Alfred Russel Wallace on Spiritualism, Man, and Evolution: An Analytical Essay

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Abstract

Only a few years after the publication of Darwin's *On the Origin of Species*, Alfred Russel Wallace made public his opinion that natural selection was not an all-sufficient cause of the evolution of man--particularly, as regards the higher human faculties (moral, artistic, and mathematical abilities, etc.). Most workers have drawn the direct conclusion that Wallace "changed his mind" about the theory he originally set out--perhaps because of an inability to reconcile "the survival of the fittest" concept with his utopian social views, or in conjunction with his adoption of spiritualist beliefs. In the present work a different interpretation of the events is presented: that Wallace's natural selection views derive from a cosmological position utterly distinct from that underlying Darwinian principles, that Wallace never believed natural selection could explain the presence of man's higher faculties to begin with, and that he never had the change of mind usually attributed to him. Wallace's approach to evolution was shaped by his youthful rejection of the doctrine of first causes and by a distrust of then-existing notions regarding continuity. His first response was to adopt a unique brand of anti-first causes teleology, but this position later matured into a body of ideas compatible with materialist logic on his recognition of the principle of natural selection and his adoption of spiritualism. Wallace is interpreted as having rejected the argument of necessary utility of adaptation before 1858: at that time he equated such acceptance with acceptance of first causes-based doctrine. The 1858 Ternate essay not only signalled his recognition of this mistake, but anticipated his later arguments that the adaptive process was associated with a hierarchical domain of causality. Wallace had been trying from the beginning to develop an evolutionary model that described a continuity of causality extending beyond the immediate domain within which natural selection is now usually credited as operating. Wallace did not view his adoption of spiritualism as a retreat from natural selection; rather, he considered spiritualism the best available accounting of the overall direction of evolution at the moral/intellectual level, and endorsed it accordingly. The arguments leading to these conclusions are supported by excerpts from (and additional references to) his writings, and by emphasizing the fact that Wallace himself wrote nothing providing any real evidence for the "change of mind" theory.

Introduction

The life and studies of the nineteenth and early twentieth century naturalist Alfred Russel Wallace (1823-1913) have received considerable attention in recent years. The main influences on his life--especially his support of Owenite social ideals,[1] interest in mesmerism and phrenology,[2] travels in tropical lands,[3]

connections with Darwin and development of the concept of natural selection,[4] and adoption of spiriitualism[5]--have been treated fairly thoroughly as a matter of historical record, and in their relation to the major sociological and scientific trends of the period. I believe, however, that Wallace is unlikely to be fully appreciated until he is perceived in other than historical-sociological terms. Otherwise put, the significant difficulty in coming to grips with Wallace's work is that his cosmology is both highly complex and irreducible to simple cause and effect associations with the major intellectual trends of his time. The debates of his period provided him with a stage for his weighed opinions, of course, but it is important to keep in mind that he was a highly inventive thinker who was not afraid to follow any path he felt was leading to the truth.

Three interrelated analyses comprise the present study. In the first I argue that Wallace's eventual adoption of spiritualism was assured many years before either his initial studies of the belief, or earlier formulation of natural selection. The second discussion focuses on the development of Wallace's evolutionary views, my conclusion being that these were broadly enough constituted to accommodate both natural selection and spiritualism without internal inconsistency. Lastly, the idea that Wallace supposedly underwent a "change of mind" regarding the applicability of natural selection to the evolution of man is refuted by reference to earlier discussion, by showing how certain contentious passages in his writings are more easily accounted for through the interpretation of his work presented here, and by taking note of the significant fact that Wallace himself never wrote anything referring to, or conceding, such a change. The analysis remains close to Wallace's own writings; not only is this not the place to attempt to treat fully of all period connections, but frequent reference to what he actually wrote is still necessary in view of the many dubious conclusions that have been reached about his thought process.

Wallace's Adoption of Spiritualism

The most relevant analyses of Wallace's belief in spiritualism, already referred to in note 5, are by R. Smith, Kottler, Schwartz, and Malinchak. Smith took an important step forward by recognizing the interdependent nature of Wallace's ideas: "...Whereas it has been customary to consider his thought as primarily biological and his digressions into phrenology, spiritualism, socialism, and ethnology as peripheral, these apparently diverse subjects were in reality aspects of a unified interpretation of the world in terms of humanitarian values."[6] He decides that "A consideration of Wallace's philosophy of nature...leads to the conclusion that he saw and intended no discontinuity between general and human evolution and that it is a mistaken view to recognize such a discontinuity."[7] Smith takes relatively little notice of Wallace's adoption of spiritualism in his analysis, preferring to attribute his rejection of the all-sufficiency of natural selection to the incompatibility of its logic with his utopian social views, especially to the degree the principle of utility could not be extended to account for the higher human faculties. Kottler, on the other hand, comes to the conclusion that "...spiritualism stimulated Wallace to reconsider the utility of various human features," and thus that it was the cause of his divergence of viewpoint from Darwin.[8] Schwartz's paper is primarily concerned with showing how Wallace's views on man might have pushed Darwin into writing *The Descent of Man*, but he also gives attention to the spiritualism issue, deciding that Wallace's position on man must have begun to shift before he committed himself to spiritualism in 1865. He concludes that "Wallace's departure from the Darwinian point of view of the origin of man resulted from his inability to bridge his scientific and moral beliefs," and that "Wallace's belief in social equality and political reform conflicted with the ineluctable operations of natural law (including natural selection)."[9] Malinchak, like Smith, examines the situation from a sociology of science perspective. Regarding the man/natural selection question, she states "It was only after Wallace engaged in his extensive studies in spiritualism and became convinced of the genuineness of spiritualistic phenomena that he began to inject quasi-religious notions of the guidance of higher intelligences in the development of the human mind into his scientific arguments."[10]

Malinchak nevertheless does not specifically refer Wallace's conversion to spiritualism to causes rooted in his natural selection views, apparently preferring to interpret it as a residual effect of some of his early experiences with the supernatural, and of period social and intellectual trends.

To summarize, the position now generally held is that Wallace was led to spiritualistic belief as a function of his inability to view human evolution in entirely materialistic terms--in particular, as a function of the limitations of natural selection. Thus, spiritualism supposedly provided Wallace with a previously missing religious element in his life--one which also explained (away) the intellectual and moral development of the human race.

It seems to me, however, that these conclusions represent a misreading of the available facts. Wallace had from the very beginning been pursuing a course of investigation that inherently (and, to a degree, unwittingly) denied priority to materialistic interpretations of nature, and only through natural selection and spiritualism was he able to forge a synthesis compatible with materialist logic. In short, I shall take the position that all events in Wallace's intellectual evolution after 1858 are entirely predictable given conclusions he had reached by that year.

As is now well known from both his own writings and secondary analysis,[11] Wallace was personally introduced to occult phenomena when he attended a lecture/demonstration on mesmerism given by a Mr. Spencer Hall in 1844. Sometime earlier, Wallace had read George Combe and become interested in related phrenological subjects.[12] At that early date, there were few believers in mesmerism. Indeed, the common opinion, even within the scientific and medical communities, was that it was a hoax. Wallace attended the lecture as a nonbeliever; shortly afterward, however, he found himself able to induce the same effects that he had witnessed on stage on subjects of his own choosing, and eventually became a skilled practitioner of the art.[13] This had a profound effect on him, as he learned, to repeat his own words, "my first great lesson in the inquiry into those obscure fields of knowledge, never to accept the disbelief of great men, or their accusations of imposture or of imbecility, as of any weight when opposed to the repeated observation of facts by other men admittedly sane and honest."[14]

This "great lesson" had both its general and specific elements. In the more general sense, new discoveries--no matter how unusual--were deserving of detached and rational study, not ignorant, ill-informed disbelief. More specially, psychical phenomena were not to be branded unworthy of attention *a priori*.[15] Wallace spent a considerable portion of the next two decades mulling over the validity of these ideas, especially in their relevance to the customs and beliefs of the many native peoples among whom he lived and worked. Their religions, superstitions, and cosmological traditions especially attracted his attention, and in later writings he made frequent use of his observations.[16]

Soon after his return to England in 1862 Wallace began to look into the by-then well-established, but still-growing, spiritualism movement.[17] It was apparently two or more years before he started taking the subject seriously, but by 1866 he was a confirmed spiritualist, as is fully evident from his 'The scientific aspect of the supernatural,' most likely written in the spring or early summer of that year.[18]

The context of Wallace's conversion has remained obscure, possibly because many have assumed that his "investigation" of spiritualism in the 1860s consisted predominantly of his attending numerous seances. That he was a frequent attender is true enough; through this experience he gained a first-hand acquaintance with the range of supposed spiritualistic "contact phenomena" (*e.g.*, spirit materializations, table-rappings, automatic slate-writing, etc.). But it is equally true that his investigation extended to more than just observation. Wallace invariably began any new investigative effort with an exhaustive literature review.[19] In this instance he read everything he could "lay his hands on" as he undertook his intensive program of

seance attendance.[20]

Through this literature review he would have learned not only of the records of purported contacts with spirit beings, but of the relevance of such phenomena to the philosophical, historical and moral teachings of the movement as well. Research on Wallace's association with spiritualism has sometimes emphasized the sensationalism attached to his seance experiences instead of what it was that attracted him to the belief to begin with. It is thus necessary first to emphasize that spiritualism *per se* is not a religion--at least not in the usual sense of that term.[21] It can more accurately be viewed as a form of theosophy,[22] depicting the natural world as extending to a level of psychic organization to which ordinary consciousness has but peripheral access. Significantly, the view expressed in spiritualist (and other theosophical) writings is that the chain of natural causality nonetheless extends continuously, and back and forth, between the psychic (*i.e.*, aspatial) and physical (*i.e.*, spatial) domains. The sensational manifestations of this continuity allegedly occurring during seances and analogous conditions are, it has usually been supposed, the only aspects of it whose causes might readily be distinguished from the ordinary "material" phenomena of nature.[23] Wallace's (and many other investigators') interest in such contact phenomena was that there appeared to be no other avenue through which the subject could be explored objectively.[24]

Wallace's recognition of the principle of natural selection in 1858 had forced him into the unanticipated role of celebrity. There is nothing in the Ternate essay (or his subsequent recollections of its writing[25]), however, that indicates he foresaw the degree and immediacy of natural selection's impact on the intellectual community. The reason for this, I suggest, is that at that time he considered the concept only a partial solution to more general problems he had been working on for about fifteen years. The remainder of the solution--as a continuation, not reversal, of thought--occurred to him only as he became familiar with the writings of spiritualism. It was almost certainly the moral, historical and philosophical themes of the belief and their relation to the subject of natural causation that really attracted him to the movement. In these themes he recognized an informal characterization of natural processes which operated in a manner transcending, yet complementing, natural selection. These views were acceptable to Wallace because they were consistent with his rational approach to the assessment of evidence, his position on the meaning of continuity of cause and effect, and the generally "progressive" attitude he had maintained since adolescence.

Wallace distilled the teachings of spiritualism in a number of his later writings. Excerpts from several of these are presented now for the sake of illustration and reference:[26]

> "...The universal teaching of modern spiritualism is that the world and the whole material universe exist for the purpose of developing spiritual beings--that death is simply a transition from material existence to the first grade of spirit-life--and that our happiness and the degree of our progress will be wholly dependent upon the use we have made of our faculties and opportunities here..."[27]

> "...we are, all of us, in every act and thought of our lives, helping to build up a mental fabric which will be and constitute ourselves in the future life, even more completely than now. Just in proportion as we have developed our higher intellectual and moral nature, or starved it by disuse, shall we be well or ill fitted for the new life we shall enter on. The Spiritualist who ...knows that, just in proportion as he indulges in passion, or selfishness, or the reckless pursuit of wealth, and neglects to cultivate his moral and intellectual nature, so does he inevitably prepare for himself misery in a world in which there are no physical wants to be provided for, no struggle to maintain mere existence, no sensual enjoyments except those directly associated with sympathy and affection, no occupations but those having for their object social, moral, and intellectual progress--is impelled towards a pure and moral life by motives far stronger than any which either philosophy or religion can supply..."[28]

> "...our condition and happiness in the future life depends, by the action of strictly natural law, on our life and conduct here. There is no reward or punishment meted out to us by superior beings; but, just as surely as cleanliness and exercise and wholesome food produce health of body, so surely does a moral life here produce

health and happiness in the spirit-world..."[29]

"...all the material imperfections of our globe, the wintry blasts and summer heats, the volcano, the whirlwind and the flood, the barren desert and the gloomy forest, have each served as stimuli to develop and strengthen man's intellectual nature; while the oppression and wrong, the ignorance and crime, the misery and pain, that always and everywhere pervade the world, have been the means of exercising and strengthening the higher sentiments of justice, mercy, charity, and love, which we all feel to be our best and noblest characteristics, and which it is hardly possible to conceive could have been developed by other means..."[30]

"...Not only is a healthy body necessary for a sound mind, but equally so for a fully-developed soul--a soul that is best fitted to commence its new era of development in the spirit world. Inasmuch as we have fully utilised and developed all our faculties--bodily, mental, and spiritual--and have done all in our power to aid others in a similar development, so have we prepared future well-being for ourselves and for them..."[31]

The preceding selections feature the following essential ideas: (1) the human being's full span of individual existence extends on to a period following biological death; (2) the characteristics of conscious existence during this alleged period are primarily determined by the level of intellectual and moral development attained during one's biological life experience; (3) said intellectual and moral development is a function of the degree of willful rejection of materialistic, self-centered goals and the adoption of an explorative, non-pre-judging, and socially-conscious attitude; and (4) there is, overall, a continuity of just cause and effect in nature which cannot for long be circumvented, and which complements individual action, sooner or later, with no more nor less than a commensurate reaction. Theme four would have been the one that most impressed Wallace initially. We shall return to this subject in a moment.

The relevance of the four themes just noted to Wallace's conversion can be better appreciated after examining words he set out almost twenty years before being introduced to spiritualism (indeed, before the beginning of the "modern spiritualism movement" itself). In late 1843, while employed as a surveyor for his older brother William, Wallace composed a lecture entitled 'The advantages of varied knowledge.' Portions of the essay are reproduced and discussed in his autobiography *My Life*, published in two volumes in 1905. From this source the following significant passages may be noted:[32]

[on gaining "a general acquaintance with history, biography, art, and science":] "...There is an intrinsic value to ourselves in these varied branches of knowledge, so much indescribable pleasure in their possession, so much do they add to the enjoyment of every moment of our existence, that it is impossible to estimate their value, and we would hardly accept boundless wealth, at the cost, if it were possible, of their irrecoverable loss. And if it is thus we feel as to our general store of mental acquirements, still more do we appreciate the value of any particular branch of study we may ardently pursue... here we see the advantage possessed by him whose studies have been in various directions, and who at different times has had many different pursuits, for whatever may happen, he will always find something in his surroundings to interest and instruct him..."

[on gaining "a knowledge of the elementary laws of physical science":] "...He who has extended his inquiries into the varied phenomena of nature learns to despise no fact, however small, and to consider the most apparently insignificant and common occurrences as much in need of explanation as those of a grander and more imposing character. *He sees in every dewdrop trembling on the grass causes at work analogous to those which have produced the spherical figure of the earth and planets; and in the beautiful forms of crystallization on his window-panes on a frosty morning he recognizes the action of laws which may also have a part in the production of the similar forms of planets and of many of the lower animal types*. [my italics] Thus the simplest facts of everyday life have to him an inner meaning, and he sees that they depend upon the same general laws as those that are at work in the grandest phenomena of nature..."

"...It would be a curious and interesting thing to have a series of portraits taken of a person each successive year. These would show the gradual changes from childhood to old age in a very striking manner; and...might elucidate the problem of how far the mind reacts upon the countenance. We should see the effects of pain or pleasure, of idleness or activity, of dissipation or study, *and thus watch the action of the various passions of the mind in modifying the form of the body*, and particularly the expression of the features..." [my italics]

"...*Can we believe that we are fulfilling the purpose of our existence while so many of the wonders and beauties of the creation remain unnoticed around us?* [my italics] While so much of the mystery which man has been able to penetrate, however imperfectly, is still all dark to us? While so many of the laws which govern the universe and which influence our lives are, by us, unknown and uncared for? And this not because we want the power, but the will, to acquaint ourselves with them. Can we think it right that, with the key to so much that we ought to know, and that we should be the better for knowing, in our possession, we seek not to open the door, but allow this great store of mental wealth to lie unused, producing no return to us, while our highest powers and capacities rust for want of use?..."[33]

"...can any reflecting mind have a doubt that, by improving to the utmost the nobler faculties of our nature in this world, we shall be the better fitted to enter upon and enjoy whatever new state of being the future may have in store for us?"

These passages reflect the views of a twenty year old man on the reasons for--and advantages of--pursuing an ongoing program of self-education and rational, moral and intellectual exploration. The messages in 'Advantages...' and the spiritualism-related excerpts presented earlier have much in common with respect to the way they portray the ideal "life strategy"; the only real difference, in fact, is spiritualism's specific referral to an afterlife ('Advantages...' only goes so far as to consider "whatever new state of being the future may have in store for us"). In both sets of writings, moreover, appear the essence of his belief in the connection between justice and natural causality, and it is this connection that represents the cornerstone of his entire life's work.

Wallace's scientific philosophy rests on two basic ideas regarding the relation of cause to effect. The first is that the occurrence of action--any action--unaccompanied by equal and commensurate reaction is unthinkable. The doctrine of first causes therefore seemed irrational to him: it accepted the notion of effect without relatable, comprehendable cause. It is not clear exactly when this element of Wallace's thinking first established itself, but his reading of Charles Lyell's *Principles of Geology* about 1844 possibly represented the eventual deciding influence. Lyell's uniformitarian geological views provided Wallace with an understanding of cause-and-effect that appealed only to continuously-acting and, importantly, observable and verifyable, forces.

Fully as central to Wallace's cosmology as the "equal and commensurate reaction" concept, however, were the implications stemming from his idea that "just" effect emanated from cause. Supposing that only a limited range of "equal and commensurate" reactions could derive from any given cause at any given time, and accepting that the consequences of any given cause were more or less restricted to some predominantly closed and limited domain, it seemed reasonable to believe that such consequences would eventually feed back on the agent of causation. Wallace considered such feedback inevitable--and, as a truism, "just"--whether the reinforcement involved was of a positive nature or not.

This utterly uniformitarian position on the meaning of "just" reaction provided Wallace with a neutral starting point for his ideas on all subjects. Take, for example, his views on morality. Those who could not see or understand the negative implications of their own actions were merely amoral, and even the bad implications themselves had the positive effect of providing instruction for anyone receptive enough to benefit from such consideration. The relative morality of behaviors could thus be assessed, with adoption or rejection following as a function of considered appraisal. At the same time, however, Wallace would not accept that new and higher moral conceptions were constantly emanating from human beings *de novo*; this contradicted his ideas on continuity of cause and effect. Instead, such notions "come to us--we hardly know how or whence, and once they have got possession of us we can not reject or change them at will";[34] *i.e.*, they originate beyond the immediate domain of human consciousness, and are merely "applied" through human action.

In like fashion, biological adaptation was the "just" result of the interplay of ambient biological/environmental conditions. The weak or maladapted individual was less successful in passing on

its traits; the broadly adapted population tended to persist at the expense of maladapted ones. These "just results," however, were no more than the logical implications of confining ecological realities. Biological evolution, on the other hand, occurred as: (1) selection forces acted on such pre-existing variation (*i.e.*, the existing "biological domain") and (2) variation itself was introduced as a function of biological and extra-biological forces of whose causes and actions we were still largely ignorant.

Wallace's position on the role of "just reaction" in progressive evolution was strongly fortified when he read Herbert Spencer's *Social Statics* in 1853. Wallace immediately latched onto Spencer's "social justice" concept. Spencer argued that each individual should receive no more nor less--especially no more--than was his or her just due, a position Wallace would fully endorse to the end of his days. There is little difficulty understanding how this fit into the 'Advantages...' argument: social evolution had to be a progressive function of the most intelligently and morally conceived actions (*i.e.*, causes).

Thus, as of 1853 (or even 1843) the only feature distinguishing Wallace's personal philosophy of life from that later endorsed by spiritualists was the latter's assignment of their rationale for moral behavior to a specific final cause--the "carrot" of continuing personal evolution in an assumed afterlife. We need address two questions in this connection. First, did Wallace in fact maintain fundamentally the same philosophical perspective between 1843 and the date of his adoption of spiritualism (about 1865)? Second, what was Wallace's position on final--as distinct from first--causes?

In view of Wallace's subsequent activities, it can hardly be doubted that over the next two decades he followed the advice offered in his 1843 essay to a tee. Certainly his experiments with mesmerism shortly thereafter attest to his inquisitiveness, as do his adoption of an evolutionary perspective about one year later[35] and later explorations and natural history and ethnological investigations in the tropics. In the latter context his appreciations of tropical peoples are particularly refreshing: he avoided prejudgment, especially the trap of using the state of so-called "civilized Europe" as a basis for assessing degree of moral advance in other cultures.[36]

The sentiment that a many-directioned (and, when specifically referred to human beings, intelligently and morally-directed) experience is fundamentally valuable to the individual's welfare actually does consistently surface in Wallace's writings over the next twenty years, and in a great variety of contexts. Take, for example, the implied basis for his assessment of the relative level of civilization attained by various native peoples:

> "The Dyaks are more lively, more talkative, and less diffident than the American [Indians], and therefore pleasanter companions. They have more amusements and are more social, while at the same time they have less variety of weapons, and are less skilful in their methods of obtaining game and fish. Both these circumstances will lead us to place them one degree higher in the scale of civilization... Dyak youths...have their social games, their trials of strength and skill... They possess...numerous puzzles and tricks with which they amuse themselves... These apparently trifling matters are yet of some importance, in arriving at a true estimation of their social state. They show that these people have passed beyond that first stage of savage life in which the struggle for existence absorbs their whole faculties, in which every thought and every idea is connected with war or hunting or the provision for their immediate necessities. It shows too an advanced capability of civilization, an aptitude to enjoy other than mere sensual pleasures, which, properly taken advantage of, may be of great use in an attempt to raise their social and mental condition."[37]

Or the following, on the "robustness" of natural forms of selection:

> "In the wild animal, on the contrary [*i.e.*, as contrasted with domesticated forms], all its faculties and powers being brought into full action for the necessities of existence, any increase [of power or capacity in an organ or sense] becomes immediately available, is strengthened by exercise, and must even slightly modify the food, the habits, and the whole economy of the race. It creates as it were a new animal, one of superior powers, and which will necessarily increase in numbers and outlive those inferior to it... Domestic animals are abnormal, artificial; they are subject to varieties which never occur and never can occur in a state of nature: their very

existence depends altogether on human care; so far are many of them removed from that just proportion of faculties, that true balance of organization, by means of which alone an animal left to its own resources can preserve and continue its race."[38]

The general idea that many-directioned efforts are likely to yield the most productive long-term results is evident in the following selections as well:

"It is only at a later period that we observe the tree to be suffering, and in the parts most affected we discover the Scolyti to have been at work, and erroneously impute the mischief to them... It now becomes a question whether the supposed criminals are not really our benefactors,--teaching us, by their presence, that there is something wrong, before we could otherwise perceive it. We may then be induced to inquire into the state of the soil or of the atmosphere, and be led to examine what diseases or what enemies may be at work on the roots or on the foliage of our trees as the points most likely for decay and death to originate in."[39]

"I am convinced that no man can be a good ethnologist who does not travel, and not travel merely, but reside, as I do, months and years with each race, becoming well acquainted with their average physiognomy and their character, so as to be able to detect cross-breeds, which totally mislead the hasty traveller, who thinks they are transitions!"[40]

"Your ingenious arguments to persuade me to come home are quite unconvincing. I have much to do before I can return with satisfaction of mind; were I to leave now I should be ever regretful and unhappy. That alone is an all-sufficient reason. I feel that my work is here as well as my pleasure; and why should I not follow out my vocation? ...I am engaged in a...study...of the relations of animals to space and time, or, in other words, their geographical and geological distribution and its causes. I have set myself to work out this problem in the Indo-Australian Archipelago, and I must visit and explore the largest number of islands possible, and collect materials from the greatest number of localities, in order to arrive at any definite results... I could never now give my whole mind to any work apart from the study of which I have devoted my life.[41] So far from being angry at being called an enthusiast (as you seem to suppose), it is my pride and glory to be worthy to be so called. Who ever did anything good or great who was not an enthusiast? ...It strikes me that the power or capability of a man in getting rich is in an inverse proportion to his reflective powers and in direct proportion to his impudence..."[42]

"Nature seems to have taken every precaution that these, her choicest treasures [birds of paradise], may not lose value by being too easily obtained. First we find an open, harbourless, inhospitable coast, exposed to the full swell of the Pacific Ocean; next, a rugged and mountainous country, covered with dense forests, offering in its swamps and precipices and serrated ridges an almost impassable barrier to the central regions; and lastly, a race of the most savage and ruthless character, in the very lowest stage of civilization. In such a country and among such a people ...they display that exquisite beauty and that marvellous development of plumage, calculated to excite admiration and astonishment among the most civilized and most intellectual races of man."[43]

"Civilisation has ever accompanied migration and conquest--the conflict of opinion, of religion, or of race. In proportion to the diversity of these mingling streams, have nations progressed in literature, the arts, and in science; while, on the other hand, when a people have been long isolated from surrounding races, and prevented from acquiring those new ideas which contact with them would induce, all progress has been arrested, and generation has succeeded generation with almost the same uniformity of habits and monotony of ideas as obtains in the animal world..."[44]

"There are speculations which are framed to support a foregone conclusion, and which ignore all but the one class of facts which may be deemed favourable. Such are altogether valueless, and deserve all the neglect that they can receive. But when the contriver of a hypothesis has no preconceived opinions to support, when he weighs and sets against each other all the conflicting facts and arguments which bear upon the question, and when his sole object is to discover what supposition will harmonise the greatest number of facts and contradict the fewest, then his speculations deserve some consideration, until they can be overthrown by positive evidence, or until some other hypothesis can be framed which shall, on similar grounds, be better worthy of acceptance."[45]

"...The Conirostres and Dentirostres...are professedly founded on one character only, and not on general

structure; and it is therefore not to be wondered at, that in their attempts to pay some little regard to natural affinities, while forcing the genera and families into these divisions, no two naturalists should be able to arrive at the same results..."[46]

"...my object has been to show the important bearing of researches into the natural history of every part of the world upon the study of its past history. An accurate knowledge of any group of birds or of insects, and of their geographical distribution, may assist us to map out the islands and continents of a former epoch; the amount of difference that exists between animals of adjacent districts being closely dependent upon preceding geological changes. By the collection of such minute facts alone can we hope to fill up a great gap in the past history of the earth as revealed by geology..."[47]

Finally, there is the following, from a letter of March 15, 1861 to Wallace's brother-in-law, Thomas Sims:[48]

"...You intimate that the happiness to be enjoyed in a future state will depend upon, and be a reward for, our belief in certain doctrines which you believe to constitute the essence of true religion. You must think, therefore, that belief is voluntary and also that it is meritorious. But I think that a little consideration will show you that belief is quite independent of our will, and our common expressions show it. We say, 'I wish I could believe him innocent, but the evidence is too clear'; or, 'Whatever people may say, I can never believe he can do such a mean action.' Now, suppose in any similar case the evidence on both sides leads you to a certain belief or disbelief, and then a reward is offered you for changing your opinion. Can you really change your opinion and belief, for the hope of reward or the fear of punishment? Will you not say, 'As the matter stands I can't change my belief. You must give me proofs that I am wrong or show that the evidence I have heard is false, and then I may change my belief'? It may be that you do get more and do change your belief. But this change is not voluntary on your part. It depends upon the force of evidence upon your individual mind, and the evidence remaining the same and your mental faculties remaining unimpaired--you cannot believe otherwise any more than you can fly.

...How, then, can [belief] be meritorious? When a jury try a case, all hear the same evidence, but nine say 'Guilty' and three 'Not guilty,' according to the honest belief of each. Are either of these more worthy of reward on that account than the others? Certainly you will say No! But suppose beforehand they all know or suspect that those who say 'Not guilty' will be punished and the rest rewarded: what is likely to be the result? Why, perhaps six will say 'Guilty' honestly believing it, and glad they can with a clear conscience escape punishment; three will say 'Not guilty' boldly and rather bear the punishment than be false or dishonest; the other three, fearful of being convinced against their will, will carefully stop their ears while the witnesses for the defence are being examined, and delude themselves with the idea they give an honest verdict because they have heard only one side of the evidence. If any out of the dozen deserve punishment, you surely agree with me it is these. Belief or disbelief is therefore not meritorious, and when founded on an unfair balance of evidence is blameable.

...In my early youth I heard, as ninety-nine-hundredths of the world do, only the evidence on one side, and became impressed with a veneration for religion which has left some traces even to this day. I have since heard and read much on both sides, and pondered much upon the matter in all its bearings. ...I think I have fairly heard and fairly weighed the evidence on both sides, and I remain an utter disbeliever in almost all that you consider the most sacred truths. I will pass over as utterly contemptible the oft-repeated accusation that sceptics shut out evidence because they will not be governed by the morality of Christianity. You I know will not believe that in my case, and I know its falsehood as a general rule. I only ask, Do you think I can change the self-formed convictions of twenty-five years, and could you think such a change would have anything in it to merit reward from justice? I am thankful I can see much to admire in all religions. To the mass of mankind religion of some kind is a necessity. But whether there be a God and whatever be His nature; whether we have an immortal soul or not, or whatever may be our state after death, I can have no fear of having to suffer for the study of nature and the search for truth, or believe that those will be better off in a future state who have lived in the belief of doctrines inculcated from childhood, and which are to them rather a matter of blind faith than intelligent conviction."

The Sims letter is an important document. Not only does it show that as of 1861--three years after his formulation of natural selection--Wallace obviously was experiencing no pangs of guilt related to his rejection of religious views, but it also succinctly roots his reasons for such rejection in his convictions regarding the value of belief. Belief had no intrinsic merit; only a continuing unbiased examination of the

facts pertaining to any given question resulted in values that were progress-serving.[49] Superficial or prejudging evaluations generated actions likely to be inconsistent with the greater reality, and thus deserving of rejection by that reality. "Progress" thus occurred only as individual human beings combined a willingness to re-evaluate positions with a receptivity to constructive change. Considering the passage assigned to note 44, Wallace extended this understanding to account for the way society in general "progressed." His approach to classification (note 46), moreover, suggests he had concluded that success within the biological world was, in like fashion, a function of a well-rounded adaptation to multiple influences. In the biological context, of course, the analog to such "continual re-evaluation of position" was achieved rotely, forced by ambient environmental circumstances; nevertheless, those individual organisms (or populations) that were capable of responding productively to the widest range of constraints were the ones that generally prevailed in the struggle for existence.[50] Thus, whether one was considering the evolution of organisms or social systems, it was possible to view progress as being facilitated by actions deriving from a wide-ranging experience (again, whether "experience" was acquired deliberately, through a coupling of conscious effort and receptivity, or probabilistically, in response to complex interactions of forces; *e.g.*, at the population level).[51]

Wallace's youthful conclusions regarding the interrelationship of justice, merit and belief are critical to understanding the directions his thinking took in 1858 and afterward.[52] He put the merit/belief argument itself to direct use on several later occasions;[53] later, we shall look further into how his biological views developed in parallel fashion.

By 1862 and his return to England Wallace was a celebrity, and any insecurity he may have ever felt concerning the validity of his personal philosophy of life had long since left him. Consider, therefore, the kind of effect spiritualist philosophy most likely would have had on him at that point. First, it concerned an occult subject--one, moreover, whose phenomena some were trying to attribute to a mechanism with which he was personally familiar: mesmerism. All of these circumstances would have held interest for him. Not only could he personally contribute to the discussion as mesmerism pertained to it,[54] but as a habitual champion of unappreciated causes, he would have enjoyed trying to right what he perceived to be naive criticisms of a poorly understood subject. Second, the moral teachings of spiritualism were directly relatable to phenomena that appeared to be, at least in some instances, verifiable, and were thus believable. Here, it seemed, was another aspect of the natural world inviting detached exploration by the intelligent skeptic, and Wallace was by nature both skeptical and insatiably curious. Third, the teachings themselves avoided dogma, instead encouraging the individual to respond as his or her personal assessment of the facts warranted. No unmeritorious belief here: this was not religion--at least not of any variety depending on the kind of inculcation and blind acceptance to which Wallace objected. The teachings were also perfectly in line with the ideas on continuity of causality Wallace had reasoned out and adopted some twenty or more years earlier. In short, he recognized in spiritualism elements of a truly "natural" philosophy: it gave a logical, testable accounting of how just cause and effect are related at the level of human consciousness, moral and intellectual behavior, and evolution. Spiritualism, moreover, supported his program of "balancing evidence" (as so succinctly described in the letter of March 15, 1861 to his brother-in-law); *i.e.*, its proponents concurred with his earlier-stated notion that there was to be no fear of suffering "for the study of nature and the search for truth." His familiarization with spiritualism could only have fortified his already existing negative impression of conventional theism: the less one depended on opinions served up by unquestioning authority, the better.

On the basis of the connections set out above alone, it is not difficult to understand why Wallace adopted the belief. He recognized in the movement something quite distinct from rote acceptance of unverifiable doctrines (*i.e.*, religion), investigated on this basis, and was convinced (rightly or wrongly) by what he found.

Whatever spiritualism may actually represent, Wallace's efforts to grapple with the vagaries of the subject seem scientific enough; that his interpretations of the phenomena (allegedly) involved were biased by anthropomorphism is clear, but the same thing is likely to be said in future years of our present manner of study of psychical subjects. In any case, analysis of Wallace's intellectual development before--or after--1858 should not rest on undefendable assumptions. It cannot be admitted as demonstrated that the teachings of spiritualism are fundamentally inconsistent with nature as the latter is more conventionally interpreted, and, more importantly, these teachings are, in point of fact, neither anti-evolutionary nor anti-"progressive." In my opinion, Wallace viewed them as relaying an evolutionary interpretation of reality, and as being, to a close approximation, compatible with the then-developing materialistic interpretations of biological evolution. Of course, if it is argued *a priori* that spiritualism and evolution represent mutually incompatible conceptual domains, one inexorably arrives at the facile conclusion that upon accepting spiritualistic beliefs Wallace must have had a change of mind regarding natural selection's relation to man's higher faculties. But the fundamental principles of Wallace's approach to the study of man/nature were set in his mind well before he finally stumbled onto natural selection, and given the fact that he repeatedly re-affirmed his belief in those principles in his writings over a span of seventy years--that is, over a period beginning well before 1858--it is extremely difficult to believe that either natural selection or spiritualism had any profound effect on re-directing them. His relation of the two ideas is the product of his personal evolution of thought, not its cause.

At this point it becomes necessary to re-examine some of the other things that were on Wallace's mind before 1858, and how these helped shape his formulation of natural selection in that year.

Wallace's Evolutionary Views: Introduction

Schwartz has analyzed Wallace's views on the evolution of man in an effort to distinguish them from Darwin's.[55] Schwartz feels that Wallace came to decide man and nonhuman animals had evolved differently some time after the appearance of his 1858 paper 'On the tendency of varieties to depart indefinitely from the original type,' as that work makes no specific mention of man. But how much weight can be put in this instance on such negative evidence? Perhaps Wallace felt the model could be applied equally well to man, but didn't want to unduly complicate his initial, and typically lucid, presentation of the idea. Or perhaps, as I shall argue, the main point of the Ternate essay, beyond its introduction of natural selection *per se*, was to lay the groundwork for the idea that man *is*, in fact, an exception. It should be kept in mind that Wallace had no opportunity to re-work his paper before it was presented to the Linnean Society and then published.[56] It had been relayed to Darwin and Lyell for comment, not for publication in that form. As such behavior was not Wallace's usual policy before attempting to publish, it is altogether likely that he was contemplating adding material to it. And even this presumes that he was intending to try to publish it right away to begin with: he had, after all, been sketching out the material for a book on evolution.

Also note that there was no particular reason for him to single out man anyway. The paper was restricted to a consideration of speciation, and avoided any discussion of Wallace's views on evolution in general. Whether he intended to add remarks concerning man's possible exceptional evolutionary relationship to natural selection before publishing the work in one form or another is, at this time, conjectural only; that the work omitted any special reference to man, however, is irrelevant altogether to the conclusions that have been drawn from this fact if Wallace had a different agendum in mind than has generally been assumed.

Wallace probably became an evolutionist about 1845 after reading *Vestiges of the Natural History of Creation*.[57] At that point, however, he had not yet begun to relate evolution to the immediate causal agencies we now associate with the workings of natural selection. His letters to Henry Walter Bates during that period[58] and later comments on *Vestiges*[59] show that he was more critical of Chambers's[60] inability to

set out a model of process integrating the facts available than he was that writer's rather philosophical/cosmological approach to the subject *per se*.[61] Certainly, there were "facts" that could be interpreted as the products of evolution, and it was out of these that a dogma-free conceptualization of the process had to be constructed. The investigations in natural history Wallace had conducted in his spare time while working as a surveyor and teacher in the early 1840s led him to conclude that the facts of diversity might provide a firm base for such a model; as a result, he made constructing a connection between evolution and the distribution of organisms a conscious objective of his collecting expeditions to South America and the Malay Archipelago. It is quite certain that he actually was giving all related variables a good deal of attention: he says so directly in print in 'On the law which has regulated the introduction of new species,'[62] remarks that are corroborated by the contents of letters he exchanged with his friend Bates.[63]

Wallace's preconceptions about natural process and organization at the time he left for South America devolved in part from his reading of *Vestiges*, and in part from the general outlook he already had at that point in his life. He had apparently rejected most orthodox Christian interpretations of nature and society long before reading *Vestiges*, and his adoption of an evolutionary perspective was not an inconsistent next step.[64] This does not mean, however, that Wallace had also rejected the notion that in one fashion or another "God" might represent the final cause of natural organization.[65] It is significant that Wallace later looked back at himself as being an agnostic--rather than an atheist--during this period.[66] "God" was a concept that, in his own words, he "cared and thought nothing about."[67] As of 1870, of course, he undoubtedly accepted that behind all "universal forces and laws" there lay "the will or power" of a "Great Mind" or "Supreme Intelligence";[68] it seemed, however, that the "law" of such a will or entity, probably being "connected with the absolute origin of life and organization," was likely "too deep for us to discover."[69]

Such "law" was not, it need be emphasized, to be interpreted as one operating through event-specific Godly intervention: "I reject the hypothesis of 'first causes' for any and every special effect in the universe, except in the...sense that the action of man or of any intelligent being is a first cause."[70] Wallace would thus have nothing of a "supranatural" God that had created--and was personally supervising--an essentially unprogressing (or, for that matter, progressing) natural reality. Rather, the "Great Mind" represented, in some sense, a universal source of will as an expression of which the laws of the universe operated, in fully uniformitarian fashion, to evolve "special" (*i.e.*, individual) effects.[71]

Again, within this framework, a final cause was in theory operating, but probably was too remote from human appreciation ever to be fully understood. Nonetheless, the "will" of the "Supreme Intelligence" was manifest as an ordered, changing existence encompassing all of reality (including itself), and operating according to describable laws of interaction (*e.g.*, natural selection and gravitational attraction). These laws combined in such a fashion--quite possibly itself formally describable, and at the least recognizable--making ordered change the necessary consequence of their operation.

I suggest that Wallace's intellectual evolution between 1845 and 1870 consisted largely of a shift in opinion as to how these fundamental laws of nature were integrated as a function of final causation. Whereas in the late 1840s and most of the 1850s he believed biological/social evolution might be explained on the basis of laws of interaction directly analogous to--and working alongside of--those governing the physical world (note the first italicized passage in the 'Advantages...' selections presented earlier), he would eventually decide: (1) that (at least) three, rather than two, general domains of interaction pursuant to such laws existed, and (2) that the interaction among these domains defined a nested hierarchy of causal organization.[72] Otherwise put, while at first Wallace felt that biological and social evolution were forced by

physical (*i.e.*, geological/geographical) relationships analogous to, but of greater complexity than, say, gravitational attraction, later he would conclude that a "push-pull" kind of mutual causality prevailed.[73] Within the confines of three dimensional space, pre-biological forces laid the foundation for conditions that could support biological organization; the latter, in turn, eventually co-evolved to a point permitting the increasing involvement of a domain of psychic organization.[74] The growth of the psychic domain within human consciousness coincided with (and depended on) our increasing transcendance of the "everyone for himself" sentiments rooted in the survival instinct necessary to biological success. Such transcendance represented an accelerating "pull" effect within the operation of the hierarchy, because consciously-willed acts by human beings increasingly enhanced the chain of causation enacted by rotely-operating physical and biological laws alone.

Before we look into the development of these ideas in more detail, it will be helpful to take special notice of a feature of Wallace's views on evolutionary causation that makes them fully distinct from Darwin's. Darwinian natural selection defines a process: one in which the selection of characters apropos to environmental circumstances supports eventual divergences in species lines. The influence of prior causes, both internal and external (loosely, genetic and environmental) to the actors involved is acknowledged, and left open for consideration, identification, and clarification.[75] The Darwinian approach is to accept historical continuity of form as direct evidence of continuity of process; thus, both natural selection specifically and evolution in general are considered demonstrated if speciation can be synonymized with spatial-temporal chronology of adaptive change.[76] In short, the focus is on the process of divergence: "process yields structure yields process..."; *i.e.*, what is now often referred to as "tree-thinking."[77] In contrast, at no time during his life did Wallace recognize a *necessary* connection between process and particular structure. Wallace considered natural selection a law of natural interaction rather than a process. There is no generalizable "process" of adaptation implicit in Wallace's realization of natural selection, only the result of being adapted.[78] For many years Wallace used the term "accumulate" to describe how he felt favorable variations were added to a population as a function of entirely idiosyncratic associations between individual and environment.[79] Characters were selected, for whatever reasons, and this fact he termed "natural selection."[80] "Evolution," on the other hand, he regarded as a process fueled by the simultaneous operation of all such laws of interaction, any of which might be secondarily influencing natural selection (or each other) over long periods of time in any number of ways. Thus, each such law could be observed to produce certain classes of immediate effects, but no one actor on the evolutionary stage could be considered "caused" in its entirety by any of these laws individually.[81]

Of course, Wallace found it easier in practice to defend the fundamental proposition that biological evolution occurred at all by yielding to the Darwinian notion that evolution was largely a matter of character divergence. This was not a difficult concession, as he could identify many adaptive features that could be related, in a relatively immediate sense, to particular classes of natural selection-mediated causation. Mimetic resemblance, for example, "accumulated" as the enhanced survival potential accruing from looking like something--anything--else that was inedible or dangerous. In analogous fashion, gravity yielded "accumulations" of particles under a variety of domain-limited physical conditions: to produce, for example, talus slopes, moraines, fluvial deposits, etc.

Utility, Adaptation, and Diversification

In early 1856 Wallace composed the essay 'On the habits of the orang-utan of Borneo,' within which the following commentary appeared:

> "Naturalists are too apt to imagine, when they cannot discover, a use for everything in nature: they are not even content to let "beauty" be a sufficient use, but hunt after some purpose to which even that can be applied

> by the animal itself, as if one of the noblest and most refining parts of man's nature, the love of beauty for its own sake, would not be perceptible also in the works of a Supreme Creator. The separate species of which the organic world consists being parts of a whole, we must suppose some dependence of each upon all; some general design which has determined the details, quite independently of individual necessities. We look upon the anomalies, the eccentricities, the exaggerated or diminished development of certain parts, as indications of a general system of nature, by a careful study of which we may learn much that is at present hidden from us..."[82]

Expressed in these words are thoughts that would be fully mature in Wallace's mind only by the mid-1860s. The first, and more straightforward, is the concept that there exists a "general design which has determined the details, quite independently of individual necessities." In this statement is reflected, simultaneously, (1) Wallace's rejection of the idea that first causes exist "for any and every special effect in the universe," and (2) his acceptance that there yet existed a confining "general design." At that point, however, he undoubtedly believed that the "general design" could be understood to directly explain specifics of diversification and adaptation (*i.e.*, in a manner similar to the way Newtonian physics modelled individual gravitational relationships in the heavens).

Also contained in the passages above is the germ of the idea that man's love of beauty should itself be perceptible as a work of the Supreme Creator. The "Supreme Creator" is here viewed as being both: (1) further removed from the efficient cause of each modification than was assumed by Creationists; and (2) more encompassing in its operation than were it merely acting to meet the immediate material needs and/or conscious desires of each individual organism (*i.e.*, both the material structure of lower organisms and the conscious/emotional faculties of higher ones fell within its influence, whether such influence could be perceived as operating or not).[83] As early as 1856, therefore, Wallace was arguing that the "general design" of nature called for a model of its productions recognizing not merely the place of material things within it, but: (1) man's emotional and intellectual response to material things, and (2) the possibility of higher causes altogether. And, although he was ready to accept that we might be ignorant of the greater forces that were at work, he was not willing to grant that such forces were necessarily unsystematic in their enaction (*e.g.*, were the product of unpredictable Godly "first causes").

It is well known that Wallace's disenchantment with the simple model of causality offered by both conventional theism and then-existing natural science was considerable well before 1858--certainly back to 1845, and probably even into the late or mid-1830s. His excitement over *Vestiges* foreshadowed many remarks he would later make, as Chambers had argued that "progressive development" was the underlying theme of existence. McKinney, Brooks, Browne, Malinchak, and Turner[84] have explained how this would have appealed to Wallace's social views at that point. At the time he read the book, Wallace had long since adopted progressive ideas regarding societal evolution; he was a disciple of the idealist reformer Robert Owen even as a teenager, believing that most of the wrongs of society could be eliminated through consciously (and, especially, conscientiously) applied programs of social reform. It was Chambers's position that evolution proceeded toward the development of "godly" beings, an idea that inherently accepted the notion of societal advance. His position on organic change, however, was primarily based on a Lyellian, uniformitarian, approach to geology. Through this approach it was possible to imagine that generally acting physical laws implicitly gave rise to progressive biological change--otherwise put, that the general design of nature depended on the operation of uniformitarian laws that supported what have been more recently called "deviation-amplifying" processes.[85]

In Chambers's position, in fact, were most of the seeds of Wallace's later synthesis.[86] If we believe his later reference to the subject in 'On the law...,'[87] Wallace quickly settled on a means of transforming these "progressive development" leanings into the set of ideas expressed ten years later in that paper. His focus became the description of divergence in species lines. But this emphasis--on large scale spatial/historical relations--turned out to be something of a mistake. In his effort to avoid a first causes-based viewpoint, Wallace almost threw the proverbial baby out with the bathwater. Creationists argued that the Creator had

specially provided all the earth's creatures with just what they needed to survive. Wallace rejected this notion outright, agreeing with Chambers that the natural progression had to be self-regulating to conserve an intelligible relation of cause to effect.

In fact, despite words he later wrote that might be interpreted as indicating the contrary,[88] it is quite clear that prior to 1858 Wallace even rejected the argument that there was necessary functional utility to adaptation. He did not yet see that the assumption of utility would be necessary to establish a generalization regarding the immediate causes of biological change; *i.e.*, to explain how population change (though not necessarily the long term "accumulations" of change) was self-regulating. In 1856, he incorporated the following comments into the already-cited 'On the habits of the orang-utan of Borneo':

> "...Do you mean to assert, then, some of my readers will indignantly ask, that this animal, or any animal, is provided with organs which are of no use to it? Yes, we reply, we do mean to assert that many animals are provided with organs and appendages which serve no material or physical purpose. The extraordinary excrescences of many insects, the fantastic and many-coloured plumes which adorn certain birds, the excessively developed horns in some of the antelopes, the colours and infinitely modified forms of many flower-petals, are all cases for an explanation of which we must look to some general principle far more recondite than a simple relation to the necessities of the individual. We conceive it to be a most erroneous, a most contracted view of the organic world, to believe that every part of an animal or of a plant exists solely for some material and physical use to the individual--to believe that all the beauty, all the infinite combinations and changes of form and structure should have the sole purpose and end of enabling each animal to support its existence--to believe, in fact, that we know the one sole end and purpose of every modification that exists in organic change, and to refuse to recognize the possibility of there being any other. Naturalists are too apt to imagine, when they cannot discover, a use for everything in nature... ...we believe that the constant practice of imputing, right or wrong, some use to the individual, of every part of its structure, and even of inculcating the doctrine that every modification exists solely for some such use, is an error fatal to our complete appreciation of all the variety, the beauty, and the harmony of the organic world..."[89]

Vague strains of this kind of thinking can also be found in other writings Wallace produced before 1858.[90] This leaning cannot be passed off as a simple *a priori* bias, however, as Wallace's preconceptions were being fortified by a modestly convincing process of reasoning by exclusion. To begin with (and given Wallace's rejection of Lamarckian thinking), no compelling non-Creationist arguments existed which provided any good reasons for thinking that every adaptation had to be useful. Importantly, moreover, the "every species has come into existence coincident in time and space with a pre-existing closely allied species" model expressed in 'On the law...' had ramifications that seemed incompatible with a point of view embracing necessary adaptive utility. In 'On the law...' Wallace notes that most authorities agree that most rudimentary organs "have no special function in the animal economy,"[91] and that such organs seem entirely inexplicable in the absence of forces yielding slow, gradational changes in organisms (forces so pervasive, one supposes, as to override the non-function of those structures having no immediate utility). In 'On the natural history of the Aru Islands' he rejects the idea that immediate conditions of climate regulate the distribution of existing species, as "we should not see countries the most opposite in character with similar productions, while others almost exactly alike as respects climate and general aspect, yet differ totally in their forms of organic life."[92] The same conclusion is implicit in his comparisons of insect size and color in the temperate versus tropical regions in 'Observations on the zoology of Borneo';[93] *i.e.*, local physical conditions apparently sponsored the same manner of adaptation in physically separated, unrelated forms.[94] This fact seemed to suggest that adaptation *per se* was a result, rather than the cause, of the "progressive development" of organisms (*i.e.*, some more general set of influences must determine how new characters combined to effect "progress").

It is thus very unlikely that before 1858 Wallace was basing any of his thoughts on the supposition of necessary character utility. He may well have believed (and probably did), as McKinney[95] observes, that adaptations "occurred" while species evolved, but this association was merely correlative; *i.e.*, derivative.

As early as 1853, Wallace implied that it was futile to pursue the "red herring" of adaptation-based causality any further: "...In all works on Natural History, we constantly find details of the marvelous adaptation of animals to their food, their habits, and the localities in which they are found. But naturalists are now beginning to look beyond this, and to see that there must be some other principle regulating the infinitely varied forms of animal life..."[96]

Wallace's belief that the "necessary utility" argument was an explanatory red herring must have been reinforced by his experiences with the native peoples he encountered over the course of his travels. It should be kept in mind that Wallace had been considering man's place in evolution right from the beginning of his attention to the subject.[97] Although many of the activities of people in primitive societies bespoke adaptation forced by local peculiarities of environment, there were yet as many that seemed unrelated. There appeared to be little connection between morality and survival, for example, and even less between the latter and mathematical, artistic or musical abilities. He could only conclude that however evolution operated, it appeared to enlist adaptations/abilities that were in some combinations directly functional and in others not so, at least with respect to survival *per se*. This is the reason for Wallace's great interest in the orangutan: he viewed it as an important bridge between animals and human beings in this respect. Judging from his comments in 'On the habits of the orang-utan...,' his study of this animal only served to confirm his then-existing thoughts regarding non-utility.

The "principle" to which Wallace alludes in the last passage quoted undoubtedly extended beyond the concepts set out in 'On the law...' He realized that the "law" expressed in that paper was incapable of doing more than stating the essential results of species divergence in time and space. Here, only, was a description of continuity of effects.[98] His problem narrowed to identifying a kind of "self-regulation" that caused such a continuity of effects.

In attempting to substantiate the view expressed in *Vestiges* that evolution consisted of a "progressive" succession of animal forms, Wallace needed to come up with three kinds of proof. First, he had to prove that evolution in fact took place. Nontrivial as this problem was, it was the easiest one to deal with--assuming, of course, that it was true. Second, he had to provide a model of how it took place; that is, he had to demonstrate those conditions immediate to the life and activities of living things that led to irreversible forms of change in them. Third, and most difficult, he had to identify not only these immediate causes, but the way his assumed final cause operated on them to produce "progress." He very quickly saw how to approach the first problem--through careful study of the spatial-temporal links between the present distribution of organisms and their fossil record. This thinking is summarized in the 'On the law...' essay.

He had made no progress whatsoever on the second problem as of 1855, however. Arguably, in fact, he had regressed. The reason for this is probably that he thought a solution would be implicit in the solution to the third problem; *i.e.*, he was approaching the problem from the "top-down." Once he had examined enough "facts" and had confirmed the spatial-temporal relations of geography and geology suggesting that evolution really took place, he set his sights on solving the final cause issue, in so doing avoiding for the moment the matter of immediate causation at the biological level (whose individual components, he believed at that time, were "unconceivable"[99]).

In sum, Wallace's pre-1858 efforts indicate that he had adopted a rather unconventional form of teleology. Following Chambers, Wallace had allowed the concept of progress to permeate his thinking, probably to the extent that he believed such progress represented movement toward a system-level goal: the development of higher, "godly," beings. Whereas the goal-centered Lamarckian model had dwelled on the immediate causes and specific effects of organic change, however, Wallace's tacitly denied a causal role to adaptation. Instead, the confining/promoting influences imagined were ostensibly of grander scale, overriding individual effects through continuity of influence, just as Newtonian forces had supported the

original consolidation of the solar system.[100] In short, he thought the direction of the continuing "accumulation" of characters was being influenced by very general--and prior--properties of environmental organization.

I suggest on this basis that Wallace's pre-1858 activities indicate his search for a geographical Bauplan. Perhaps as a function of his youthful involvements with trigonometry, mechanics, and geodesy,[101] he anticipated that the details of animal distribution would reveal to him, in their organized relations, those ever-present, unformly-acting laws that conspired to guide evolution, much as the interrelations of the heavenly bodies had revealed the nature of gravity.

Wallace's commitment to a search for a geographical kind of Bauplan--rather than a physiological/morphological one--is not puzzling. To begin with, all of his pre-1845 nature-oriented activities had had a distinctly geographical side: plant and insect collecting, surveying, land use study and evaluation, and informal study of the economics of agriculture. About the same time, moreover, he read--and was very favorably impressed with--several works containing strongly geographical themes.[102] Further, he lacked the formal training (and interest) in physiology and morphology that would have been necessary to support a laboratory investigation of adaptive trends--which, in any case, did not seem the right direction for exploration, giving into, as it appeared, adaptationist lines of reasoning. Finally, and very significantly, a geographical framework was less remote from an understanding of how societal change took place. As mentioned earlier, Wallace was much taken with Herbert Spencer's *Social Statics*--especially with that writer's views on how social problems were created by injustices stemming from the then-existing conditions of land ownership.[103] Over the period 1853-1858, geographical determinism--as related to the explanation of both biological and social evolution--was a subject at the very front of his mind.[104]

During this period Wallace obviously regarded species diversification as the distinguishing feature of biological advance. Adaptation was a derivative, or even incidental, process. Nonetheless, he realized that character states could be used to distinguish between varieties, and that an understanding of the manner of emergence of varieties was crucial to an appreciation of the process of speciation. Thus it would be necessary, in one fashion or another, to relate his law of geographical/geological influence to the adaptive characteristics of individual organisms.

But as the years passed, Wallace could not recognize any way in which the greater conditions of environment imposed an influence of the kind he was anticipating. Again, important characteristics of animals--their size and color, for example[105]--seemed more relatable to immediate causal agencies. There was, further, the persisting problem of how to fit social evolution into the picture. Man passed on innovations--in the form of mathematics, art, music, moral teachings, etc.--and did so regardless of whether there seemed to be any apparent survival value involved. How could organic evolution proceed in a fashion responding to environmental constraints and opportunities, yet produce adaptive structures whose persistence was not necessarily a direct and exclusive function of those constraints and opportunities?[106]

The natural selection concept reinforced his belief that this question could be answered within the general framework of final causes he had set out for himself. Admitting character variation, natural selection could be viewed as operating to yield *whatever* new adaptations that could come about and differentially persist. This was a model through which one could understand the process of diversification, as long as one accepted that selection itself (in contradistinction with the "accumulation" of character states) was the generalizable law, the necessary result of interaction between life and its environment. As has been pointed out by Browne,[107] Wallace envisioned a selection process operating at the group level, and producing new populations characterized by distinct adaptive suites. Browne notes that Wallace was thinking in terms of statistical generalizations; this appears to be consistent with the rules for systematic revision (multiple

character trait-based analysis, etc.) he was applying at the time.[108] If single characters were untrustworthy distinguishers of species from one another taxonomically, neither were they likely to mirror the only relevant population-dividing forces. Suites of peculiarities defined species.[109]

Significantly, it was still possible to admit that certain individual characteristics might have no adaptive value--as long as their presence was correlated, for reasons yet unknown, with ones that did. This suited Wallace perfectly: he could now explain how new forms came into existence, but could still avoid the assumption that structural continuities over time necessarily implied single causal continuities.[110] At the same time, of course, natural selection shed no light on the prior problem of why some characters maintained themselves indefinitely despite their apparent non-utilitarian nature, and an unceasing, biological utility-refining selection pressure.

It appears to me that Wallace never thought that all levels of adaptive function could be attributed to the action of natural selection. Those that could were to be contextualized in simple survival terms as responses to the immediate (causal) constraints of environment--but the utility function of the rest had to be referred to associations with causes not yet understood. This conclusion, not natural selection itself, was the real breakthrough in Wallace's thinking. It allowed him a position consistent with his continuing aversion to "first causes" thinking, but conducive to explaining one-to-one associations between environment and biological structure.

The relationship that apparently helped Wallace sort all this out was that existing between man and domesticated animals. Consider the following passages from pages 59-61 of 'On the tendency...':

> "The essential difference in the condition of wild and domestic animals is this,--that among the former, their well-being and very existence depend upon the full exercise and healthy condition of all their senses and physical powers, whereas, among the latter, these are only partially exercised, and in some cases absolutely unused... ...Half of [the domestic animal's] senses and faculties are quite useless; and the other half are but occasionally called into feeble exercise, while even its muscular system is only irregularly called into action. Now when a variety of such an animal occurs, having increased power or capacity in any organ or sense, such increase is totally useless, is never called into action, and may even exist without the animal ever becoming aware of it... ...in the domesticated animal all variations have an equal chance of continuance; and those which would decidedly render a wild animal unable to compete with its fellows and continue its existence are no disadvantage whatever in a state of domesticity... ...We see, then, that *no inferences as to varieties in a state of nature can be deduced from the observation of those occurring among domestic animals*. The two are so much opposed to each other in every circumstance of their existence, that *what applies to the one is almost sure not to apply to the other*..." [my italics]

Wallace's arguments here seem to be directed toward exposing an exception to the rule. The point of interest, however, is that it is not altogether clear which discussion he is posing as the exception, and which the rule. Earlier in the same work, on page 54, he straightforwardly states:

> "...it is the object of the present paper to show that [the] assumption ["that varieties occuring in a state of nature are in all respects analogous to or even identical with those of domestic animals"] is altogether false, that there is a general principle which will cause many varieties to survive the parent species, and to give rise to successive variations departing further and further from the original type, and which also produces, in domesticated animals, the tendency of varieties to return to the parent form."

Later in the same essay he notes that his theory explains "the remarkable persistence of unimportant parts such as colour, texture of plumage and hair, form of horns or crests, through a series of species differing considerably in more essential characters."[111] His ideas have progressed--ever so subtly--from the non-utilitarian position expressed in the orangutan essay to one in which he views characters varying in being "the more or the less" "essential" (the characters he lists are, of course, among the easiest to modify through selective breeding practices).

The passages I have italicized in the selections above are of especial interest. From the last it is apparent that, in contrast with Darwin, Wallace did not view domestication as a process paralleling natural selection--rather, it was its antithesis.[112] Why? Because no biological "self-regulation" was operating in the case of artificial selection. The latter produced changes "without the animal ever becoming aware of it" or leaving it at any "competitive disadvantage." These concepts were the key: traits that could be passed on, for no apparent reason of utility (that is, with respect to "natural" environment), yet produce no "disadvantage." By inference, biological utility was a valid concept only to the extent that it supported characters whose regulation (or further development) in a population might well be guaranteed only through the intervention of additional, but not yet known, causal agencies.[113] This flexibility of interpretation was necessary, because it would be very difficult in any given instance to prove that an immediate "one cause-one effect" determinism actually existed.[114]

These connections explain Wallace's continuing interest in the study of character utility and why, as he grew older, he was able to maintain his strong defense of natural selection while developing an increasingly teleological cosmological position. As of 1858 he could not guage to what extent the immediate physical/biological environment determined utility function (and, in fact, in later years he abandoned some of his earlier arguments regarding particular "non-necessary" physical traits, as Kottler[115] and others have pointed out).

I suggest, therefore, that the purpose of 'On the tendency...' has never been entirely recognized. It was not intended in the main as the revelation of a "new theory of evolution" (*i.e.*, natural selection), but as an interim statement clearing the ground for an interpretation of evolutionary change that was not bound *a priori* by the assumption that all adaptive characters are directly related to the program of the immediate environment. Natural selection thus in effect became the "rule" that distinguished between those characteristics that were so related, and those for which additional explanation was necessary. That Wallace sent the manuscript to Darwin was predictable: how to treat the domestication process had been one of the main subjects of their earlier exchanges of letters. One surmises that he felt Darwin would be interested in both parts of his argument. As mentioned earlier, however, Darwin recognized no logical difference between "artificial" and "natural" selection processes. To be sure, the immediately operating influences in each instance were quite different; the common thread for him, however, was that both kinds of selection produced the result of changes in biological form. Wallace, by contrast, still holding the view that changes in form were no more than correlative to process, was coming at the matter from a totally different starting point.

In 1870 Wallace wrote:

> "I have also endeavoured to show, how the same power which has modified animals has acted on man; and have, I believe, proved that, as soon as the human intellect became developed above a certain low stage, man's body would cease to be materially affected by natural selection, because the development of his mental faculties would render important modifications of its form and structure unnecessary. It will, therefore, probably excite some surprise among my readers, to find that I do not consider that all nature can be explained on the principles of which I am so ardent an advocate; and that I am now myself going to state objections, and to place limits, to the power of "natural selection." I believe, however, that there are such limits; and that just as surely as we can trace the action of natural laws in the development of organic forms, and can clearly conceive that fuller knowledge would enable us to follow step by step the whole process of that development, so surely can we trace the action of some unknown higher law, beyond and independent of all those laws of which we have any knowledge."[116]

In the same essay he adds:

> "The inference I would draw from this class of phenomena is, that a superior intelligence has guided the development of man in a definite direction, and for a special purpose, just as man guides the development of many animal and vegetable forms. The laws [note plural "laws"!] of evolution alone would, perhaps, never have

> produced a grain so well adapted to man's use as wheat and maize; such traits as the seedless banana and bread-fruit; or such animals as the Guernsey milch cow, or the London dray-horse. Yet these so closely resemble the unaided productions of nature, that we may well imagine a being who had mustered the laws of development of organic forms through past ages, refusing to believe that any new power had been concerned in the production, and scornfully rejecting the theory (as my theory will be rejected by many who agree with me on other points), that in these few cases a controlling intelligence had directed the action of the laws of variation, multiplication, and survival, for his own purposes. We know, however, that this has been done; and we must therefore admit the possibility that, if we are not the highest intelligences in the universe, some higher intelligence may have directed the process by which the human race was developed, by means of more subtle agencies than we are acquainted with. At the same time I must confess, that this theory has the disadvantage of requiring the intervention of some distinct individual intelligence, to aid in the production of what we can hardly avoid considering as the ultimate aim and outcome of all organized existence--intellectual, ever-advancing, spiritual man. It therefore implies, that the great laws which govern the material universe were insufficient for his production, *unless* [my italics] we consider (as we may fairly do) that the controlling action of such higher intelligences is a necessary part of those laws, just as the action of all surrounding organisms is one of the agencies in organic development."[117]

I see no reason why Wallace might not just as easily have written the preceding words in 1864--or even 1858--as 1870: he merely would have felt a good deal less confident in doing so before he had collected evidence supporting the notion that, in parallel with domesticated animals, man was evolving without "ever becoming aware of it." The essential element of Wallace's cosmology with respect to man--that forces extending beyond his immediate awareness of their operation and impact were influencing his overall development--remained intact between at least as early as 1856 (the year of the orangutan essay) and his 1870 publication of *Contributions to the Theory of Natural Selection*. It must have been in good part for this reason that Wallace wanted to hear what Darwin and Lyell had to say about his theory before he attempted to publish in 1858: he believed it identified no more than the critical efficient cause of the process named in the paper's title. It did not yet explain, however, why some characters, once in existence, could be *maintained* despite their apparent inutility. Would others (especially Lyell, who Wallace must have known was not an evolutionist) object to this weakness?

Ironically, Wallace was probably afraid that his new theory would be criticized on the grounds that it attempted to explain "too much"; *i.e.*, the dynamics of emergence of all purely biological structures.[118] But the pendulum swung the other way, and with the premature reading of the paper and Darwin's publication of *On the Origin of Species* the next year, Wallace's initial worry became academic. With no proof of more remote causes at hand, it would have been futile to press the issue at that point, and Wallace turned his attention to defending ground already gained. He accelerated his study of the connections between biological change and (1) adaptation[119] and (2) geological/geographical distribution;[120] clearly, it was crucial to the more immediate cause to develop a better appreciation of these two critical relationships, and in turn to get others thinking about related subjects and contributing. Just as clearly, no attempts could be made to raise specific objections to Darwin's more open-ended position on evolutionary causality until he had taken the time to consider in detail the limits of the explanatory domain of natural selection.

It is surely for this reason that Wallace had almost nothing to say about the evolution of man between 1858 and 1864: he had little to add to what he had already said in 1856 regarding the relationship of continuity to utility, and there was no point in speculating further until a solution to the hierarchical causality issue presented itself.

The Completion of Wallace's "Theory of Evolution"

When Wallace returned to England in 1862, he was a man in an awkward position. Despite the fact that in the four preceding years he had written virtually nothing regarding Darwinian concepts,[121] on the basis of the Ternate essay he was considered a "Darwin supporter." This was true enough; what was not

appreciated, however, was that the emergence of natural selection as a viable concept merely meant that he now had to concentrate on figuring out how, specifically, human beings were evolving "without ever becoming aware of it."

Initially encouraged by the success of the (Darwinian) materialist formulation of natural selection, Wallace turned to the work of another famous materialist, Herbert Spencer, for inspiration. In 1862 he read Spencer's *First Principles* and, around the same time, apparently re-read *Social Statics*.[122] In *My Life*, Wallace writes:

> "Soon after my return home, in 1862 or 1863, Bates and I, having both read *First Principles* and been immensely impressed by it, went together to call on Herbert Spencer... Our thoughts were full of the great unsolved problem of the origin of life--a problem which Darwin's *Origin of Species* left in as much obscurity as ever--and we looked to Spencer as the one man living who could give us some clue to it. His wonderful exposition of the fundamental laws and conditions, actions and interactions of the material universe seemed to penetrate so deeply into [the] nature of things...that we both hoped he could throw some light on that great problem of problems..."[123]

In a January 2, 1864, letter to Darwin, Wallace says of Spencer: "He appears to me as far ahead of John Stuart Mill as J. S. M. is of the rest of the world, and, I may add, as Darwin is of Agassiz. The range of his knowledge is no less than its acuracy... in his forthcoming volume on Biology he is I understand going to show that there is something else besides Natural Selection at work in nature. So you must look out for a 'foeman worthy of your steel'!"[124] In this letter Wallace also suggests that Darwin read *Social Statics*. Spencer's influence on Wallace's thinking was undoubtedly strong during this period: the combined arguments of *Social Statics* and *First Principles* probably convinced him once and for all that evolution occurred as the result of "persistently directed force." Spiritualism would provide support for the conclusion that such force was a manifestation of a universal will.[125]

Wallace's "experiment" in materialist (Wallace usually employed the word "individualist" rather than "materialist") thinking culminated in two important position papers he presented at scientific meetings in early 1864. These were 'The origin of human races...,' read to the Anthropological Society of London on March 1, 1864, and 'On the phenomena...,' presented sixteen days later to the Linnean Society of London.[126] The first paper represented the first time Wallace combined his historical 'On the law...' model with his ecological 'On the tendency...' arguments to treat man's evolution;[127] the second, the first time he applied these in combination to a discussion of animal evolution. Wallace was uncharacteristically proud of both works, and intent on making sure Spencer knew of them: he sent him a reprint copy of 'The origin of human races...,' probably as soon as one was available,[128] and specially composed an article-length abstract of 'On the phenomena...' for the journal *Reader*,[129] with which Spencer was connected in an advisory capacity.

Wallace was not entirely happy with the individualism-influenced arguments presented in 'The origin of human races...,' however (see later discussion). Still, by 1865 he was certainly convinced that natural selection was, at least within the general limits he had always conceived for it, an absolutely valid concept. Just as certainly, he believed that natural selection could do no more than provide a general label for the proximate causes of organic diversification. Wallace was apparently still trying to work out a hierarchical causal model accounting for the evolutionary function of ostensibly survival-unrelated characters when he began to digest the spiritualism literature sometime between 1862 and 1865.

From his many later writings on the subject (including those sampled earlier), it can be seen that he soon came to the conclusion that the spirit realm described by spiritualist prophets such as Stainton Moses constituted a natural domain within which the function of organic evolution was continued--in the same way the latter continued, was intimately linked with, and depended on, the impetus of continuing forms of

inorganic evolution. The critical connection for Wallace would have been his recognition that, given the supposed nature of the spirit realm, the higher faculties of man did in fact have utility. But this was not a function contributing only to biological survival, and thus devolving from causes dictated by conditions of the immediate physical environment. Rather, the refinement of the higher faculties made possible a continuing elevation of function after the biological death of the individual within a purely psychic (or "will-expressed") domain of organization. Higher spiritual development meant a greater capacity for identifying (and setting into action) new causal forces contributing to the overall evolutionary progression (much as biological evolution had modified the evolution of physical systems such as the atmosphere).

Wallace apparently felt that the formal languages of thought--logic and mathematics, for example--did no more than to serve belief. Both logic and mathematics could be called upon to help identify and characterize any evidence adjudged, of course, but ultimately a belief consistent with the reality of the senses--including others' beliefs--was the final object of learning, not a detached logical shorthand. Wallace's style of thinking is therefore perhaps more relatable to pragmatism than it is to naturalism. Will existed prior to force, which itself was prior to matter (and thus "nature"). Causal continuity was best addressed in terms of will, not matter; thus, coincidence of structure and function should not be held to offer proof that the former "caused" the latter.[130] The brain, for example, was not to be construed as the "cause" of conscious awareness; rather, it was a structure that had evolved pursuant to consciousness.[131]

Wallace's approach to spiritualism itself seems little different from that he applied to the consideration of any other subject he took up.[132] His attraction to automatic slate-writing, apparitions, and so forth almost assuredly had nothing to do with a "religious conversion" occasioned by "disappointment" over natural selection. Rather, he considered spiritualism what might be termed "evolutionary psychology"--a "new branch of anthropology."[133] In sum, Wallace "believed" in the tenets of spiritualism for exactly the same reason he "believed" in natural selection (or, for that matter, any other concept he had come to accept as being valid within certain limits)--they were substantiated by "facts":

> "...I have reached my present standpoint by a long series of experiences under such varied and peculiar conditions as to render unbelief impossible. As Dr. W. B. Carpenter well remarked many years ago, people can only believe new and extraordinary facts if there is a place for them in their existing "fabric of thought." The majority of people to-day have been brought up in the belief that miracles, ghosts, and the whole series of strange phenomena here described cannot exist; that they are contrary to the laws of nature; that they are superstitions of a bygone age; and that therefore they are necessarily either impostures or delusions. There is no place in the fabric of their thought into which such facts can be fitted. When I first began this inquiry it was the same with myself. The facts did not fit into my then existing fabric of thought. All my preconceptions, all my knowledge, all my belief in the supremacy of science and of natural law were against the possibility of such phenomena..."[134]

Though it is apparent that Wallace came to believe that creative diversification was in the broadest sense purposeful (*i.e.*, was part of a universal process evolving enlightened spirituality), there is nothing to suggest that he thought the alleged "spirit realm" itself was constituted in a fashion necessitating fundamentally exceptional treatment in a conceptual/analytical sense:

> "...Now, modern Spiritualism rests solely on the observation and comparison of acts in a domain of nature which has been hitherto little explored, and it is a contradiction in terms to say that such an investigation is opposed to science. Equally absurd is the allegation that some of the phenomena of Spiritualism "contradict the laws of nature," since there is no law of nature yet known to us but may be apparently contravened by the action of more recondite laws or forces. Spiritualists observe facts and record experiments, and then construct hypotheses which will best explain and co-ordinate the facts, and in so doing they are pursuing a truly scientific course."[135]

Within this cosmology, natural science as we usually conceive it was effectively restricted to the study of special origins; that is, to those classes of causes that could be attached to specific immediate results,

whether these led to permanent structural divergences or reversible ecological relationships.[136] When one began to look beyond the fact of change (and toward the overall context of its "accumulations"), however, Wallace preferred to view the forms of interaction (notably, gravity, natural selection, and spiritualization) propelling the whole process as operating in conjunction with one another. Wallace would probably have agreed that gravity could not explain why dogs have eyes and choose to walk uphill some of the time for the same general reasons that natural selection could not provide a reason for the creation of a great symphony or the acts of a martyr. At the same time, he believed there was nothing in his approach that either contradicted or discouraged working within a conventional materialistic framework (which, in its own fashion, filled in the pieces one at a time by concentrating on the elucidation of increasingly subtle efficient causes).

There seems little reason to complain that Wallace's natural science studies (*e.g.*, in biogeography, glaciology, and the individual applications of natural selection) "suffered" after 1865 from any apparent spiritualism-related concepts. Nor should they have. When Wallace felt that the subject of interest could be analyzed adequately on the basis of efficient causes (*i.e.*, the framework of interaction within which its origin was implicit), there was no need to bring questions regarding indeterminate functions into the discussion. For man, cosmological subjects (*i.e.*, "beginnings" and "ends," in both a spatial and temporal sense), and all social issues, however, the extenuating circumstances of the "more recondite forces" operating became directly relevant. Mankind, for example, was increasingly to become the architect of its own further evolutionary diversification (*i.e.*, as a spiritual being):

> "...we Spiritualists must feel ourselves bound to work strenuously for such improved social conditions as may render it possible for all to live a full and happy life, for all to develop and utilise the various faculties they possess, and thus be prepared to enter at once on the progressive higher life of the spirit-world. We know that a life of continuous and grinding bodily labour, in order to obtain a bare existence; a life almost necessarily devoid of beauty, of refinement, of communion with Nature; a life without adequate relaxation, and with no opportunity for the higher culture; a life full of temptation and with no cheering hope of a happy and peaceful old age, is as bad for the welfare of the soul as it is for that of the body..."[137]

Wallace viewed social cooperation as the road to the development of higher awareness in the individual. Society was thus pictured as an evolving collective will that was slowly but surely transcending the constraints imposed by environment and restrictive historical customs. In the early stages of this process scattered civilizations had arisen, their eventual declines being more attributable to a lack of collective social wisdom in not recognizing the need for establishing non-materialistic goals than to any blatant physical, moral, or intellectual inferiorities on the part of their citizens individually.[138] Wallace reasoned that evolution of the "collective will" would accelerate only once the physical necessities of life had been made equally available to all, allowing people the leisure time to pursue more varied and consciousness-expanding interests. Not surprisingly, therefore, most of his social criticism was aimed at what he felt were the institutions standing in the way of "equality of opportunity" for the general populace.[139]

Wallace despised the many crude attempts to apply Darwinism to social analysis by analogy; in his view, an over-emphasis on individualistic forms of competition within society led, among other things, to wars, a discriminatory distribution of wealth, and addiction to a consumptive materialism that was both individually and collectively counter-evolutionary.[140] While spiritualist philosophy helped him recognize a transitory function in existing imperfections (these forced a process of moral advance through "character-building": mankind's own route of changing without being "aware of it"), human progress in general was measured through their absolute rate of elimination (at least, to the extent that society came to recognize they *should* be eliminated!). Such progress could not be contextualized within simplistic material "one cause-one effect" frameworks: the more "human" the problem, the more its just solution lay in terms of evolutionarily-consistent goals, as opposed to reactions arising from the consumptive inertia of tradition or habit.[141]

A Change of Mind?

The preceding discussion shows how a different reading of what Wallace wrote up through 1858 leads us to anticipate certain continuities in his positions after 1858. Ample references are given to show that after that date his position on most subjects did, in fact, remain consistent with his earlier stated opinions. (To trace this out in any further detail, though fully possible, would require much more space than can be allowed at present.) Significantly, it can hardly be viewed as inconsistent with his earlier-stated views--indeed, the earliest-stated ones of which we have a record--that he became a spiritualist. The entire progression of his views on the special problem of biological evolution, moreover, can be attributed to his changing position on the concept of biological utility.

These connections, I submit, provide a more than adequate prior argument as to why Wallace's views on natural selection should not have reversed at any time after 1858. It has long been maintained that they did, however, and we must now therefore briefly notice three related subjects: (1) whether Wallace himself later admitted to a "change of mind"; (2) whether, in fact, Wallace ever actually stated a position that demanded such a change later; and (3) whether certain things he did write that have been pointed to as signifying a change might be more reasonably explained in other ways.

The first subject can be disposed of rather quickly. As far as I am aware (and I have now read nearly everything Wallace wrote for publication), Wallace never specifically admitted to a "change of mind" in print--for example, to the effect that "Before 1865 and my introduction to spiritualism, I believed natural selection accounted for the development of all human attributes." Neither, so far as I am aware, has anyone ever claimed he did write anything to this effect.

The second subject is a rather more difficult one to approach. As explained earlier, Wallace's lack of specific mention of man in 'On the tendency...' is at the least just as easy to contextualize as the initiation of a "special case" argument as it is evidence he considered man's situation as being the same as that of animals. Additional considerations, moreover, appear to make the first interpretation the more probably correct one.

Schwartz,[142] Kottler,[143] and others have stated as if it were unequivocal fact that before 1864 Wallace felt natural selection accounted for man's evolution in the same fashion it did other living things. The detailed researches of Beddall, McKinney, Brooks, and others referred to earlier (notes 1-4) have sustained this belief with their establishment that at the time of his recognition of the principle Wallace was giving as much consideration to the problem of human development as he was animal origins. But again, this simple fact of correlation does not substantiate the conclusion that he believed the two problems could be disposed of through a model of proximate causes alone. As shown earlier there is reason to think he did not so believe. Further reason exists as well.

Browne has written: "At the head of his 1858 paper on organic change he stated that wild varieties had a 'tendency to depart indefinitely from the original type' and proceeded to set out his reasons for believing this to be the case. The theory of evolution and the concept of Malthusian selection of varieties were introduced as explanations--as the efficient cause--of this biological tendency."[144] But in truth, the situation was just the opposite--at least with respect to evolution "as the efficient cause." Wallace in reality thought he had identified an "efficient cause" of evolution, was describing how this operated, and how it accounted for certain characteristics of adaptation and change in organisms. Nowhere in the essay does he in any way infer that this "biological tendency" is synonymous with evolution. In fact, no mention whatsoever is made of the 1855 paper 'On the law...' or its undeniably evolutionary orientation. Considering the fact that a number of the studies he published between 1855 and 1858[145] dwell heavily on points made in that work, this is to say the least rather peculiar--that is, if the one is to be viewed as a conceptual extension of the thinking set out in the other. Moreover, and just as strangely, no reference is made in 'On the tendency...' to

any of these other studies either. And, though we know that Wallace did have man's evolutionary development very much on his mind just prior to writing 'On the tendency...,' neither is there any reference, in one fashion or another, to the evolution of man in the paper. One should conclude from these facts that at the time of writing 'On the tendency...' Wallace strongly distinguished between his newly discovered principle and evolution *per se*. This impression is further strengthened by the fact that he certainly had connected man to the arguments of 'On the law...,' as is plainly evident from commentary presented in 'On the habits of the orang-utan...,' his letters to Bates,[146] and his 'Species notebook.'[147] Nor should one ignore the otherwise puzzling fact that all of his evolution-oriented writings between early 1858 and late 1863, including one long paper on man,[148] reflect extensions of the line of thought present in 'On the law...' rather than that evident in 'On the tendency...'. In short, the obvious sometimes goes unappreciated: the species divergence discussion in 'On the tendency...' was never intended for application to man--that is, to the extent of explaining his uniquely human "higher nature."

On reading *On the Origin of Species* while still in the East, and after further communications with Darwin, Wallace certainly must have surmised that Darwin intended natural selection to account equally for the development of man's higher faculties and the development of his purely biological structure. With this application of the theory he surely disagreed, but until he had clarified his own thoughts on the matter it would be pointless to object. On this view, it is therefore hardly surprising that Wallace published not a single word between 1858 and 1864 that connected the Darwinian model of natural selection to man,[149] much less anything suggesting that he felt natural selection accounted for the evolution of man's higher faculties.[150]

In the absence of any direct positive evidence, we are reduced to examining some Wallace writings that might secondarily be interpreted as supporting the "change of mind" hypothesis. A thorough review of this subject is not possible here, but two especially well-known passages, at least, should be looked at briefly.

Kottler has stated that "Wallace wrote to Darwin in 1869 that his new view was solely the result of his new belief in spiritualism."[151] The source of this impression is a letter from Wallace to Darwin dated April 18, 1869.[152] In this letter Wallace says:

> "I can quite comprehend your feelings with regard to my "unscientific" opinions as to Man, because a few years back I should myself have looked at them as equally wild and uncalled for... My opinions on the subject have been modified solely by the consideration of a series of remarkable phenomena, physical and mental, which I have now had every opportunity of fully testing, and which demonstrate the existence of forces and influences not yet recognised by science."

Here, I submit, Wallace says no more than what he says: that the now "fully tested" phenomena have led him to a theory which "a few years back" he would have considered "wild and uncalled for" (*i.e.*, in the absence of relatable evidence). In presenting this as evidence of a change of mind, Kottler has assumed that prior to 1864 Wallace believed that natural selection could be applied to man's evolution in exactly the same fashion it could to other living things. There is no reason to doubt that Wallace's opinions were, as he put it, "modified" (rather than "reversed") from an earlier position, but the nature of that earlier position must be established, not assumed as a function of a correlation in time.[153]

The main evidence that has been used to support the "change of mind" hypothesis, however, consists of certain passages in 'The origin of human races...' and the particular additions and changes in wording that were made for the 1870 version of that paper entitled 'The development of human races under the law of natural selection.'[154] When Wallace included the 1864 paper in his *Contributions to the Theory of Natural Selection*, he made many revisions. Most were relatively minor and are easily accounted for; some, however, are suggestive of a change in position. In the Preface to *Contributions*... he states: "I had intended

to have considerably extended this essay, but on attempting it I found that I should probably weaken the effect without adding much to the argument. I have therefore preferred to leave it as it was first written, with the exception of a few ill-considered passages which never fully expressed my meaning."[155] Note Wallace's deliberate use of the word "extended"--not "reversed" or "changed"--and the fact that he is apparently more worried about "weakening" the effect than "not adding" to it. The inference is that he considered the existing argument sound, and was reluctant to do anything that would draw attention away from it. He finally decided to end the book with the entirely new essay 'The limits of natural selection...'. Why, if his opinion had "changed": (1) would he have decided to leave the essay more or less as it was; or (2) chosen to include it in *Contributions*... at all? Obviously, Wallace himself did not feel his position had changed.

There is also the matter here of what his "meaning" was, and which passages were "ill-conceived." In 1864 the individualist thinking of Spencer was consuming his attention;[156] on this basis he appears to have extended Darwinian natural selection as far as he felt he could to account for the manner of human evolution. But this discussion pointedly avoided any explanation of the reasons behind the *emergence* of intellect or moral behavior. That their presence *influenced* man in ways that would be subjected to the workings of natural selection he did not doubt (nor did he in 1870[157]). Again, Wallace had for many years recognized that man exhibited many "above nature" qualities; 'The origin of human races...' was his attempt to describe how these qualities, once in existence, could be expected to aid or retard natural selection. The manner of their own origin and the connection of this to evolution in general, however, he still had no handle on and deliberately avoided.[158]

In the 1864 essay on man, Wallace writes "But while these [physical] changes had been going on, his mental development had correspondingly advanced, and had now reached that condition in which it began powerfully to influence his whole existence, and would, therefore, become subject to the irresistible action of 'natural selection.'"[159] In the 1870 version this passage was changed to "But while...mental development had, from some unknown cause, greatly advanced, and had now... 'natural selection.'"[160] The subtle but important substitution for "correspondingly" indicates that Wallace had settled on a model for the origin of man's higher faculities. The emergence of intellect and morality-based decision-making signalled the beginning of humankind's participation in the causal domain of a higher level of existence. This emergence was implicit in the evolutionary scheme, much as life had been when physical conditions had reached a satisfactory degree of complexity and stability. The immediate impact of intellect was to produce certain kinds of "above nature" behavior, but eventually most such behaviors generated kinds of negative feedback that would ultimately cause society to reject them (failure of that entire society being the consequence if it did not). Materialism was one such behavior. Though counterproductive as an all-consuming individual or societal goal, it had the vital effect of producing a gradual societal increase of knowledge, and through the latter a greater understanding of others leading to an elevation of tolerance and the moral sense.[161] Eventually, man's moral capacity would "catch up" with his intellectual excesses, at which point natural selection could again act in a fully positive fashion (rejecting, for example, those self-serving, "others-neglecting" materialistic tendencies that remained).[162]

When Wallace used the wording "modification" of position rather than "change" of position in his April 18, 1869 letter to Darwin, therefore, he was stating the situation as a matter of record. He had been unable to associate the meaning of the origin of man's intellectual and moral capacities with a general evolutionary model since he had taken up the question in the 1840s; the concepts stated in 1855's 'On the law...,' 1858's 'On the tendency...,' and 1864's 'The origin of human races...' show that his formulation of natural selection had not solved--or even addressed--this problem. The 1864 version of the essay on man was "ill-conceived" to the extent that it still did not address the problem of hierarchical causation; *i.e.*, like 'On the law...,' it dwelled on results whose efficient causes could be directly inferred, but whose final causes could not. Thus,

Wallace's "modification of position": to one in which both final and efficient causes for man's higher faculties were specified.[163]

Conclusion

Analysis of Wallace's work has been seriously hindered by a general unwillingness to view it on its own terms. Has it ever been demonstrated, for example, that spiritualism (or, more realistically, some other understanding invoking a general form of psychic causality) is incompatible with a conventionally materialistic understanding of evolution? Is Wallaceian natural selection really as naive and undevelopable as writers such as Gould[164] would have us believe, or has its updating in more modern terms merely been delayed by a chronic reluctance of evolutionary biologists to think in other than "process yields structure yields process" terms?[165] In short, are Wallace's ideas really a threat to Darwinian materialism, or might they be after all, as he claimed in his book *Darwinism*, its logical conclusion?

That many of Wallace's ideas were presented inchoate, with too much emphasis on argument and too little on formal proofs, and at times anthropomorphically, is not disputed here. This does not necessarily mean, however, that the cosmology he worked out is fundamentally unsound--logically, or descriptively.

Notes and References

1. J.R. Durant, 'Scientific naturalism and social reform in the thought of Alfred Russel Wallace,' *Brit. J. Hist. Sci.* (1979) 12, pp. 31-58; R. Smith, 'Alfred Russel Wallace: philosophy of nature and man,' *Brit. J. Hist. Sci.* (1972) 6, pp. 178-99; F.M. Turner, *Between Science and Religion: The Reaction to Scientific Naturalism in Late Victorian Britain* (New Haven & London, 1974); M. Malinchak, 'Spiritualism and the philosophy of Alfred Russel Wallace,' Ph.D. thesis (Drew University, 1987).
2. R. Cooter, *The Cultural Meaning of Popular Science; Phrenology and the Organization of Consent in Nineteenth-Century Britain* (Cambridge, etc., 1984); Malinchak, *op.cit.* (1); Smith, *op.cit.* (1).
3. B.G. Beddall (ed.), *Wallace and Bates in the Tropics* (London, 1969); J.L. Brooks, *Just Before the Origin* (New York, 1984); A.C. Brackman, *A Delicate Arrangement* (New York, 1980); H.L. McKinney, *Wallace and Natural Selection* (New Haven & London, 1972); L. Eiseley, *Darwin's Century* (New York, 1958); W. George, *Biologist Philosopher; A Study of the Life and Writings of Alfred Russel Wallace* (London, 1964); D. Quammen, *The Song of the Dodo; Island Biogeography in an Age of Extinctions* (New York, 1996); P. Van Oosterzee, *Where Worlds Collide: The Wallace Line* (Ithaca & London, 1997).
4. H.L. McKinney, 'Alfred Russel Wallace and the discovery of natural selection,' *J. Hist. Med. & Allied Sciences* (1966) 21, pp. 333-57; H.L. McKinney, 'Wallace's earliest observations on evolution,' *Isis* (1969) 60, pp. 370-3; McKinney, *op.cit.* (3); Brooks, *op.cit.* (3); J. Browne, *The Secular Ark; Studies in the History of Biogeography* (New Haven & London, 1983); Eiseley, *op.cit.* (3); Brackman, *op.cit.* (3); J. Marchant (ed.), *Alfred Russel Wallace; Letters and Reminiscences* (New York, 1916; reprinted, New York, 1975); G.M. Henderson, 'Alfred Russel Wallace: his role and influence in nineteenth century evolutionary thought,' Ph.D. thesis (Univ. of Pennsylvania, 1958); M.J. Kottler, 'Charles Darwin and Alfred Russel Wallace: two decades of debate over natural selection,' in D. Kohn (ed.), *The Darwinian Heritage* (Princeton, 1985), pp. 367-432; R.E. Hughes, 'Alfred Russel Wallace: some notes on the Welsh connection,' *Brit. J. Hist. Sci.* (1989) 22, pp. 401-18.
5. Malinchak, *op.cit.* (1); M.J. Kottler, 'Alfred Russel Wallace, the origin of man, and spiritualism,' *Isis* (1974) 65, pp. 145-92; J.S. Schwartz, 'Darwin, Wallace, and The Descent of Man,' *J. Hist. Biol.* (1984) 17, pp. 271-89; Smith, *op.cit.* (1); J. Oppenheim, *The Other World; Spiritualism and Psychical Research in England, 1850-1914* (Cambridge, 1985); Durant, *op.cit.* (1); Turner, *op.cit.* (1).
6. Smith, *op.cit.* (1), p. 178.
7. *Ibid.*, p. 191.
8. Kottler, *op.cit.* (5), p. 191. Wallace, in the Preface to the first edition of his *Miracles and Modern Spiritualism* (rev.ed., London, 1901, pp. vi-vii), specifically denies that "my divergence from the views of Mr. Darwin arises from my belief in spiritualism."
9. Schwartz, *op.cit.* (5), pp. 288, 286.
10. Malinchak, *op.cit.* (1), p. 109.
11. Wallace, *My Life*, 2 vols. (London, 1905), i. 232-3; Wallace, op. cit. (8), pp. ix-x, 126; Kottler, *op.cit.* (5), pp. 164-5; Malinchak, *op.cit.* (1), pp. 32-3.
12. Wallace 1905, *op.cit.* (11), i. 234.

13. *Ibid*., i. 233-6, ii. 275-6.

14. Wallace, 'Notes on the growth of opinion as to obscure psychical phenomena during the last fifty years,' *The Two Worlds* (1893) 6, pp. 440-1, on p. 440.

15. These ideas later lay at the heart of a short paper Wallace prepared for his first honorary appointment, President of the Dept. of Anthropology, Section D, Biology, at the 1866 meeting of the British Association for the Advancement of Science: 'Anthropology,' *Anthr. Rev*. (1866) 4, pp. 387-9.

16. See, for example: 'How to civilize savages,' *Reader* (1865) 5, pp. 671-2; 'Primitive culture,' *Academy* (1872a) 3, pp. 69-71; 'Ethnology and spiritualism,' *Nature* (1872b) 5, pp. 363-4; *The Malay Archipelago*, 2 vols. (London, 1869); *Australasia* (London, 1879); 'The Polynesians and their migrations,' *Q. J. Science* (1867) 4, pp. 161-6; 'The birds of paradise in the Arabian Nights,' *Independent Review* (1904) 2, pp. 379-91, 561-71; K.R. Wikman, 'Letters from Edward B. Tylor and Alfred Russel Wallace to Edward Westermarck,' *Acta Acad. Aboensis Humaniora* (1940) XIII.7.

17. Kottler, *op.cit*. (5), p. 167, refers the beginning of Wallace's interest to the year 1865, stating: "...from 1862 to 1865 there is no evidence of any interest by Wallace in spiritualism," but Wallace himself specifically pointed to the year 1862 on at least one occasion: *Light* (1907) 27, pp. 208-9 (as part of his testimony in the 1907 fraud trial of medium J.N. Maskelyne); he also vaguely refers to 1862 in a late interview: *Outlook* (1913) 105, pp. 618-622, on p. 621. In *My Life*, *op.cit*. (11), ii. 276, moreover, he notes that he was aware of spiritualist writings even while travelling in the East. On the other hand, on p. 132 of 'Notes of personal evidence' in *Miracles...*, *op.cit*. (8), he cites 1865; further, in his November 1876 testimony in the Henry Slade fraud trial, he states "I have been investigating this subject for eleven years" (*The Spiritualist* (1876) 9, pp. 161, 164, on p. 161). Probably his investigations did begin in 1862, but reached a consuming level only by 1865, at which point his natural history collections would have been demanding less of his time (as Malinchak, *op.cit*. (1) points out; I have determined that between May 1862 and December 1864 Wallace published seventeen systematic revisions, in 1865 three, and in 1866, one).

18. Unlike the better known 'A defence of modern spiritualism,' *Fortnightly Review* (1874) 15 (n.s.), pp. 630-57 & 785-807, written at the request of editor John Morley after the leadership of the journal *The Spiritualist* appealed to him to invite Wallace to discuss the subject, this work was apparently written at Wallace's own initiation. It first appeared in print in installments in the weekly secularist publication *The English Leader* in August and September 1866 (2, pp. 59-60, 75-6, 91-3, 107-8, 123-5, 139-40, 156-7, 171-3).

19. Marchant, *op.cit*. (4), pp. 353, 363-4; also see relevant comments in *My Life*, *op.cit*. (11), ii. 100-1, 231, 233, 243, 350-1, 353; and A.J. Dawson, 'A visit to Dr. Alfred Russel Wallace,' *The Christian Commonwealth* (1903) 23, p. 176-7, on p. 176.

20. Wallace 1905, *op.cit*. (11), ii. 279; also see Malinchak, *op.cit*. (1), pp. 80-2. Wallace's writings on spiritualism--including 'The scientific aspect of the supernatural'--do, in fact, display the same commanding knowledge of the related literature evident in his treatments of other subjects.

21. "The spiritualist, though he does not claim infallibility, believes he is dealing with facts; he insists that his faith is constructed to conform to the facts, as contrasted with a change of facts to conform to faith." --J.P. Williams, 'Spiritualist groups,' *Encyclopaedia Britannica, Macropaedia* 17 vols. (Fifteenth ed., Chicago, 1975), 17, pp. 511-3, on p. 513.

22. *Webster's Seventh New Collegiate Dictionary* (Springfield, MA, 1966), p. 916, defines "theosophy" in the more specific sense as "the beliefs of a modern movement originating in the United States in 1875 and following chiefly Buddhist and Brahmanic theories especially of pantheistic evolution and reincarnation."

23. Wallace and other spiritualists argued that the evidence for at least some of the "miracles" that have allegedly occurred throughout human history is quite satisfactory, but that such events represent products of continuing interaction with "spirit beings" rather than otherwise wholly inexplicable first causes. Miracles were thus assigned natural causes--if one made a leap of faith and accepted that casual continuity in this instance was maintained by yet poorly understood, but nonetheless generalizable, influences.

24. Most spiritualists undoubtedly adopted the belief on faith (*i.e*., that observable "spirit manifestations" indicated that the "spirit realm" actually existed) and on the strength of its moral teachings. The more personal experiences some claimed to have had (involving, for example, Swedenborgian out-of-body "projection") did not seem to lend themselves to scientific investigation.

25. Especially, Wallace 1905, *op.cit*. (11), i. 359-63; 'How was Wallace led to the discovery of natural selection,' *Nature* (1895) 52, p. 425; *The Darwin-Wallace Celebration Held on Thursday, 1st July 1908, by the Linnean Society of London* (London, 1909), pp. 111-8; 'The dawn of a great discovery,' *Black and White* (1903) 25, pp. 78-9; *The Wonderful Century* (London, 1898), pp. 138-9. For comment, see Brooks, *op.cit*. (3), p. 179, and McKinney, *op.cit*. (3), pp. 80-1.

26. In addition to the works quoted here, see: Wallace, *If a Man Die, Shall He Live Again?* (San Francisco, 1888); Wallace 1901, *op.cit*. (8); and F. Rockell, 'The last of the great Victorians,' *The Millgate Monthly* (1912) 7, pp. 657-663. Wallace published about one hundred essays, lectures, reviews, notes, and letters to the Editor on spiritualistic subjects.

27. 'Spiritualism,' *Chambers's Encyclopaedia* 10 vols. (London & Edinburgh, 1892), 9, pp. 645-9, on p. 648.

28. 'Why live a moral life?,' *The Agnostic Annual 1895* (London, 1894), pp. 6-12, on p. 9.

29. *Ibid*., p. 12.

30. 'Are the phenomena of spiritualism in harmony with science?,' *The Medium and Daybreak* (1885) 16, pp. 809-10, on p. 810. Wallace held a life-long interest in the question of why suffering exists. He discusses his early fascination with the problem in *My Life*, *op.cit*. (11), i. 87-9. See his 'Two Darwinian essays,' *Nature* (1880) 22, pp. 141-2, and *My Life*, *op.cit*. (11), ii. 237-8, for two of his treatments of the matter; as late as 1910 he was still commenting on related matters: see 'Is nature

cruel?,' Chapter 19 of *The World of Life* (London, 1910). Wallace considered it one of spiritualism's strongest philosophical points that it offered a logical response to this question.

31. Wallace, 'Spiritualism and social duty,' *Light* (1898) 18, pp. 334-6, on p. 335.

32. Wallace 1905, *op.cit.* (11), i. 201-4.

33. Wallace closed his paper 'On the physical geography of the Malay Archipelago,' read to the Royal Geographical Society on 8 June 1863 (*J. Roy. Geogr. Soc. Lond.* (1863) 33, pp. 217-234), with the following words: "If...[the European powers do not undertake comprehensive natural history collecting programs in the areas they are colonizing]...future ages will certainly look back upon us as a people so immersed in the pursuit of wealth as to be blind to higher considerations. They will charge us with having culpably allowed the destruction of some of these records of Creation which we had it in our power to preserve; and while professing to regard every living thing as the direct handiwork and best evidence of a Creator, yet, with a strange inconsistency, seeing many of them perish irrecoverably from the face of the earth, uncared for and unknown." These sentiments are very close to those expressed in this section of 'Advantages...'. H.L. McKinney ('Alfred Russel Wallace,' *D.S.B.*, 14, p. 137) interprets this passage as possibly signifying a pre-1864 religious conversion on Wallace's part, but I feel it is probably better to regard it as a simple re-statement of a philosophical position he had adopted much earlier.

34. Wallace 1909, *op.cit.* (25), p. 11. In 'The origin of moral intuitions,' *Public Opinion* (1869) 2, pp. 336-7, Wallace discusses related thoughts. His ideas on instinct are based in the same line of thinking; see: 'The philosophy of birds' nests,' *Intellectual Observer* (1867) 11, pp. 413-20; 'On instinct in man and animals,' in Wallace, *Contributions to the Theory of Natural Selection* (London, 1870), pp. 201-10; 'Houzeau on the faculties of man and animals,' *Nature* (1872) 6, pp. 469-71; 'Modern biology and psychology,' *Nature* (1891) 43, pp. 337-341, on p. 341.

35. McKinney 1966 & 1969, *op.cit.* (4).

36. For representative passages, see Marchant, *op.cit.* (4), p. 45; Wallace 1905, *op.cit.* (11), i. 288, 342-3; Wallace, *The Malay Archipelago* (10th ed., London, 1891), pp. 68-71, 317-9, 446-51; Wallace, 'Notes of a journey up the Sadong River,' *Proc. Roy. Geogr. Soc. Lond.* (1857) 1, pp. 193-205, on pp. 195, 197, 203-5; Wallace, 'Evolution and character,' *Fortnightly Review* (1908) 83 (n.s.), pp. 1-24, on pp. 16-8, 21; Wallace, *Social Environment and Moral Progress* (London, 1913), Chapter Six.

37. Wallace 1857, *op.cit.* (36), p. 204.

38. 'On the tendency of varieties to depart indefinitely from the original type,' *J. Proc. Linn. Soc. Zool.* (1858) 1, pp. 53-62, on pp. 60-1.

39. 'Note on the habits of the Scolytidae and Bostrichidae,' *Trans. Entom. Soc. Lond.* (1860) 5, pp. 218-20, on pp. 219-20. This passage represents a thinly-veiled admonition against jumping to conclusions on the basis of incomplete information.

40. From a letter reproduced in Wallace 1905, *op.cit.* (11), i. 366.

41. These last six sentences closely echo sentiments expressed in 'Advantages...,' p. 201.

42. From a letter reproduced in Wallace 1905, *op.cit.* (11), i. 367-9.

43. 'Narrative of search after birds of paradise,' *Proc. Zool. Soc. Lond.* (1862), pp. 153-61, on p. 160. These words practically glow with the idea that the best efforts tend to produce the most rewarding discoveries. The same concepts are incorporated into 'Government aid to science,' *Nature* (1870) 1, p. 315.

44. 'On the varieties of man in the Malay Archipelago,' *Trans. Ethnol. Soc. Lond.* (1865) 3, pp. 196-215, on p. 206. This paper was first presented publicly in September 1863 at the annual meeting of the British Association for the Advancement of Science. Here Wallace extends his views on how individuals "progress" (*i.e.*, as the function of a many-directioned learning process) to a parallel prescription for success at the societal level. This theme is present in many other of his writings, *e.g.*: 'The origin of civilization,' *Spectator* (1869) 42, pp. 1072-3; 'Difficulties of development as applied to man,' *Popular Science Monthly* (1876) 10, pp. 60-72; 'Human progress: past and present,' *Arena* (1892) 5, pp. 145-159; and 'On the trade of the Eastern Archipelago with New Guinea and its islands,' *J. Roy. Geogr. Soc.* (1862) 32, pp. 127-37, on p. 136. Also note the comment on p. 207 of his 'The South-Wales farmer,' pp. 206-22 of Vol. 1 of *My Life*, *op.cit.* (11), published in 1905 but written in 1843.

45. Wallace 1865, *op.cit.* (44), pp. 214-5.

46. 'Attempts at a natural arrangement of birds,' *Ann. Mag. Nat. Hist.* (1856) ii. 18, pp. 193-216. Wallace favored basing classification on multiple character traits. Also see his 'Who are the humming bird's relations?,' *Zoologist* (1863) 21, pp. 8486-91; and 'Remarks on the value of osteological characters in the classification of birds,' *Ibis* (1864) 6, pp. 36-41.

47. Wallace, *op.cit.* (33), pp. 233-4.

48. Marchant, *op.cit.* (4), pp. 65-7.

49. See note 34.

50. Such "roteness of re-evaluation" implies that there is a degree of environmental control over the nature of organic change, but this understanding does not demand outright determinism. See the author's 'A contribution to the geographical understanding of biological change,' *Acta Biotheoretica* (1986) 35, pp. 229-78, for related discussion.

51. In *My Life*, *op.cit.* (11), ii. 272, Wallace writes: "Equality of opportunity is, as Herbert Spencer has shown in his *Justice*, the correlative of natural selection in human society, and thus has a broad foundation in the laws of nature."

52. In *My Life*, *op.cit.* (11), i. 87-9, Wallace says he first considered such ideas during his teens.

53. Especially: Wallace, *op.cit.* (28); Wallace, *op.cit.* (31); 'A suggestion to sabbath-keepers,' *Nineteenth Century* (1894) 36, pp. 604-11; 'Public responsibility and the ballot,' *Reader* (1865) 5, p. 517; and 'President's Address,' *Land and Labor* (1895) no. 64, pp. 40-5, on p. 44. Also note the letter to biologist to George Rolleston reproduced in *My Life*, *op.cit.* (11), ii. 94-5.

Wallace specifically re-affirmed his acceptance of the "no merit to belief" tenet as late as 1908 in a speech to the Linnean Society: see 'The origin of the theory of natural selection,' *Popular Science Monthly* (1909) 74, pp. 396-400, on p. 400.

54. As he did, for example, in a review of Edward Tylor's *Primitive Culture*, *op.cit.* (16); letters to *Nature* (1872b, *op.cit.* (16)) and *The Daily News*, London (11 December 1876, p. 2c, and 19 December 1876, p. 3f), and a review of William B. Carpenter's *Mesmerism, Spiritualism, etc., Historically and Scientifically Considered* in the *Q. J. Science* (1877) 7 (n.s.), pp. 391-416.

55. Schwartz, *op.cit.* (5).

56. Wallace pointedly commented on this fact in an 1869 letter to Adolf Bernhard Meyer (Wallace 1895, *op.cit.* (25)), and again, just as pointedly, in a note added to the version of 'On the tendency...' included in *Natural Selection and Tropical Nature* (London, 1891); in Wallace 1903, *op.cit.* (25); and in *My Life*, *op.cit.* (11), i. 363, in 1905. Considering the spectacular success of the paper, it is odd that Wallace continued to draw attention to this matter.

57. McKinney 1966 & 1969, *op.cit.* (4).

58. McKinney 1969, *op.cit.* (4).

59. For example, in *My Life*, *op.cit.* (11), i. 362; also see Wallace 1898, *op.cit.* (25), pp. 137-8.

60. *Vestiges* was published anonymously. Its author was Robert Chambers, of publishing fame.

61. See analysis by McKinney, *op.cit.* (3), Brooks, *op.cit.* (3), and Browne, *op.cit.* (4).

62. p. 185.

63. Marchant, *op.cit.* (4), pp. 52-5.

64. See further discussions in Malinchak, *op.cit.* (1), and Browne, *op.cit.* (4), pp. 165-68; also, *My Life*, *op.cit.* (11), i. 226-8, and Smith, *op.cit.* (1).

65. This conclusion has also been reached by Malinchak, *op.cit.* (1). Note in this connection the last sentence in the passage referred to note 48.

66. Wallace 1905, *op.cit.* (11), i. 228.

67. *Ibid.*, p. 228.

68. *Contributions to the Theory of Natural Selection* (2nd ed., London, 1871), p. 372. Note the second edition reference.

69. *Contributions to the Theory of Natural Selection* (1st ed., London, 1870), p. 360.

70. Wallace, *op.cit.* (68), p. 372A.

71. On p. 372 of *Contributions...*, *op.cit.* (68), Wallace writes: "...only in reference to the origin of universal forces and laws have I spoken of the will or power of 'one Supreme Intelligence'."

72. Smith, *op.cit.* (1), p. 190, has also referred to the fundamentally hierarchical nature of Wallace's cosmology.

73. "Push-pull," because a coupling of positive and negative feedback relations to produce irreversible forms of change is involved. See M. Maruyama's important paper 'The second cybernetics: deviation-amplifying mutual causal processes,' *Am. Scient.* (1963) 51, pp. 164-79.

74. Wallace probably believed that this domain existed prior to earth's/mankind's involvement with it, a position inherently accepting that there might have been "past evolutions."

75. As is well know, Darwin himself believed that agencies such as the transmission of acquired characters were also helping evolution along.

76. Wallace discusses Darwin's position on continuity and the origin of man's higher faculties on p. 463 of his *Darwinism* (London, 1889).

77. R.J. O'Hara, 'Homage to Clio, or toward an historical philosophy for evolutionary biology,' *Syst. Zool.* (1988) 37, pp. 142-55.

78. In a letter sent to Darwin on 2 July 1866 (Marchant, *op.cit.* (4), pp. 140-3, on p. 142), Wallace complained that Darwin had been using the term "natural selection" to mean two things: "survival of the fittest," and the changes produced through survival of the fittest. Wallace himself associated natural selection with only the first of these two meanings. See Wallace's 'The origin of species and genera,' *Nineteenth Century* (1880) 7, pp. 93-106, especially pp. 93-6, for a discussion of some of his reasons for contrasting the two concepts. This understanding is consistent with Wallace's continuing observation that the "causes" *per se* of variation were unknown.

79. Wallace actually never really abandoned the idea that adaptation and organic change were but correlatively associated. He uses the imagery that favorable variations are "accumulated" in at least seven places that immediately come to mind: 'Natural selection--Mr. Wallace's reply to Mr. Bennett,' *Nature* (1870) 3, pp. 49-50, on p. 50; 'Remarks on the habits, distribution, and affinities of the genus Pitta,' *Ibis* (1864a) 6, pp. 100-14, on p. 110; 'The origin of human races and the antiquity of man deduced from the theory of "natural selection",' *J. Anthro. Soc. Lond.* (1864b) 2, pp. clviii-clxxxvii, on p. clxiv; 'Remarks on the Rev. S. Haughton's paper on the bee's cell,' *Ann. Mag. Nat. Hist.* (1863) ii. 12, pp. 303-9, on pp. 304 & 308; 'Sir Charles Lyell on geological climates and the origin of species,' *Quart. Rev.* (1869) 126, pp. 359-94, on p. 384; and Wallace, *op.cit.* (78), on p. 103. "Accumulation" implies haphazard addition--allowably, however, under the influence of ordered forces, as when the planets came into being as the result of a process of "particle accumulation" operating under the law of gravity. In his later years, Wallace discarded the term "accumulated" in favor of "preserved," perhaps a concession to Darwinian thinking (or at the least, to tree-thinking).

80. Note Wallace's attempt at "logical demonstration" of the "law" of natural selection on p. 302 of *Contributions...*, *op.cit.* (69).

81. Wallace's portrayal of natural selection seems to indicate he viewed it as the key operator in a negative feedback loop--

one in which the ecological disequilibrium created by the combination of organic growth and limited space is resolved by removal of the less fit. Wallace felt that the positive feedback processes setting up the continuing reaction were poorly understood, and was unwilling to ignore the possibility that they themselves changed with time in such a manner as to have a powerful cumulative effect on structural change. See Smith, *op.cit.* (50), for related discussion.

82. Ann. Mag. Nat. Hist. (1856) ii. 18, pp. 26-32, on pp. 30-1.

83. Wallace may merely be trying to dramatize a point here in his reference to a "Supreme Creator," but the implication, allegorical or not, is that there are causes further removed from the immediate results of nature than those that can be expressed in proximate terms alone. In a note at this point in the essay he refers approvingly to "the talented author of the *Plurality of Worlds* [William Whewell]," quoting the following passage from that work: "In the structure of animals, especially that large class best known to us, vertebrate animals, there is a general plan, which, so far as we can see, goes beyond the circuit of the special adaptation of each animal to its mode of living; and is a rule of creative action, in addition to the rule that the parts shall be subservient to an intelligible purpose of animal life. We have noticed several phenomena in the animal kingdom, where parts and features appear rudimentary and inert, discharging no office in their oeconomy, and speaking to us not of purpose, but of law." Wallace integrated these very concepts into several of his later writings; see 'Creation by law,' *Q. J. Science* (1867) 4, pp. 471-488; and 'Darwinism and design,' *Spectator* (1874) 47, pp. 535-6; for two particularly good illustrations. Further, all of Wallace's arguments concerning the function of beauty in nature emanate from such thinking; see, for example: Wallace, *op.cit.* (82), on pp. 30-1; 'A theory of birds' nests,' *J. Travel & Nat. Hist.* (1868), 1, pp. 73-89; Wallace 1867, *op.cit.* (83), on pp. 471, 473, 480-2; 'The colours of animals and sexual selection,' Essay V of *Tropical Nature and Other Essays* (London, 1878), pp. 158-220, on pp. 159-60; and a review of *The Colours of Animals* by Edward B. Poulton, *Nature* (1890) 42, pp. 289-91, on pp. 290-1. As late as 1905, Wallace was still speaking approvingly of *The Plurality of Worlds*: see Wallace 1905, *op.cit.* (11), ii. 288; and *Man's Place in the Universe* (6th ed., London, 1905), on pp. 8, 14-5.

84. McKinney 1966, *op.cit.* (4); McKinney, *op.cit.* (3); Brooks, *op.cit.* (3); Malinchak, *op.cit.* (1); Browne, *op.cit.* (4); Turner, *op.cit.* (1). Chambers himself was an ardent spiritualist.

85. See note 73.

86. Wallace continued to defend *Vestiges* into his later years. See Wallace 1905, *op.cit.* (11), i. 255; and Wallace 1898, *op.cit.* (25), pp. 136-40.

87. p. 185.

88. In *My Life*, *op.cit.* (11), ii. 22, he comments "The principle of 'utility,' which is one of [natural selection's] chief foundation stones, I have always advocated unreservedly..." He does not specifically say (either here or in any other writings, as far as I am aware), however, what his exact thoughts on the subject of utility were before the principle of natural selection occurred to him.

89. Wallace, *op.cit.* (82), pp. 30-1.

90. Notably, in 'On the law which has regulated the introduction of new species,' *Ann. Mag. Nat. Hist.* (1855) ii. 16, pp. 184-196, on pp. 191, 195; Wallace, 1856, *op.cit.* (46), pp. 196, 204; Wallace 1857, *op.cit.* (36), p. 204; and *A Narrative of Travels on the Amazon and Rio Negro* (London, 1889), pp. 58-9.

91. Wallace's views on rudimentary organs, perhaps originating with his reading of Whewell, seem to have paralleled his thoughts on a variety of other subjects, though the exact connections remain unclear. For example, he apparently held the view that the history of such structures in some manner resembles that of residual island populations, an impression that would be strengthened by his later (1857) visit to the Aru Islands (see Brooks, *op.cit.* (3), p. 172). Wallace would later come to regard man's entire biological existence as "rudimentary" with respect to his spiritualization, as discussed in Part II of 'A defence of modern spiritualism' ('Moral teachings of spiritualism'), *op.cit.* (18).

92. *Ann. Mag. Nat. Hist.* (1857) ii. 20 suppl., pp. 473-485, on p. 481.

93. *Zoologist* (1856) 14, pp. 5113-7, on pp. 5114-5.

94. As in his discussion of what constitute useful characters for classification in Wallace, *op.cit.* (46); the "differs in degree versus differs in nature" argument in 'Note on the theory of permanent varieties,' *Zoologist* (1858) 16, pp. 5887-8; and the anti-Lyellian geological/geographical arguments of Wallace, *op.cit.* (92). Even after the emergence of natural selection, Wallace continued to feel that some peculiarities of adaptation were most likely relatable to subtle environmental dictates. This position is best summed up in the first half of his 1876 Presidential Address to the Biological Section of the British Association for the Advancement of Science (see *Tropical Nature and Other Essays* (London, 1878), Essay VII, 'By-paths in the domain of biology,' pp. 249-303). When he later saw how Fritz Müller's discoveries regarding mimicry explained many of these or analogous phenomena, however, he practically gave up on environmental determinism altogether (see 'Dr. Fritz Müller on some difficult cases of mimicry,' *Nature* (1882) 26, pp. 86-7; and 'Difficult cases of mimicry,' *Nature* (1883) 27, pp. 481-2).

95. Wallace, *Travels on the Amazon and Rio Negro* (ed. H.L. McKinney, New York, 1972), p. xii.

96. Wallace, *op.cit.* (95), p. xii. On pp. 58-9 of the same edition Wallace goes on: "It must strike every one, that the numbers of birds and insects of different groups, having scarcely any resemblance to each other, which yet feed on the same food and inhabit the same localities, cannot have been so differently constructed and adorned for that purpose alone. Thus the goat-suckers, the swallows, the tyrant fly-catchers, and the jacamars, all use the same kind of food, and procure it in the same manner: they all capture insects on the wind, yet how entirely different is the structure and the whole appearance of these birds!... What birds can have their bills more peculiarly formed than the ibis, the spoonbill, and the heron? Yet they may be

seen side by side, picking up the same food from the shallow water on the beach; and on opening their stomachs, we find the same little crustacea and shell-fish in them all. Then among the fruit-eating birds, there are pigeons, parrots, toucans, and chatterers,--families as distinct and widely separated as possible,--which yet may be often seen feeding all together on the same tree... It has been assumed by some writers on Natural History, that every wild fruit is the food of some bird or animal, and that the varied forms and structure of their mouths may be necessitated by the peculiar character of the fruits they are to fee on; but there is more of imagination than fact in this statement: the number of wild fruits furnishing food for birds is very limited, and the birds of the most varied structure and of every size will be found visiting the same tree." This suggestive discussion can only be interpreted as indicating Wallace's disapproval of assuming one-to-one cause and effect between particular environmental influences and particular adaptations, and between particular adaptations and particular evolutionary lineages.

97. McKinney 1969, *op.cit.* (4), pp. 372-3.

98. Note Wallace's direct statement to this effect in *My Life*, *op.cit.* (11), i. 355. Browne, *op.cit.* (4), p. 172, elaborates on this matter.

99. In *My Life*, *op.cit.* (11), i. 360, Wallace writes: "My paper written at Sarawak [*i.e.*, 'On the law...,' *op.cit.* (90)] rendered it certain in my mind that the change had taken place by natural succession and descent--one species becoming changed either slowly or rapidly into another. But the exact process of the change and the causes which led to it were absolutely unknown and appeared almost unconceivable." This statement is easiest to understand under the assumption that he still believed that adaptations *per se* were more derivative than causal. On p. 359 he adds: "[In early 1858 the] solution flashed upon me, *and to a large extent marked out a different line of work from that which I had up to this time anticipated*" [my italics].

100. Wallace never gave up the idea that biological processes operated in a manner paralleling physical ones. Note: (1) the very last sentence in 'On the law...,' *op.cit.* (90): "Granted the law, and many of the most important facts in Nature could not have been otherwise, but are almost as necessary deductions from it, as are the elliptic orbits of the planets from the law of gravitation"; (2) p. 62 of 'On the tendency...,' *op.cit.* (38), on which appears: "The action of this principle is exactly like that of the centrifugal governor or the steam engine, which checks and corrects any irregularities almost before they become evident..."; (3) the first italicized sentence in the series of quotations referred to note 32; and (4) the much later written "To me it appears that, just as gravitation rules the whole material universe, so natural selection rules, and has ruled, the whole organic world..." (from Wallace 1908, *op.cit.* (36), p. 22). S.A. Kleiner, in 'Darwin's and Wallace's revolutionary research programme,' *Brit. J. Philos. Sci.* (1985) 36, pp. 367-92, has remarked on the similarity of some of Wallace's style of argumentation to that employed by earlier students of celestial mechanics.

101. Wallace 1905, *op.cit.* (11), i. 106-10, 131-3, 187-92.

102. Primary among these were Charles Darwin's *Journal of Researches into the Natural History and Geology of the Countries Visited During the Voyage of H. M. S. Beagle*, Alexander von Humboldt's *Personal Narrative of Travels to the Equinoctial Regions of the New Continent*, Baron Justus von Liebig's *Chemistry in Its Application to Agriculture and Physiology*, Sir Humphrey Davy's *Elements of Agricultural Chemistry*, Charles Lyell's *Principles of Geology*, and William Swainson's *A Treatise on the Geography and Classification of Animals*.

103. *My Life*, *op.cit.* (11), ii. 235. Wallace even tried to interest his friends in starting up a discussion group concerning the work. *Social Statics* became the inspiration for Wallace's views on land nationalization (see note 139).

104. Brooks, *op.cit.* (3), p. 172, has commented on related matters; Wallace's own ideas at the time are best stated in his discussion of Lyell's explanation of the nature of island faunas in Wallace, *op.cit.* (92), pp. 480-1; and in 'On the law...,' *op.cit.* (90).

105. Wallace, *op.cit.* (93), pp. 5114-5; letter, *Zoologist* (1858) 16, pp. 6120-4.

106. In *My Life*, *op.cit.* (11), i. 360-3, Wallace discusses his approach to this question in terms of what was, for him, its most significant immediate component: how divergence into "well-defined and constant species" takes place. See Browne, *op.cit.* (4), pp. 174-182, for one detailed analysis; also McKinney, *op.cit.* (3), and Brooks, *op.cit.* (3).

107. Browne, *op.cit.* (4), p. 181; also see Wallace, *op.cit.* (38), p. 59.

108. For example, in Wallace 1856, *op.cit.* (46).

109. Wallace's position on this matter was later summarized in Wallace 1880, *op.cit.* (78).

110. In 'On the tendency...,' *op.cit.* (38), p. 59, Wallace states "Here, then, we have progression and continued divergence deduced from the general laws which regulate the existence of animals in a state of nature...." On the same page he continues "Variations in unimportant parts might also occur, having no perceptible effect on the life-preserving powers; and the varieties so furnished might run a course parallel with the parent species, either giving rise to further variations or returning to the former type."

111. p. 62.

112. In Marchant, *op.cit.* (4), p. 192, the reproduction of an exchange of letters between Wallace and Darwin highlights their difference in perspective. Darwin writes that his "deception" as to the possible significance of single variation was brought about by "simple illustrations, as when man selects." Wallace apparently was already promoting the "antithesis" argument well before the concept of natural selection occurred to him, judging from comments offered by Darwin in a letter of 1 May 1857 responding to an earlier Wallace communication, now lost (see Marchant, *op.cit.* (4), p. 108): "I have acted already in accordance with your advice of keeping domestic varieties, and those appearing in a state of nature, distinct, but I have sometimes doubted the wisdom of this, and therefore I am glad to be backed by your opinion." Browne, *op.cit.* (4), pp. 176-7, discusses this early Darwin-Wallace exchange.

113. In 1870, in the essay 'The limits of natural selection as applied to man' (in Wallace, *op.cit.* (69), pp. 332-371, on p. 358) Wallace in part qualifies those characteristics that can only be maintained through such an additional causal agency as being ones that "transcend time and space." Immediately thereafter, he notes parenthetically that "all of [these] were occasionally manifested at such an early period of human history as to be far in advance of the few practical applications which have since grown out of them." His various treatments of mediumistic abilities (*e.g.*, as related to witchcraft: see Wallace 1888, *op.cit.* (26), pp. 5-6, and an interview printed in *Pall Mall Magazine* (1904) 34, pp. 73-9, on p. 78-9) later followed both lines of thought. But he also applied the first line of thinking, at least, to strictly animal-directed considerations of utility (e.g., in Wallace 1891, *op.cit.* (34), pp. 338-9). A striking example of how he applied the "additional causal agency" concept to animal evolution is afforded by his remarkable conclusion, developed in Chapter 9 of *The World of Life*, *op.cit.* (30), that the protective/mimetic coloration of many insects arises strictly from selective effects imposed *on* them by animals of higher organization than themselves.

114. For an example of how Wallace handled this aspect of "one cause-one effect" thinking in the crucial 'The origin of human races...' discussion in 1864, see pp. clxxxiii-clxxxiv of that work (Wallace 1864b, *op.cit.* (79)). In this, he points out that some correlations, at least, seem to exist between the varying physical nature of man and the varying characteristics of the environment. He does not argue, however, that all characteristics of man must be treated in this fashion.

115. Kottler, *op.cit.* (5), p. 191.

116. Wallace, *op.cit.* (69), pp. 332-3.

117. *Ibid.*, p. 359-60.

118. Some critics of Wallace's theory of natural selection have argued that it explained too much (*i.e.*, is "panselectionist"); others, that it explained too little (*i.e.*, irrationally put human change outside the causal realm of the "survival of the fittest"). Wallace accepted neither objection, arguing that natural selection was no more nor less than the logically inescapable result of the acting out of individually organized forces within a limited domain. Many times he objected to "judgment being passed on a theory of nature by its power to explain all mysteries": for some early examples of related commentary see Wallace 1864a, *op.cit.* (79), p. 111; Wallace 1864b, *op.cit.* (79), p. clxxxiv; Wallace, *op.cit.* (69), p. 332; and Wallace 1870, *op.cit.* (79), p. 50.

119. 'The ornithology of Northern Celebes,' *Ibis* (1860) 2, pp. 140-7; Wallace 1863, *op.cit.* (46); Wallace 1863, *op.cit.* (79); Wallace 1864, *op.cit.* (46); Wallace 1864a, *op.cit.* (79); 'On the phenomena of variation and geographical distribution as illustrated by the Papilionidae of the Malayan Region,' *Trans. Linn. Soc. Lond.* (1865) 25, pp. 1-71.

120. 'Letter from Mr. Wallace concerning the geographical distribution of birds,' *Ibis* (1859) 1, pp. 449-54; 'On the zoological geography of the Malay Archipelago,' *J. Proc. Linn. Soc. Zool.* (1860) 4, pp. 172-84; Wallace 1860, *op.cit.* (119); 'On the ornithology of Ceram and Waigiou,' *Ibis* (1861a) 3, pp. 283-91; 'Notes on the ornithology of Timor,' *Ibis* (1861b) 3, pp. 347-51; Wallace, *op.cit.* (33); 'On some anomalies in zoological and botanical geography,' *Edinburgh New Philos. J.* (1864) 19, pp. 1-15; Wallace 1865, *op.cit.* (44).

121. Wallace first refers in print (and refers is all he does) to Darwinian natural selection in Wallace 1860, *op.cit.* (119), published in April 1860. The subject did not come up again in his writings--and obliquely at that--until his short discussion of mimicry in 'List of birds collected in the island of Bouru,' *Proc. Zool. Soc. Lond.* (1863), pp. 18-36, on pp. 26-8. In Wallace 1863, *op.cit.* (46), it is referred to in passing. Not until Wallace 1863, *op.cit.* (79), in October 1863--incredibly, over five and one half years after the Ternate essay was written--did Wallace actually develop any natural selection-related ideas in print. Evolutionary--but not natural selection-based--arguments regarding man initially appear in his 'On the varieties of man in the Malay Archipelago,' *op.cit.* (44), first presented publicly in September 1863.

122. 'How to nationalize the land,' *Contemporary Rev.* (1880) 38, pp. 716-36, on p. 735.

123. ii, p. 23-4.

124. Marchant, *op.cit.* (4), pp. 124-5. On at least two later occasions (in a letter to Keir Hardie published in *Labour Leader* (1896) 8, p. 251, and in *My Life*, *op.cit.* (11), i. 104), Wallace recalled how he had temporarily slipped into an "individualist" mode of thinking.

125. See *Contributions...*, *op.cit.* (69), pp. 366-8, for Wallace's argument relating force to will (including the conclusion that matter must be energy!).

126. Wallace 1865, *op.cit.* (119).

127. Note relevant comments in a letter printed in Marchant, *op.cit.* (4), p. 126.

128. *Ibid.*, p. 277.

129. 16 April 1864, 3, pp. 491-3. Fifteen Wallace letters, notes, and abstracts appeared in *Reader* between 1863 and 1866.

130. Wallace's possible incidental contribution to the evolution of pragmatism lies unassessed. Charles Peirce and William James were in their impressionable twenties when the debates on evolution and spiritualism were at their height, and both men later spoke very appreciatively of Wallace's powers of logical argumentation. James became a spiritualist, and shortly after his discovery of the famous medium Mrs. Piper attended at least one seance with Wallace during the latter's Lowell Institute lectures visit to Boston in 1886 ('Letter re Mrs. Ross,' *Banner of Light* (1887) 60, p. 4d-e)--was the famous psychologist actually responsible for Wallace coming to America, in a behind-the-scenes kind of way? James's first known publication was an approving review of 'The origin of human races...' (*North American Review* (1865) 101, pp. 261-3); other ties exist as well. Peirce apparently followed Wallace's career rather closely, and his remarkable reviews of Wallace's *Studies Scientific and Social* and *My Life* in *Nation* ((1901) 72, pp. 36-7, and (1906) 111, pp. 160-1, respectively) suggest he held a practically reverential respect for him. The many connections--and differences--among the three men would be well worth

looking at in detail.

131. In a note published in *Light* ('Harmony of spiritualism and science,' (1885) 5, p. 352), Wallace offers the following remark "[To the question] 'Does mortality give consciousness to spirit, or does spirit give consciousness for a limited period to mortality?' I would reply, 'Neither the one nor the other; but, mortality is the means by which a permanent individuality is given to spirit'."

132. Smith, *op.cit.* (1) and Malinchak, *op.cit.* (1) also take this position.

133. Note his comments to this effect in a letter to Thomas Huxley reproduced in Marchant, *op.cit.* (4), p. 418.

134. *My Life*, *op.cit.* (11), ii. 349.

135. Wallace 1885, *op.cit.* (30), p. 809.

136. In a letter (Marchant, *op.cit.* (4), p. 341) referring to the then recent publication of his book *The World of Life*, *op.cit.* (30), in 1910, Wallace notes: "Hardly one of my critics (I think absolutely not one) has noticed the distinction I have tried to draw between Evolution on the one hand, and the fundamental powers and properties of Life--growth, assimilation, reproduction, heredity, etc.--on the other. In Evolution I recognize the action of Natural Selection as universal and capable of explaining all the facts of the continuous development of species from species, 'from amoeba to man.' But this...has nothing whatever to do with the basic mysteries of life--growth, etc., etc." In 1909, in another letter (Marchant, *op.cit.* (4), p. 337) he writes: "Another point I am becoming more and more impressed with is, *a teleology of fundamental laws and forces rendering development of the infinity of life-forms possible (and certain) in place of the old teleology applied to the production of each species*" [my italics]. "Growth, etc., etc." are thus recognized as properties of nature "more recondite" than natural selection *per se*, though the latter is still viewed as a law of interaction supporting a progression of changing life forms within the constraints of these properties.

137. Wallace, *op.cit.* (31), p. 335.

138. One should not underestimate the weight of these ideas on Wallace's thoughts in general. Given his very early-developed Owenite ideals, it is just as likely--perhaps more likely--that his acceptance of the degeneracy theory of social evolution shaped his biological theorizations as *vice versa*. In this regard it should be noted that he refers to the concept of social degeneracy as early as 1843 in a work (*op.cit.* (44)) that reached publication only in 1905 as part of *My Life*, *op.cit.* (11). The basic idea of the degeneracy theory appears in many different aspects of his writing (see note 113). He continued to defend the idea in print right to the end--see Wallace 1913, *op.cit.* (36); Wallace 1908, *op.cit.* (36); 'Dr. A.R. Wallace & Sir W.M. Ramsay's theory,' *Public Opinion* (1907) 92, p. 336; and 'The spectre of poverty' (anonymous interview), *The Daily News & Leader* (6 January 1913), p. 1a-b.

139. Typical of Wallace's efforts in this direction was his leadership of the land nationalization movement. For summaries of his views on this subject, see his *Land Nationalisation* (London, 1882); 'The "why" and the "how" of land nationalisation,' *Macmillan's Magazine* (1883) 48, pp. 357-68, 485-93; and *My Life*, *op.cit.* (11), ii. 235-66.

140. For Wallace's views on the "might vs. right" issue, see his 'Darwinism in sociology,' *The Eagle and the Serpent* (1898) 1, pp. 57-9; letter, *The Eagle and the Serpent* (1900) 1, p. 164; 'The causes of war, and the remedies,' *The Clarion* (London) (8 July 1899), p. 213; and 'Is it peace or war?,' *Public Opinion* (London) (1908) 94, pp. 202-3. For his opinion of eugenics, see 'Human selection,' an interview by Sarah A. Tooley, *Humanitarian* (1894) 4, pp. 80-8; Rockell, *op.cit.* (26); and Wallace 1913, *op.cit.* (36). Wallace's social criticism writings are voluminous. For an introduction, see his *Studies Scientific and Social* 2 vols. (London, 1900), ii; *Bad Times* (London, 1885); *The Wonderful Century*, *op.cit.* (25); *The Revolt of Democracy* (London, 1913); and C.H. Smith (ed.), *Alfred Russel Wallace; An Anthology of His Shorter Writings* (Oxford, 1991), pp. 119-216.

141. One of Wallace's most ingenius combinations of immediate- and final causes-based reasoning in a social theory context related natural selection to the women's rights movement. On a number of occasions (most notably 'Human selection,' *Fortnightly Review* (1890) 48 (n.s.), pp. 325-37; Wallace 1892, *op.cit.* (44); Wallace 1908, *op.cit.* (36); and Wallace 1913, *op.cit.* (36)) he opined that natural selection would only reassume an important role in human evolution when women no longer needed to marry for reasons of economic security, and could instead select mates purely on consideration of their moral qualities.

142. Schwartz, *op.cit.* (5), p. 282.

143. Kottler, *op.cit.* (5), p. 146.

144. Browne, *op.cit.* (4), p. 182.

145. Notably, Wallace, *op.cit.* (93); Wallace, *op.cit.* (81); Wallace 1856, *op.cit.* (46); Wallace 1857, *op.cit.* (36); letter to *Zoologist* (1857) 15, pp. 5414-6; Wallace, *op.cit.* (92); 'On the entomology of the Aru Islands,' *Zoologist* (1858a) 16, pp. 5889-94; and 'On the Arru Islands,' *Proc. Roy. Geogr. Soc. Lond.* (1858b) 2, pp. 163-70.

146. Wallace, *op.cit.* (81), pp. 31-2; McKinney 1969, *op.cit.* (4); and McKinney, *op.cit.* (3).

147. See McKinney, *op.cit.* (3); and Brooks, *op.cit.* (3) for related discussion.

148. Wallace 1865, *op.cit.* (44).

149. Recall that during this period Wallace wrote only one article in which natural selection itself is the focus of attention in any respect: 'Remarks on the Rev. Haughton's paper on the bee's cell,' *op.cit.* (79), in late 1863.

150. At the 19 January and 2 February 1864 meetings of the Anthropological Society of London, however, he did contribute some discussion referring to human evolution *per se*: see *J. Anthr. Soc. Lond.* (1864) 2, pp. cx-cxi, cxxix-cxxx.

151. Kottler, *op.cit.* (5), p. 163.

152. Marchant, *op.cit.* (4), pp. 199-200.

153. Again, it should be emphasized that Wallace himself directly denied this interpretation in print (see note 8).

154. Wallace, *op.cit.* (69), pp. 303-31 (as discussed by McKinney, *op.cit.* (33), Kottler, *op.cit.* (5), and Schwartz, *op.cit.* (5)).

155. *Ibid.*, pp. viii.

156. *Ibid.*, p. 321.

157. *Ibid.*, pp. 303-31.

158. Wallace's basic model of the physical evolution of mankind--including the chronology of racial differentiation, the emergence of the higher characters, and the cessation of physical bodily change--remained utterly unchanged between 1864 and 1876. Compare Wallace 1864b, *op.cit.* (79), 'The development of human races under the law of natural selection' in *Contributions...*, *op.cit.* (154), and the portion of his 1876 British Association address dealing with human evolution (*op.cit.* (44)).

159. Wallace 1864b, *op.cit.* (79), p. clxvi.

160. Wallace 1870, *op.cit.* (69), pp. 320-1.

161. In a review of Benjamin Kidd's *Social Evolution* (*Nature* (1894) 49, pp. 549-51), Wallace speaks approvingly of Kidd's idea that religious belief produced an influence fundamental to the development of civilization through its support of centralization of power. Nevertheless, at no point in his life did Wallace demonstrate more than a nominal respect for the idea of religious belief as a goal of itself.

162. This last concept was integrally connected to the "equality of opportunity" idea Wallace supported in such works as 'Human selection,' *op.cit.* (141). In a letter printed in *Nature* in 1903 (67, p. 296), Wallace dubbed this entirely "positive" form of selection, destined to "supercede" natural selection, "perpetuation of the fittest."

163. It should be noted that 'The origin of human races...' was not the only pre-1869 writing into which Wallace incorporated discussion to the effect that man was to a certain degree "above nature." 'Creation by law,' *op.cit.* (83), and 'Mr. Wallace on natural selection applied to anthropology,' a letter printed in *Anthr. Review* (1867, 5, pp. 103-5), contain similar, though less directly stated, ideas. These works and 'The origin of human races...,' *op.cit.* (79), in fact represent a direct continuation of the line of thought introduced in 'On the habits of the orang-utan,' *op.cit.* (82), in 1856. Compare all three works with the later Wallace 1874, *op.cit.* (83), and differing little in point of view.

164. S.J. Gould, 'Wallace's fatal flaw,' *Natural History* (1980) 89, pp. 26-40.

165. Gould's "panselectionism" criticism of Wallace's approach, for example, does not really address the issue. As a statement about environmental interaction--not specifics of adaptation--its proper vehicle for test should be spatial analysis of a biogeographical or ecological type; just because Wallace treats adaptation as an outcome rather than a process doesn't mean that the spatial and temporal conditions of environment and distribution attached to the outcome cannot be studied on their own terms. See Smith, *op.cit.* (50), and the author's 'Historical biogeography: geography as evolution, evolution as geography,' *New Zealand J. Zool.* (1989) 16, pp. 773-85.

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