Chapter 2
Wallace's Controversy with Darwin on Man's Mental Evolution, on the Position of the Natives in Human Evolution, and His Anticipation of Cultural Evolution, as Distinct from Biological Evolution

Joseph Neumann

Abstract Darwin argued that man, including his mental faculties, developed from his sub-human ancestors by natural selection, sexual selection, and the use and disuse of organs (in the Lamarckian mode). He rejected any non-natural involvement in this process, and described a large number of behavioral and mental properties, including language, which can be found in rudimentary form in some animals. However, he assumed this, prior of the discovery of the crucial differences between the instinctive and specific calls of animals, and the symbolic language of humans. His major conclusion was that although the gap in the mental properties between humans and their closest relatives is enormous, it is quantitative rather than qualitative. With regard to the different human races, Darwin suggested that they differ in their inherited mental properties, but belong to a single species. In contrast to Darwin, Wallace did not regard modern human "primitives" as candidates that could fill the gap between humans and apes. He envisioned two steps in human evolution: first, the development of upright posture and freeing of the hands, brought about by natural selection, and then a second step that involved mainly the evolution of the brain and the mind. Wallace subsequently argued that some of the higher human mental abilities (mathematics, art, or the use of abstract concepts) were not the result of natural selection, since they are beyond utility. He claimed that these properties developed as a result of the action of a "higher intelligence", which guides human intelligence and morality, and the whole evolutionary process, purposefully. There is some disagreement as to whether Wallace's belief in the action of a "higher intelligence", and his descent from Darwin on this issue, were the result of his support of spiritualism or was based on purely scientific arguments. Darwin, on his part, forcefully rejected Wallace's support of the involvement of non-natural causes in evolution of human mental faculties and provided arguments that they were the result of the same mechanisms that acted in the formation of the body, and generally in species evolution. Later, S. J. Gould pointed out that the rapid rate of the development of several mental functions, which Wallace had regarded as an indication of a lack of role in the struggle of life are actually the result of cultural evolution. Both Darwin and Wallace did not pay sufficient attention to the large diversity in human mentality, and the rare and unique existence of individuals with outstanding achievements ("geniuses"). The latter's unusual and unique creativity in various artistic, philosophical and related activities apparently developed intrinsically, from some "inner resources", unrelated to the Darwinian "struggle for life".

Keywords Darwin • Guiding intelligence • History of science • "Struggle for life" • Wallace

Introduction

It is known that the publication of the "Origin of Species" by Darwin in 1859 was provoked by a short assay by Alfred Russel Wallace, who outlined a similar theory, and sent it to Darwin for review and publication. In the "Origin", Darwin devoted just a single sentence to man: "Light will be thrown on the origin of man and his history". The detailed discussion of human evolution had to wait till 1871, with the publication of "The Descent of Man", which was too, in a sense, a response to Wallace, who at about this time had abandoned natural selection as a cause for the formation of human higher mental faculties, and replaced it by the action of a "higher intelligence".

It should be noted that in "The Descent", Darwin extended his theory to man, without having the benefit of the

J. Neumann (✉)
Department of Molecular Biology and Ecology of Plants, Tel-Aviv University, 69978 Tel-Aviv, Israel
e-mail: jnoy@post.tau.ac.il

J. Neumann
Department of Philosophy, Tel-Aviv University, 69978 Tel-Aviv, Israel

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evidence of a single subhuman fossil. His arguments in the "Descent" were based on his own observations, on the scientific and popular publications of others, and occasionally, on some anecdotes.

Darwin's thesis was opposed to the widely accepted view of his time. According to Darwin, "many authors insisted, that man is divided by an insuperable barrier from all the lower animals in his mental faculties. … man alone is capable of progressive improvement; that he alone makes use of tools or fire, domesticated other animals or possesses property; that no animal has the power of abstraction, or of forming general concepts, is self-conscious and comprehends himself; that no animal employs language; that man alone has a sense of beauty, is liable to caprice, has feeling of gratitude, mystery etc.; believes in God or is endowed with a conscience" (Darwin 2009, p. 70).

In opposition to this view, Darwin believed that man descended from an ancestral form, common to man and the anthropoid apes, by the same mechanisms that were active in the evolution of other species, namely, natural selection (based on the laws of variation and heredity), sexual selection, the inherited effects of use and disuse, (in the Lamarckian mode), and "correlated variation".[1]

Darwin insisted that both human body and mental faculties, including intellectual, moral and spiritual capacities, have been derived from their rudiments in the lower animals, through the above mentioned mechanisms. He presented many observations, showing that the rudiments of most, if not all mental and moral faculties of man are present in some animals. Thus, certain animals exhibit distinct acts of reasoning, curiosity, imitation, attention, wonder and memory; some of their behaviors may be interpreted as displays of kindness toward their fellows; some exhibit pride, contempt, shame, suspicion, pleasure, pain, happiness, misery and fear, as well as courage and timidity; some exhibit behavior that suggests the power to deceive; many animals exhibit maternal affection; grief; attention; jealousy; some adopt youngsters, even from other species; and the love of the dog (a domesticated beast) for his master is well known.[2]

As for the origin of the mental powers Darwin wrote: "In what manner the mental powers developed in the lower organisms, is as hopeless an inquiry as how life originated" (Darwin 2009: 61).

Turning to the development of intellect, Darwin endorsed the premise that the size of the brain is closely correlated with the development of the intellectual faculty. This he thought is supported by the "skulls of savage and civilized races, of ancient and modern people and by the comparison of the whole vertebrate series" (Darwin 2009: 52).

One important feature separating humans from other animals is language. According to Darwin, language also developed in the process of evolution; it depended on, and was enhanced by sociality. Darwin compared the similarity of the formation of the different languages, with the formation of the species, indicating that the former developed also through a gradual process (Darwin 2010: 33).[3]

Darwin assumed that the human "vocal organs" became adapted through the inherited effect of use for the utterances of articulate language. He stressed the similarity between human language and the calls made by certain animals, suggesting that the two may have developed by comparable mechanisms. Some animals, indeed, utter different sounds, to their fellows or their young, each which a different message. However, he wrote this, before the discovery of the crucial difference between the instinctive calls of animals, and human symbolic language.[4]

All in all, Darwin's major conclusion was that the difference in mental abilities between man and the higher

[1]Darwin noted that since an organism is an integrated whole, an adaptive change in one part of the organism, may entail non-adaptive changes in other parts (Darwin 2009: 44).

[2]Note that here Darwin drew conclusions about the existence of feelings and emotions, like fear, anger and pleasure, which are subjective, from the observation of behavior – an objective property. Still, it should be mentioned that Darwin did speculate about the relation between the brain and the mind – "The brain, for example, might secrete thoughts as the liver secreted bile" (quoted by Richards 2005: 169).

[3]Modern support for the evolutionary origin of language was discussed in Pinker (1994). Pinker regards language as an ability unique to humans, formed during evolution, in order to solve the specific problem of communication among social hunter-gatherers. He compared language to other species' adaptations, such as spiders' web-weaving or beavers' dam-building behavior, designating all three "instincts".

[4]Unlike human language, which is based on a large vocabulary, that can still be enlarged, animals possess a limited number of sounds, each one directed to a specific aim. Animals are unable to increase the number of their sounds, or transform their emotional cries into sounds with different meanings. Human language, on the other hand, is composed of symbols (Cassirer 1944), with a wide range of meanings, including the capacity to refer to past and future events. A symbol is not an element of reality, like mass or energy; it is a sign that a humans refer to an entity, by arbitrary convention.

According to the philosopher Karl Popper (1972), "Human languages share with animal languages the two lower functions: (1) self-expression and (2) signaling. Animal language is symptomatic of the state of the organism; whereas the signaling or release function can cause a response in another organism".

On the other hand, human languages have in addition, many other functions. And the two most important according to Popper (1972) are: the descriptive function and the argumentative function. "It is to the development of these higher functions that we owe our human reason. They are also a condition for acquiring knowledge".

One should add, that humans use language for many other functions, like asking questions, giving promises or giving orders; it is also a prerequisite for the development of a complex human culture (see below).

Finally, today we know that the sounds of animals depend on the activity of an evolutionary older part of the brain, the "limbic system", whereas human language is based on the activity of the neo-cortex.

animals, although immense, is one of degree and not of kind; it is quantitative and not qualitative.

Darwin on Human Races[5]

Darwin's opinion on human races was equivocal. It has been argued that Darwin was not a racist. He actively opposed the mistreatment of other races and opposed slavery. During his voyage on the 'Beagle' he described the Fuegians as a starving, dirty, ill clad, and war like people, who would kill and eat their elderly women before they devour their hunting dogs. On the other hand he wrote: "The Fuegians rank among the lowest barbarians, [but]…the three natives on board H.M.S. 'Beagle', who have lived some years in England … resembled us in disposition and in most our mental faculties" (Darwin 2009: 60).

Darwin claimed that until paleontological evidence of human origin were discovered, the best case for human evolution could be made by assuming that the most primitive human groups could be shown to be behaviorally as little different as possible from the great apes.

Belonging to the cultural milieu of the mid-19th century Victorian England, Darwin believed in a racial gradation tracing back to the ape. The less culturally advanced people were regarded as living fossils, both culturally and physically, without a clear differentiation between the two.

In the "Descent" (quoted by Eiseley 1961: 288) Darwin "implied marked differences in the inherited mental faculties between the members of the different existing races, postulating that in the lowest savages many of these faculties are very little advanced from the condition in which they appear in the higher animals, and some are very inferior in comparison to those that appear in the civilized races".

In addition, Darwin, like many thinkers of his time, argued that the cultures had changed from the simple to the complex, by gradually, developing from an original type that was perhaps less different, from that of the great apes, than it was from the most advanced modern societies. He assumed that all civilized nations were once barbarous, which he supported by observation, of the low conditions, customs, beliefs, language etc. in the societies of the natives of his day.

All in all, according to Darwin, the western nations of Europe immeasurably surpassed their former savage progenitors and stand now at the summit of civilization; still he maintained, that all human races descended from a single ancestral population, thus believing in monogenism as against polygenism, according to which the different races, represent different lineages of origin.

Alfred Russel Wallace

Wallace was a naturalist who spent a considerable time among the tribal societies in South America and South-East Asia under conditions where his existence depended on their help. Observing their life extensively, he concluded that these people, as far as their behavior and habits are concerned, were indeed retarded in comparison to the Europeans, but basically they are neither intellectually nor morally inferior to them; and with proper training, could rapidly reach their level. Unlike Darwin, Wallace did not explain human races as representing successive stages of evolution leading up to the Europeans; and maintained that there were no essential differences between civilized and savage men. Further breaking from Darwin, he did not regard "the modern primitives as almost filling the gap between man and ape" (Eiseley 1961, p. 305). Wallace rejected Darwin's conclusion that the mental faculties of the savages are very little advanced from their conditions in the higher animals, and that they are much inferior in comparison to those possessed by the civilized races. In his description of the natives, Wallace betrays scarcely a trace of the superiority so common in nineteenth-century European scientific circles (Eiseley 1961).

With regard to human evolution, Wallace accepted Darwin's basic conclusion that human's bodily structure descended from an ancestral form, common to man and the anthropoid apes, by natural selection. However, in a paper published in 1864 (quoted in Darwin 2009: 107), he presented a novel idea, according to which the rise of the human brain had altogether altered the nature of the evolutionary process (Eiseley 1961). Wallace maintained that human evolution took place in two stages: the first was indeed a product of natural selection and resulted in the physical changes of the body, culminating in the bipedal posture and the freeing of the hands, as implements to carry out the dictates of the brain; however, in a second stage whose postulation constituted Wallace's original contribution to the evolution of man (Eiseley 1961) nature had at last produced an organism that was not confined to any narrow category of existence, but rather was potentially capable of endless inventions (by which Wallace alluded to cultural evolution, see below), a being whose mind was of vastly greater importance than his bodily structure – "a true culture-producing brain" (Eiseley 1961: 318).

Wallace pointed out that the bodily differences between man and the great apes were small, but the gap in mental and cranial characters was vast. He surmised that the evolution of

[5]In modern times, some anthropologists (e.g., Alland 1973) have claimed that the term "race" should be restricted to sociological analyses, since according to this view, it is not a valid taxonomic unit in biology.

human cranial size was a very long process, perhaps lasting as long as ten million years (Eiseley 1961, p. 307).[6]

Wallace's "Apostasy"

Several years after publishing the paper about the two phases of human evolution, Wallace made a radical change in his attitude to the development of mind (sometimes dubbed as "apostasy"). In a paper published in 1869, Wallace came to the conclusion that "natural selection and its purely utilitarian approach to life could not account for many aspects and capacities of the human brain" (quoted in Eiseley 1961, p. 310). "We must therefore admit, that man's large brain could never have been solely developed by any of those laws of evolution, whose essence is that they lead to a degree of organization exactly proportionate to the wants of each species never beyond those wants" (Shanahan 2004, p. 252). "There had come into existence, (Wallace emphasized), a being in whom mind was of vastly greater importance than bodily structure"; this view, "neither requires us to depreciate the intellectual chasm which separates man from the apes, nor refuses the full recognition of the striking resemblances to them, which exists in other parts of his structure" (quoted in Eiseley 1961: 308). Furthermore, "Natural selection…could have endowed the savage with a brain a little superior to that of an ape, whereas he actually possesses one but very little inferior to that of the average member of our learned societies" (Wallace's quoted in Eiseley 1961: 311).

Commenting on this statement, Loren Eiesley (1961: 311) wrote: "Today when careful distinctions are made between natural genetic endowment and cultural inheritance, such a remark does not sound particularly iconoclastic. In Wallace's time, however, it was a direct challenge to western ethnocentrism and the whole conception of the natives as a living fossil".

Wallace pointed out that "among the lowest savages with the least copious vocabularies, the capacity of uttering a variety of distinct articulate sounds, and of applying them to an almost infinite amount of modulation and inflection, is not in any way inferior to that of the higher races. Thus, the problem posed by human evolution was the failure of natural selection to explain the enlarged human brain (event of the savages), compared to that of the apes, (since as far as we know, the brains of savages are neither smaller nor more poorly organized than our own),[7] as well as the organ of speech. *An instrument has been developed in advance of the needs of its possessor"* (my emphasis); Wallace quoted in Eiseley (1961: 311).

Wallace reminded us that Darwin maintained in the "Origin" that "natural selection tends only to make each organic being as perfect as or slightly more perfect than, the other inhabitants of the same country with which it has to struggle for existence; "Natural selection will not produce absolute perfection". Thus, Wallace concluded that natural selection and its purely utilitarian approach cannot account for many aspects and capacities of the human brain.

Though, like all his contemporaries, Wallace did not doubt the superiority of the European culture, he believed that all human groups had *innately* equal intellectual capacities.

With regard to the role of natural selection in the development of human mental evolution, Darwin did not concur. "Man in the rudest state in which he now exists it the most dominant animal that has ever appeared on this earth… He manifestly owes this superiority to his intellectual faculties, to his social habits, which laid him to aid and defend his fellows, and to his corporeal structure, …through his power of intellect, articulate language has been evolved… He has invented and is able to use various weapons, tools traps etc., by which he defends himself… He has made canoes for fishing or for crossing to neighboring fertile islands. He discovered the art of making fire… These several inventions, by which man in the rudest state has become so pre-eminent are the direct result of the development of his power of observation, memory, curiosity, imagination and reason. I cannot therefore understand how it is that Mr. Wallace maintains that natural selection could only have endowed the savage with a brain a little superior to that of ape" (Darwin 2009: 48).

The intellectual and moral faculties of man are variable and probably heritable, "therefore if they were formerly of high importance to primeval man and to his ape-like

[6]Since Darwin's and Wallace's time, a number of highly important "proto-human" fossils were discovered. Some of these could be arranged (in hindsight!) as a series of "missing links" leading to modern humans. Based on these discoveries, it is indeed by now agreed, that human bipedal posture and the freeing of the hands preceded the large end very fast rate (on an "evolutionary time scale") expansion of the brain.

Unlike Wallace's supposition, that this process took perhaps 10 million years, there is now substantial evidence that the brain increased over the last 2 million years from about 500 cc (a size only slightly over that of non-human primates) to about almost 1400 cc. This fast rate of change was probably not the result of ecological change, but of fierce social competition (e.g., Foley 1995).

The social competition was expressed by Richard Dawkins as the dictate "to be smart and outsmart the other", a type of competition which led to an "arms race", i.e., a process of "evolutionary interactions, within a species or between two species, in which each player becomes adapted as a result of interaction with the other player" (Sterelny 2007: 199).

[7]Thomas Henry Huxley responded to Wallace's challenge by pointing out, that the life of primitive people actually required extraordinary mental feats. "The intellectual labor of a good hunter or warrior considerably exceeds that of an ordinary Englishman" (Shanahan 2004: 253).

progenitors, they would have been perfected or advanced through natural selection" (Darwin 2009: 107). Thus, Darwin concluded that both the intellectual and moral faculties have been increased by natural selection.

Darwin speculated that in the civilized society, perhaps those of superior intellect tend to rear a greater number of children hence producing "some tendency to an increase in both number and standard of the intellectually able". He claimed that those individuals who were the most sagacious, who invented and used the best weapons, would rear the greatest number of offspring. In the same vain, the tribes that included the greatest numbers of such men would increase in number and supplant other tribes.

Moreover, Darwin claimed that since there are gradations in mental capacity between a savage and a Newton or a Shakespeare,[8] gradual changes are possible between civilized people and brutes, and between the latter and some primeval man (Darwin 2009: 60).

Wallace's descent from Darwin, concerning the alleged insufficiency of natural selection in the formation of various mental faculties in man, was supported by several observations and arguments. Regarding the mathematical faculty, Wallace claimed that in the lower races, this faculty is either absent or quite unexercised, if at all present. Bushmen are unable to count beyond two; and many Australians tribes can count only to six, whereas people in civilized races can count up to hundred thousand. Moreover, the development of the mathematical faculty in its broad sense depended on the introduction (in the sixteenth century), of the decimal notation, after which, it developed very rapidly and widely, particularly in the last three centuries. This fast development, Wallace argued, could not be the result of natural selection, since it did not serve as a means in the struggle for life, neither between individuals nor between tribes or nations (Wallace 1889: 277).

The musical faculty resembles the mathematical. Among the savages, music as we understand it, hardly existed; no elements of harmony, or other essential features of modern music were present, and little progress took place, until the fifteenth century. From that point on, however, the musical faculty advanced rapidly and in curious tandem with the advance of mathematics, with great musical geniuses appearing suddenly among different nations, at about the same time (Wallace 1889: 280).

Again, like the mathematical faculty, Wallace argues, this fast development is unrelated to the struggle of life, and he continues, "It seems to have arisen as a *result* of social and intellectual advancement" (Wallace 1889: 280).

Alluding to the metaphysical faculty, which enables us to form abstract concepts remote from any practical applications, such as the concept of cause, the nature and qualities of matter, the existence of the will and the existence of the conscience, Wallace states that they appear suddenly, and develop very rapidly. They are unique to humans and are not derived from animals.

Considering the development of the mathematical faculty, Wallace claimed: "we are limited to two possible theories": either the natives did not possess this faculty, or else they possessed it, but had neither the means nor the incentive for its exercise. In the former case, we have to ask by what means had this faculty appeared, and rapidly developed in the civilized races, reaching the level of a Newton, a La Place or a Gauss;[9] what motive power caused this development? (Wallace 1889: 278). What advantage has this extremely fast development of the mathematical faculty for the individual possessor in the struggle for life, in the struggle of tribe with tribe, of race with race?; if it had no such advantage, it could not have developed by natural selection.

As an alternative explanation, Wallace considered the possibility of the existence of the above mentioned properties in a latent form, which became activated under particular circumstances, very much later; he claims that this option, posed even a greater difficulty. Any property formed by natural selection must have some advantage at the time and place of its formation; no property can be formed by this mechanism for future use; no creature can be improved beyond the necessary existence.

In addition, anticipating Darwin's response, Wallace argued that "to prove continuity and the progressive development, of the intellectual (and moral) faculties leading from animals to man, is not the same as proving that these faculties have been developed by natural selection". In Wallace words, "Because man's physical structure has been developed from an animal form by natural selection, it does not

[8]Newton and Shakespeare are regarded as "geniuses", a quality defined by Rubens as "evincing of exceptional range of vision, and exceptional technique for conveying that vision". All the epithets used here imply that genius is extremely rare (Rubens 2012: 78–85).

More important and relevant to Darwin's conclusion, in regarding Newton or Shakespeare as indicating "degrees" of human mental evolution, is the fact he is referring to their phenotype (and not their genotype, concepts unknown to Darwin, and other biologists at his time), and therefore irrelevant to evolution.

[9]See footnote 10. In addition, it should be noted, that both Darwin and Wallace did not address the problem of the existence of the enormous mental differences among men. In a book published about 60 years after the Wallace-Darwin dispute, the anthropologist Alexander Alland J. wrote: "Acceptance of the problem of [the mental] differences [should be searched] in historical, rather than genetic terms … [in] the importance of contact between people as stimulant to creative thinking. It is an exchange of ideas, not of genes [that matters] … The accomplishments of Greek philosophers and scientist, Elizabethan writers, Flemish painters, German musicians, are understandable not in terms of biological changes that occurred antecedent to their periods of intense activity, but in light of peculiar conjunctions of outlooks and juxtapositions of contrasting world views" (Alland 1973: 167).

necessarily follow that his mental nature, even though developed *pari passu* (side by side) with it, has been developed by the same causes only" (Wallace 1889: 277).[10]

In addition, Wallace pointed out that the fast development of the mental faculties in the fields of music, mathematics or metaphysics is confined to a very small segment of the population, claiming, that "natural selection cannot work on extreme variations that crop up in only a tiny proportion of the population … Natural selection cannot work on extreme variation…" (Wallace 1889: 280).

This statement calls for some qualifications. To the extent that "geniuses" have some inborn (today we shall call it genetic) components, (a possibility that was supported at the time of Darwin by Francis Galton), it should be pointed out (in hindsight, and again based on our present knowledge) that the problem is not their rarity, but the question whether these outstanding people had any advantage, as far as differential reproduction is concerned, which in some famous individuals, like Kant, Newton or Schubert, who were childless, they evidently had not.

In summary, Wallace's major conclusion was that man's higher mental abilities, his intellectual (and moral) faculties have not been developed by natural selection, but were formed by some other "influence" for a special purpose (resembling man, who can direct and select in the process of artificial selection of plants or animals, certain properties); they "point to the existence in man of something which has not been derived from his animal progenitors – something which we may best refer to as being under spiritual essence … we may perceive that the love of truth, the delight of beauty, the passion for justice ….are the working within us of a higher nature which has not been developed by means of the struggle for material existence" (Wallace 1889: 282); it also explains the enormous influence of ideas and beliefs over man's action and his whole life. It is pertinent to mention (as Wallace does not) that this capacity seems to be a mixed blessing![11]

Furthermore, Wallace claims that "the nobler qualities of justice, mercy and humanity…have been steadily increasing in the world" (Wallace 1892: 284). The statement reflects perhaps the rather myopic view of a nineteenth century Victorian thinker, but becomes very questionable in the 21st century!

Against the expected argument, this belief in a "higher intelligence" introduces a new cause in the continuous process of evolution. Wallace reminds us that the three new powers had been introduced (in the development of the organic world), which caused a breach of continuity: the change from the inorganic to the organic (introducing vitality), the introduction of sensation or consciousness into the animal kingdom, and the third one, discussed above. The latter "raises [man] furthest above the brutes and opens up possibilities of almost indefinite advancement". In this phase Wallace includes "the constancy of the martyr, the unselfishness of the philanthropist, the devotion of the patriot…the love for beauty and more" (Wallace 1889: 282).

"These three distinct stages of progress, from the inorganic world of matter and motion up to man, point clearly to an unseen universe – to a world of spirit, to which the world of matter is altogether subordinate" (Wallace 1889: 283). The existence of a spiritual world would also remove the sense of despair about the ultimate fate of the universe (referring to the "heat death", as a result of the second law of thermodynamics). In Wallace's words, "we who accept the existence of a spiritual world, can look upon the universe as a grand consistent whole, adapted in all its parts to the development of spiritual beings capable of indefinite life and perfectibility… To us the whole purpose, the only *raison d'être* (reason for existence) of the world … was the development of the human spirit in association of the human body" (Wallace 1889: 284).

It is known that Wallace turned to spiritualism,[12] believing (among other supernatural phenomena) that departed souls can communicate through mediums with humans still living on Earth (Wallace 1892). He attended séances, and claimed to obtain messages from dead friends.

In addition, Wallace was known to be a reformer and a socialist who was passionately concerned with struggles for justice and well-being for humanity – values that were inconsistent, in his view, with a materialistic philosophy (Wallace 1892).

There is some disagreement as to whether Wallace's turn to spiritualism affected his position regarding his dispute with Darwin. According to Cartwright (2001: 17): "What seems to have prompted Wallace's apostasy from the cause of

[10]Today, such a separation between the body (or the brain) and the mental systems, as is implied by Wallace's description, would be rejected by most philosophers and neuroscientist. For example, the philosopher John Searle wrote: "We know that human and some animal brains are conscious. Those living systems with certain sorts of nervous systems are the only systems in the world that we know for a fact are conscious" (Searle 1997: 170).

[11]The psychologist Charles Rycroft wrote: "As both religious and political history show, men who in their private life may be kind and tolerant are prepared to kill, persecute and engage in heresy-hunting at the behest of abstract nouns, whether these be God, Liberty, Equality, Fraternity, the Fatherland or the Party." (Rycorft 1985: 293). Note also that here once again, Wallace disregards the extreme diversity among men with respect to the above mentioned properties.

[12]Spiritualism is the name applied to a belief in a series of abnormal phenomena, including the possibility to communicate with the dead, through mediums. Spiritualists claim that their beliefs are founded on evidence and proven beyond any reasonable doubt. In addition spiritualism is based on the belief that the whole material universe exists for the purpose of spiritual development, and that death is simply a transition from material existence to spirit life.

naturalism was his conversion, around 1866 to spiritualism. Like many of his British contemporaries, including Francis Galton … and some Americans, like William James".

Kottler (1974), in a detailed and closely argued paper, also claimed that Wallace's belief in spiritualism was a major cause of his departure from Darwin. On the other hand, Harman (2004), in reviewing Michael Shermer's "In Darwin's Shadow: The Life and Science of Alfred Russell Wallace", argued that according to the latter, "[Wallace's] spiritualism did not influence his science or his teleological evolutionary worldview… He simply assumed that a guiding intelligence was a more likely inference from reality than the reductionist view, ascribing the mystery of mind to the properties of matter" (Shermer 2002; Harman 2004: 470–473).[13]

How did Darwin react to Wallace's "apostasy"? He concurred that humans indeed have a powerful ability to adapt to new life conditions by inventing weapons, tools, clothes and dwellings, and making fire. They aid their fellow men in many ways, and anticipate future events; even in remote periods humans practiced some form of division of labor. However, contrary to Wallace, Darwin claimed that since the intellectual and moral faculties of man are variable and probably heritable, "therefore if they were formerly of high importance to primeval man and to his ape-like progenitors, they would have been perfected or advanced through natural selection" (Darwin 2009: 107).

As for the introduction of a "higher intelligence", Darwin was no less than dismayed by Wallace's "heresy" and his response is by now notorious: "I hope you have not murdered too completely your own and my child" (quoted in Eiseley 1961: 313). He was worried that his co-discoverer of evolution had lost his nerve when it came to consider the case of humans. Darwin vehemently opposed Wallace's conclusion about the involvement of some "higher intelligence" in the formation of human intellectual and moral faculties; "he could never endure miraculous additions at any one stage of ascent" (Eiseley 1961: 313). "Darwin's aim [in the "Descent of Man] was to elaborate a thoroughly naturalistic account of human characteristics physical and mental" (Shanahan 2004: 254).

With regard to Wallace's belief in evolutionary progress it is fitting to quote Howard (1982: 77): "Perfection and progress were abstractions which had no place in Darwin's pragmatic and relativistic scheme… "perfection" in biological organization could be defined only in relation to the environment in which an animal or plant live". However, Darwin's attitude to the idea of progress in evolution of species, and the evolution of man is in dispute.

According to Shanahan, who summarized Darwin's idea of progress in the "Descent", "Darwin's evolutionary progress is both a well-grounded theoretical prediction derived from the theory of natural selection, and an established empirical fact confirmed by geological evidence" (Shanahan 2004: 192). A contrary view is presented by Foley (1995), and it is worthwhile to quote in length from his book. "Along with the growth of knowledge of animal behavior has come a greater understanding of the diversity of human life, and to some extent to which humans could be said to be above the swamp of animal brutishness. The camps of Dachau and Belsen, the millions killed in religious wars, and the almost boundless capacity of humans to do damage to each other at national and personal levels, in the twentieth century, rather dented human self esteem." (Foley 1995: 39).

According to S.J. Gould, who studied extensively the question of progress in evolution, "…the overarching aim of his book *Full House* is to present the general argument for denying that progress defined the history of life or even exists as a general trend at all" (Shanahan 2004: 207).

Gould's Criticism of Wallace

The prominent paleontologist Stephen Jay Gould contested Wallace's conclusion that the development of man's mental faculties depended on the action of a "higher intelligence". To begin with, he pointed out that unlike Darwin, who repeatedly emphasized that "natural selection has been the chief, but not the only agent of change" (during evolution), Wallace (according to Gould) was a "pan-selectionist", believing that each and every property of the organism was the result of natural selection leading to an improved adaptation.

It is known that Darwin added "sexual selection" to the principle of natural selection – the competition between males for females, for reproduction (independent of the availability of any resources) and "female choice", where the female selects the more agreeable partner.[14] Wallace rejected sexual selection, (particularly "female choice" where there was an element of "volition"). Darwin assigned a rather important role to "sexual selection" in the formation of the different human races.[15]

[13]It is of some interest to note that the distinguished American Philosopher, Thomas Nagel, has recently published a book – "Mind and Cosmos", (2012), in which he claimed that Neo-Darwinism is probably unable to explain the formation of life and the appearance of mind; he proffered to believe in the existence of some hitherto unknown, teleological laws acting in evolution.

[14]"The whole case for sexual selection is in fact an enormous appendage to Darwin's book, *The Descent of Man and Selection in Relation to Sex (1870),*" quoted in Howard (1982: 55).

[15]"In the *Descent of Man*, sexual competition and sexual choice were invoked to explain some of the physical attributes of man that did not seem to contribute directly to the general biological advantage. The general lack of body hair compared with man's ape-like relatives and its

Against Wallace's conclusion, that higher human mental properties could not have been developed by natural selection, Gould argued that natural selection could build an organ 'for' a specific 'purpose', but this 'purpose' need not fully specify its capacity.

"Our large brains may have originated "for" some set of necessary skills, such as gathering food, socializing, or whatever; but these skills do not exhaust the limits of what such a complex machine can do. Fortunately for us, those limits include among other things an ability to read and to write, and for some creative people to compose poems and symphonies" (Gould 1980: 57). In other words, "historical origin and current function are different properties of biological traits" (Gould 1988: 122).

As a variation on the same idea, it is enlightening to consider Tennant's comment that "the human mind once having attained in the course of evolution to ideation, social intercourse and language, is in a position to develop spontaneously, no longer controlled by mechanical selection (which is but rejection) but by his own interest and intrinsic potencies. From intelligence and emotional sensibility, that are biological useful, it may proceed to disinterested science, to pure mathematics, having no relation to the needs of life, to art, morality and religion", and he adds, probably hinting to Wallace's 'higher intelligence', "without requiring any unexpected intervention" (quoted in Eiseley 1961: 322).

Furthermore, in reference to the Cro-Magnon people, who lived about 40,000 years ago, Gould wrote that it is known that they produced marvelous paintings in their caves. He asserted that these men had a brain that was not smaller (perhaps even greater) than ours, and all that we have accomplished since then is the product not of biological evolution but of cultural evolution (Gould 1980; and see below).

In addition Gould wrote, again referring to the brain: "here side consequences may overwhelm the original purposes … consider for example our knowledge of personal mortality. Nothing in our large brain … has proved more frightening and of weighty import. Surely no one would argue that our brains increased in order to teach us this unpleasant truth." (Gould 1988: 122).

It may be of interest to point out that Darwin preceded Gould in suggesting a similar idea (albeit with some hesitation), writing: "If it could be proved that certain high mental powers, such as the formation of general concepts, self-consciousness, etc. were absolutely peculiar to man, which seems extremely doubtful, it is not improbable that these qualities are merely the incidental results of other highly-advanced intellectual faculties; and these again mainly the result of the continuous use of a perfect language" (Darwin 2009: 106). Related to this sort of explanation is also Darwin's concept of correlated change (see footnote 1).

Cultural Evolution Versus Biological Evolution

As mentioned earlier, Wallace came close to realizing that in man there occur two distinct processes: biological evolution and cultural evolution. According to the anthropologist Loren Eiseley: "Wallace's contribution to anthropology…[was] the recognition that man had transferred to his tools and mechanical devices the specialized evolution which so totally involves the plants and animals…" (Eiseley 1961: 313).

The concept of cultural evolution preceded the Darwinian theory of evolution, or both were seen as aspects of a single process, for example by Herbert Spencer.[16] The distinction between these two processes depended on the discovery of the hereditary units of biological evolution by Mendel (latter dubbed genes), or rather their "re-discovery" in 1900, independently by three different biologists.

Man originated from his progenitors, like all other species, by the slow process of biological evolution. At some point in the past, based on his developed cognitive abilities and his sociality (which was crucial for a weak organism who lacked devices for self-defense), a new process was superadded to the biological evolution – cultural evolution.[17] Instead of passively adapting to the environment, man began to change the environment actively and consciously according to his needs. He used various natural implements as tools, invented tools, made clothes and dwellings, exploited various sources of energy and much more.[18]

Some aspects of culture (like the use of simple tools) are found in certain groups of animals, but only in humans is cultural change cumulative, resulting in a very wide gap

(Footnote 15 continued)
different distribution in males and females, Darwin attributed to sexual preference" (Howard 1982, p. 69).

[16]See, for example "Social Darwinism in American Thought". R. Hofstadter. Beacon Press, Boston (1944).

[17]According to Medawar 1981, "cultural evolution is not a very good description of this process, because it could be taken to connote evolution of culture, instead of evolution mediated through culture", thus he prefers "exogenetic" or "exosomatic" evolution. Separating these two aspect seems to be rather important; they can be lucidly exemplified for example by "The Great Transition" from nomadic life to permanent settlement that took place same 15,000 years ago. This transition produced a profoundly altered social environment: among other changes, society became more hierarchical with all the consequences.

Julian Huxley (1955: 17) preferred the term "psycho-social evolution".

[18]According to the anthropologist Edward Tylor (1924), culture is "that complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities and habits acquired by man as a member of society".

between the modest beginnings of culture among animals and human culture (Neumann 2013).[19]

One major difference between biological and cultural evolution is their rate of change.[20] The latter is several orders of magnitude faster compared to the former. Biological evolution depends on the rare appearance of "useful" chance mutations, and their proliferation in the population, through an increase in the relative rate of the reproduction of individuals in whom they reside. Thus, the minimum time for the transmission of a novel change is one generation. Cultural innovations, on the other hand may be transmitted very quickly, whether by imitation, learning,[21] indoctrination and most importantly through man's symbolic language (a major event in human history).

The transmission of a favorable genetic mutation can take place only "vertically", from parents to children. In cultural change the transmission can be "vertical", in both directions (from parents to children and vice versa) and most important, "horizontally", from one individual to another, in the population. New discoveries by some individuals (sometimes even by a single individual!) can quickly spread to the entire society and indeed across the world.

Thus, the fast rate of cultural evolution is a pertinent answer to Wallace's claim, who pointed to the very fast speed of some of the cultural innovation, mentioned above, in the last centuries in the arts, music, or mathematics.

As a matter of fact, both Darwin and Wallace provided many examples of man's behavior and action, such as hunting and fishing, using weapons and many other activities, without being aware that these processes are part of culture and not biological traits.

Addendum

Wallace versus Darwin: On the Relation of Consciousness[22] to the Brain

Wallace quoted with approval John Tyndall's remarks in 1868: "…the passage from the physics of the brain to the corresponding facts of consciousness is unthinkable. Granted that a definite thought and a definite molecular action in the brain occur simultaneously, we do not possess the intellectual organ, nor apparently any rudiment of the organ, which would enable us to pass by a process of reasoning from the one phenomenon to the other…"

This quotation was aimed to oppose the materialistic position of Thomas Henry Huxley, who reduced the thinking process to the molecular level. Huxley wrote: "Consciousness is a function of nervous matter, when that nervous matter has attained a certain degree of organization, just as we know the other actions, to which the nervous system ministers, such as reflex action and the like…" (Slotten 2004: 283).

Wallace surmised that Huxley's theory "was not only untestable but inconsistent with accurate conceptions of molecular physics". He continued by describing the almost infinite complexity of molecular combination, which enables us to comprehend the possibility of vegetative life. "But this increasing complexity, even if carried out, could not have the slightest tendency to originate consciousness in such molecules or groups of molecules…or to produce a self-conscious existence". And Wallace concluded: there was no escaping from the dilemma: "Either all matter was conscious, or consciousness was something distinct from matter" (Slotten 2004: 283).

Furthermore, Slotten (2004: 284), wrote "that after accusing Huxley of using words "to which we can attach no clear conception", Wallace made statements equally abstruse. Matter was force and nothing but force…He identified two types of force: the first was "primary force", which included gravitation, cohesion, heat and electricity. The second was what he called will-force, which he defined as a power that directed the action of the forces stored up in the body…The origin of the will-force could be traced not to something inside, but to something outside humans – the will of higher intelligences or of one Supreme Intelligence".

According to Slotten, Wallace's response to the critics of the above statements (regarding the existence of the Higher Intelligence etc.) was to conclude the *Homo sapiens* differed in kind from other animals (Slotten 2004: 286).

Darwin on Consciousness

Gould (1977) refers to Darwin's ideas on consciousness, as described in the so-called "M" and "N" notebooks, written in 1838 and 1839. He claims that these sketches indicate that "Darwin supported materialism – the postulate that matter is

[19]This does not mean, that humans are independent of the action of genes. According to Ernest Gellner, "humans are still subject to genetic control, but "Humans are the way they are, because their genes do no determine their behaviour, but rather permit great variation and flexibility" (quoted in Foley 1995: 197).

[20]Another major difference is the fact that biological evolution is irreversible, whereas cultural change is reversible.

[21]Learning involves the capacity to respond to stimuli with appropriate behavior (it is an example of phenotypic plasticity). In man this capacity has been highly developed, including the capacity to learn a language and a culture.

[22]A common sense definition of consciousness is given by Searle: 'consciousness' refers to those state of sentience or awareness

(Footnote 22 continued)
that typically began when we wake from a dreamless sleep and continue through the day, until we fall asleep again, die, go into a come or otherwise become 'unconscious' (Searle 2002: 21).

the stuff of all existence and that all mental and spiritual phenomena are its by-products. … mind – however complex and powerful is simply a product of the brain".

It is noteworthy that in his commentary on the "M" and "N" notebooks, Gruber labeled materialism as "at that time more outrageous than evolution" (quoted by Gould).

One should add that the relation of consciousness to the brain, is a major controversial issue in philosophy, psychology, neurophysiology and related areas, dubbed in its modern version as (part of) the "Mind-Body" problem (see for example, Searle 2004).

Perhaps it should also be mentioned that according to some philosophers, not only it is an unsolved problem, but it is unsolvable! (e.g., McGinn 1989).

References

Alland, A. Jr. (1973). *Human diversity*. Garden City, New York: Anchor Books

Cartwright, J. (2001). *Evolution and human behavior*. Cambridge, MA: The MIT Press.

Cassirer, E. (1944). *An essay on man*. New Haven: Yale University Press.

Darwin, C. (2009). *The descent of man and selection in relation to sex* (2nd ed. First Published in 1874). A Digireads.com Book.

Darwin, C. (2010). *The descent of man*. Abridged with an Introduction by Ghiselin M. Minnesota. New York: Dover Publications

Eiseley, L. (1961). *Darwin's century*. New York: Anchor Books.

Foley, R. (1995). *Humans before humanity*. Oxford: Blackwell Publishers.

Gould, S. J. (1977). *Ever since Darwin: Reflections on natural history*. London: W. W. Norton & Company.

Gould, S. J. (1980). *The panda's thumb*. New York: W.W. Norton & Company.

Gould, S. J. (1988). *An urchin in the storm*. London: Collins Harvill.

Harman, O. S. (2004). The evolution of a naturalist. *American Scientist, 92*, 470–473.

Hofstadter, R. (1944). *Social Darwinism in American thought*. Boston: Beacon Press.

Howard, J. (1982). *Darwin*. New York: Hill and Wang.

Huxley, J. (1955). *Evolution in action*. New York: Penguin Books.

Kottler, M. J. (1974). Alfred Russell Wallace, the origin of man and spiritualism. *Isis, 65*, 145–192.

McGinn, C. (1989). Can we solve the mind-body problem? *Mind*, *98*, 349–356.

Medawar, P. B. (1981). Stretch genes. Genes, mind and culture: The co evolutionary process, by C.L. Lumsden and E.O. Wilson. *NYB, 28*, 45–48.

Nagel, T. (2012). *Mind and cosmos: Why the materialist neo-Darwinian conception of nature is almost certainly false*. Oxford: Oxford University Press.

Neumann, J. (2013). Biology and culture. *Journal of Life Sciences, 7*, 322–333.

Pinker, S. (1994). *The language instinct*. New York: Allen Lane The Penguin Press.

Popper, K. R. (1972). *Objective knowledge—an evolutionary approach*. Oxford: Oxford University Press.

Richards, R. J. (2005). Darwin's metaphysics of mind. In V. Hosle & C. Illies (Eds.), *Darwinism and philosophy* (pp. 166–180). Notre Dame Indiana: University of Notre Dame Press.

Rubens, T. (2012). *Genius and changes in social context in politics and neo-Darwinism and other essays*. Exeter UK: Societas, Imprint Academic.

Searle, J. R. (1997). The mystery of consciousness. *The New York Review of Books*.

Searle, J. R. (2002). *Consciousness and language*. Cambridge: Cambridge University.

Searle, J. R. (2004). *Mind – a brief introduction*. Oxford: Oxford University Press.

Slotten, R. A. (2004). *The heretic in Darwin's court*. New York: Columbia University Press.

Shanahan, T. (2004). *The evolution of Darwinism*. Cambridge: Cambridge University Press.

Shermer, M. (2002). *In Darwin's shadow*. Oxford: Oxford University Press.

Sterelny, K. (2007). *Dawkins vs. Gould*. Cambridge: Icon Books Ltd.

Tylor, E. B. (1924). *Primitive culture. Researches into the development of mythology, philosophy, art and custom* (7th ed.). New York: Brentano's

Rycroft, C. (1985). *Psychoanalysis and beyond*. Chicago: The University of Chicago Press.

Wallace, A. R. (1892, 1980). 'Spiritualism'. Excerpt from 'spiritualism' chambers encyclopedia. In N. G. Coley & M. D. Hall (Eds.), *Darwin to Einstein. Primary sources on science and belief* (pp. 645–648). London: Longman in Association with The Open University Press.

Wallace, A. R. (1889, 1980). 'Darwinism applied to Man'. Excerpt from 'Darwinism Applied to Man' In N. G. Coley & M. D. Hall (Eds.), *Darwin to Einstein. Primary sources on science and belief* (pp. 274–299). London: Longman in Association with The Open University Press.