, fit them into niches, give continuity to the stories, and make more unified ecosystemic stories of the many stories. Always there are themes in their settings, characters moving through space and time, problems and their resolutions, the plotting of life paths. Exceeding the births and deaths of individual members, a specific form of life unfolds an intergenerational narrative. What humans are bound to respect in natural history is (...) the living drama, continuing with all its actors. (Rolston, H., 1988, p. 145)

The crucial importance of choosing a narrative model to understand the successive forms of life begins to be clearer. As J.-Y. Goffi (2000) rightly remarks, to a large degree this is a novel variation on the theme of the Great Book of Nature: Galileo invited readers to learn its timeless language, that of mathematics, without which it is humanly impossible to understand even a single word, but Rolston invites us, in harmony with the model of neo-Darwinian intelligibility, to trace the development and intricacy of life lines through time, to rediscover behind current forms of life the long history of which they are the heirs, to grasp for its own sake the long and painstaking process of life on Earth – this true miracle of creativity – investing the beings it calls into existence with a dignity that commands respect. The history of life reveals nature as "projective", developing projects, tracing a lineage, constructing ecosystemic equilibria, within a framework where nothing is left to chance, where everything plays a role, however modest, and where nevertheless, anything is possible. If only humans can learn to admire this scene they are an integral part of, can learn to wonder at the breadth and the length of the biotic enterprise, they cannot

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but be concerned about the part they play in it and aspire to cease acting like vandals⁸.

Here again, all we can do is tell a story – the story of that long sequence of events which led to the arrival on the scene of human beings – so that men are inspired to believe that they are part of the immensity of nature and that duties are incumbent upon them because they are the actors of a tale that is not fully told:

I cannot give you an argument explaining how humans arrived, some logic by which the Earth story eventuates in *homo sapiens*. No theory exists from which we follow as conclusions. (...) What I can do is invite you as a historical subject to appreciate the objective story that lies in, with and under the Earth we inhabit, to enrich the story by telling it. You can be a microcosm of the macrocosm and enjoy your storied residence here. (Rolston, H., 1986, p. 97)⁹

The concept of “storied residence” which Rolston uses habitually and in many variations (“storied place”, “storied natural history”, “storied fitness”, etc.) is central to all his environmental policy constructions. It can be understood in two ways.

First of all, following a clearly bioregionalist modulation, the concept refers to the “place attachment” that humans cultivate according to their historical or geographical background, to the topography and cultural environment where

⁸That at any rate is Rolston’s wager and is evidence that the position he is defending is closer than he cares to recognise to environmental virtue ethics, which he wrongly interprets as being anthropocentric. Environmental virtue ethics is an extension in the environmental ethics field of the teleologic or communitarian types of ethics which emerged in the 1970s in connection with the censure of the dominant deontological or utilitarian ethics. The central point consists in arguing that since ecology is a developing science, it can never be sufficiently explicit for it to be possible to apply a definition of what is right or wrong directly on a case-by-case basis, which is why it is important to acquire the habit of respecting nature and granting moral consideration to the entities of the natural world. Therefore, although environmental virtue ethics deals in effect with actions to be undertaken, it only does so obliquely, by taking into account the attitudes and practices which support them, so that by the same token it can elude having to examine specifically each singular action.

⁹The expression “storied residence” does not translate easily. In English, the word “storied” has several meanings. It can designate that which is illustrious or glorious (e.g. “the storied journey of the Mayflower”), or in a description of a tapestry or the capital of a pillar, the decoration of a scene with figures, in particular scenes from the Scriptures (as in the French word “*historier*”). Rolston plays on both these meanings, to which in English is added the notion of a narrative, a story or a romance as in a tale recounting real or imaginary events (e.g. a “love story”). Evolutionary history is, par excellence, without any need to endow it with any Panglossian orientation, a “storied natural history” because, taken altogether, it is the history of the triumph of life and in particular the triumph of the species that are still in existence and have co-evolved. In French, the adjective formed from the word “*légende*” seems to cover the same semantic ground.

they live and within which their personal history evolves. From this angle, Rolston points out that it is worthwhile to reinvest humanity’s sojourn on earth with *tangible warmth*, making sure that effective specificities, the continuity that defines a place as time passes and the complex tissue of territorial sediment which makes up its physiognomic identity, related to the way in which the community’s establishment in a given place was historically arrived at, are not left out. But not with the intention of preserving a set of museum pieces, rather to comply with the notion that habitation, as a process of shaping a dwelling, is the product of a slow and unpredictable appropriation of tradition, a complex set of actions, memories and identities. Inhabited territories are a kind of diagram of the meaning that a community or a culture gives itself and includes in the visible pattern of a specific landscape or built-up area so that it can tell a tale to its descendants centuries later. If we accept that built-up areas and the countryside can be defined as forming a “cultural locality”, the violation of their formal and symbolic identity will result in the disruption of aesthetic and natural values and of memory and will affect the conditions in which a given historical intergenerational community was able to imprint an environmental entity with its own style, so that it became a region in life on earth (a “bioregion”). These considerations are surely sufficiently powerful to justify submitting town and country planning policies to a certain number of rules¹⁰.

But more fundamentally, the “storied residence” of humans is to be taken as meaning that its nature is evolutionary and ecological and that it is therefore a reminder of the kinship of humans with all the other living beings with which they co-evolved as “fellow voyagers in the odyssey of evolution”, whose survival depends on the integrity of a certain number of ecological processes. However, unlike many environmental ethicists, Rolston refrains from drawing on this undeniable common origin of all the forms of life on earth to construct an ethic founded on a biotic community. He prefers to insist on the *cultural* specificity of the “storied residence” of humans for whom particular pride of place in creation must be observed:

Humans superimpose cultures on the wild nature out of which they once emerged, with radical innovations. Information in wild nature travels intergenerationally on genes; information in culture travels neurally as people are educated into transmissible cultures. Though the higher animals can learn

¹⁰On this point, Rolston generally mentions the work associated with Kirkpatrick Sale’s bioregionalist trend. See (in French) the special issue of the review *Eléments*, “*Le localisme. Une réponse à la mondialisation*”, (no. 100, 2001). It may seem surprising that Rolston never refers to J. Brinckerhoff Jackson’s remarkable work, although it triggered a revolution in the study of landscapes in the 20th century and the theories he supported are very close to Rolston’s own: see J. B. Jackson (1980), and the issue of the review *Le Visiteur* (no. 5, 2000) that is almost entirely focused on this author. But, presumably, as happens once in while, Jackson is probably better known in France than in his own country.

limited behaviors from parents and conspecifics, animals do not form transmissible cultures. (Rolston, H., 1994, p. 2)

Let us be clear: Rolston in no way seeks to find for humans the possibility of *surpassing* nature – if that were so, humans would be seen as essentially alien to nature, in a perspective which would seem far from compatible with the Darwinian paradigm and, more generally, with the very scheme of environmental ethics – but more of a *reiteration* of nature. The transition of nature to culture in Rolston's thinking takes place through an evolutionary process of the mind giving rise, so to speak, to a second nature based on the one that is our human heritage, by virtue of the very exercise of the mind's innate capacity for reflection and learning, which not content with augmenting its cognitive capacities, also endows them with specialisation.. Recent advances in the neurosciences have taught us that it is not sufficient to say that cerebral structure and function determine the conditions allowing psychic activity, but that reciprocally, the dynamics of synaptic connections and of the neuronal networks linked to the exercise of psychic capacities lead to a reorganisation of the brain through what neurologists call "cerebral plasticity", and orchestrate profuse construction and destruction of our "mental maps". Cerebral activity is a natural power, generating its own rebirth through the reversal of cause and effect, so that it ceases to be the sole product of our genes and expresses the permanent modifications imposed by our personal history¹¹.

Once the discontinuity between nature and culture is established, it becomes a convenient touchstone to determine which duties are incumbent upon us in our relationships with various entities in the natural world and with other human beings. For example, is it our duty to relieve suffering, as best we can, regardless of who is affected? Rolston's response deserves to be quoted at length:

¹¹See on this subject H. Rolston (2005a). The concept of "cerebral plasticity" follows explicitly a concept deriving from neo-Darwinism. G. Edelman speaks of "neuronal Darwinism" on this subject and J.-P. Changeux of "epigenesis by selective stabilization of neurons". Although the concept of neuroplasticity is a new one, the act of guaranteeing the passage of nature to the mind by a replication of the mind itself reminds us irresistibly of Hegel: the spirit is the *single* moment in Hegelian philosophy where the same expression is used for the result and the beginning. The Philosophy of Nature ends with a study of the spirit and of its functions, whereas the Philosophy of Mind starts with a study of the spirit and of its functions. For both Hegel and Rolston, the terminal boundary of nature and the initial boundary of the mind are closely related; for both Hegel and Rolston, it is the form of relationship in time which is the essence of anthropological differentiation (a function of cultural and educational tradition for the one, and a function of the power of habituation as a condition for any learning process, for the other). The schematic character of the dualist-interactionist theory supported by Rolston is perhaps to be regretted as is the absence of serious discussion of progress in the field of evolutive robotics and artificial intelligence.

It might be thought that pain is a bad thing, whether in nature or culture. Perhaps when dealing with humans in culture, additional levels of value and utility must be protected by conferring rights that do not exist in the wild, but meanwhile at least we should minimize animal suffering. That is indeed a worthy imperative in culture where animals are removed from nature and bred, but it may be misguided when animals remain in ecosystems. (...) Pain in ecosystems is instrumental pain, through which the sheep are naturally selected for a more satisfactory adaptive fit. (...) The question, Can they suffer? is not as simple as Bentham thought. What we *ought* to do depends on what *is*. The *is* of nature differs significantly from the *is* of culture, even when similar suffering is present in both. (Rolston, H., 1998, p. 128)

To demand that the virtues of compassion and charity, justice and honesty apply to any form of life, independently of the place it occupies in the network of life and whether or not it belongs to the natural wild or to a specific culture, would mean abandoning any attempt to discriminate between orders that are essentially separate.

Socio-biology makes an exactly opposite mistake in believing in "gene morality": no conclusion – and even less justification – can be drawn regarding the social organisation of humans from the fact that evolution selects a particular genetic trait, which increases the prevalence of the specific gene or genes in the genetic pool of the species concerned. Inclusive fitness and altruistic kin selection may well be powerful instruments, explaining animal behaviour when they help members of their bloodline, in the interest of the genes of their shared inheritance, but they do not have any descriptive or regulatory value in explaining the merciful attitude of which the parable of the Good Samaritan is a paradigm.¹²

As a consequence, there must be no confusion between two very different claims: that nature can provide the norms on which to base a limitation of the actions that are allowable in the natural world; and that nature can teach us how we should behave towards each other. It may well be that nature

¹²"The Morality of the Gene" is the heading of the first chapter of Edward O. Wilson's founding book (1975). The concepts: "the selfish gene" and "kin selection" were developed respectively by R. Dawkins and J. Maynard-Smith. Here again H. Rolston defends a standpoint in a debate that has generated a great deal of discussion in recent years, opposing those who seek to explain moral behaviours in terms of "ultimate causes" (E. Mayr), i.e. causes whose study requires recourse to evolution (inter alia, F. de Waal, R. Alexander, R. Trivers, E. Sober and D. S. Wilson), and those who consider that morality transcends per se biological functions, mostly based on Christian perspectives (St. Pope, Ph. Clayton, Rolston himself). Rolston attaches considerable importance to, and has no hesitation in applauding the considerable success of recent developments in behavioural ecology and evolutionary psychology. But he believes that both trends fail to recognise the truly emergent dimension of human culture, which has introduced a radical and irrepressible novelty into the history of evolution. See in particular on this point Rolston (1993, 2004).

holds some objective intrinsic values that humans must respect, even if these values are not the conscious outcome of a subject's evaluation and deliberation. Animals with the gift of awareness, plants and ecosystems are not moral agents but may be recognised as having an intrinsic value and therefore an impact on the deliberations of those moral agents who discover them within the natural world.

The whole purpose of ecological ethics is to reveal such natural values – those which are inscribed in the world's raw material and which are swept along on the current of evolution, as well as those which are interlocked with to the storied residence of humans on earth – so as to provide a rational basis to support decisions on environmental policies.

In conclusion, we must note that whatever policies we finally decide to adopt, they can not be limited to simply preserving national natural values – much the same way as Mark Sagoff (1974) once proposed to set aside the natural indigenous environment of the United States to serve as testimony to the existence and history of the first settlers, so that Americans – who, unlike the inhabitants of the Old World, have no ancestral scientific and artistic traditions – could maintain a living link with their past. While each natural value represents a fabric of stories woven by the multiple intricate strands of evolution, it is not possible to reduce such values to their sole and fleeting geographic existence and to confine them artificially within national borders, because it is only when the tale is told that it becomes reality. For this reason, in the same way that the path of any individual life always spans, unknowingly, phylogenetic mutations over centuries of time, for Rolston there can be no policy unless it is planetary and no justice unless it is interspecific.

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