Epilogue on Neo-Darwinian Theory

Some readers of the originally published version of the evolution-based argument for God's existence have affirmed that the neo-Darwinian theory of evolution already provides an explanation for the emergence of complexity in the evolutionary process. The main point is that, whereas mutation and natural selection are each presumed to be purely random, the retroprojected mechanisms of neo-Darwinian evolutionary theory are not purely random, because, under certain conditions, feedback or resonance between mutation and natural selection can generate a non-random (lawful) progression of biological forms.

However, the non-random features of neo-Darwinism can function only in the presence of a host of assumptions concerning such things as the rate and nature of favourable mutations, the (relative) selective advantage of spontaneous increases in complexity, and the nature and stability of the ecosystem at every stage of the evolutionary process. All of these parameters are involved in creating a dynamical system that would have the features necessary to account for the process of evolution (and in particular for the continual complexification involved in evolution). The simple point is that the necessary critical values of these parameters cannot reasonably be held to have occurred by chance.

Thus, all of the questions involving evolutionary theory do not diminish in the least the strength of the argument for the existence of an evolutionary force (based on the facts of evolution); they only raise questions about the various mechanisms by which this force may have acted. Thus, the logic of my proof does not strictly necessitate a consideration of the various strengths and weaknesses of the neo-Darwinian theory of evolution. However, in a previous discussion of these questions, I did in fact undertake a brief criticism of certain aspects of neo-Darwinism. (See Hatcher, "The Unity of Religion and Science" in The Science of Religion, Baha'i Studies, Vol. 2, p. 23). It will perhaps be helpful to some readers if we here undertake a somewhat more elaborate disucssion of these points.

In accordance with Darwin's original terminology, we will use the term "natural selection" to refer to the cumulative effect on populations of phenotypical environmental impact, and the term "mutation" to mean spontaneous genetic change, i.e., any allele possessed by an offspring that is not present in either parent. Now, natural selection, in this specific sense, can never, under any

circumstances, be the source of complexification. This is because natural selection decreases genetic diversity (or variability). Natural selection favours the proliferation of (positively selects) certain existing genotypes by reducing or eliminating (negatively selecting) other (competing) forms.

Moreover, it is most important to stress that natural selection operates strictly on the phenotypical not genotypical level; it has no direct influence on the physical genes themselves. But, insofar as given physical types in a population are due to specific genes, natural selection can affect the total gene pool of a population by giving a reproductive advantage to the positively selected phenotypes (and thus, indirectly, to the related genotypes). If this differential is sufficiently strong and persistent, it can result in either the reduction within or the disappearance from the total gene pool of those alleles associated with the negatively selected phenotypes. In this process, no new forms are created and no new genes enter the gene pool. However, some forms may be eliminated and some alleles with them. Natural selection is thus a kind of purification process by which certain alleomorphs (genetic forms) are purged from the population.

Clearly and indisputably, this (narrow) process of natural selection could never, even theoretically, account for the progressive complexification of life forms in the evolutionary process. In fact, without mutation, and when once the effect of a given set of selective pressures have played themselves out, a closed population in a stable environment will quickly converge to a stable equilibrium state (Hardy-Weinberg) in which the proportion of all alleles is constant, i.e., in which no further genetic change occurs.

How, then, could Darwin have possibly thought that natural selection explained evolution? The answer is simple: Darwin, like others of his day, was a Lamarckian. Darwin formulated his theory of natural selection before the birth of modern genetics, and he tacitly assumed that acquired (phenotypical) characteristics could be inherited, that is, passed on to the next generation. If we add this explicit assumption to the operation of natural selection, the picture changes drastically. Now, every individual organism becomes an active participant in the process of evolution. Any creative or adaptive response of an organism can be passed on to the subsequent generation, and since creativity tends to beget more creativity, one can easily see how a steady upward movement of complexification could be generated.

In such circumstances, my argument for the existence of an "evolutionary force" is still valid, but this force can now be conceived as the total sum of individual adaptive responses. The force of

evolution is distributed -- it "resides in the particulars" à la Aristotle, rather than having an objective existence outside the process of evolution itself, à la Plato. (One would still have to account for the origin and genesis of the individual creativity involved in this process, but that is another matter.)

However, the advent of modern genetics utterly refuted the Lamarckian theory of the inheritability of acquired characteristics, and thus dashed all hopes of explaining evolution by natural selection alone. This gave birth to the neo-Darwinian theory, described by Dicks, which attributes the source of novel physical forms in evolution to mutation, that is, to spontaneous genetic change. In this theory, mutations are assumed to be totally (purely) random in the sense explained by Dicks. Thus, according to the second law of thermodynamics, only an infinitesimal number of mutations will be favourable, i.e., will represent an increase in order or complexity. In fact, if one takes the typically neo-Darwinian materialistic-reductionistic view of evolution, even the assumption of pure randomness is probably over-optimistic, because the known physical causes of mutations are such events as incomplete chemical processes or radiation trauma -- events which by their very nature tend to produce unfavourable mutations. Thus, rather than being uniform, the distribution of mutations would, under such assumptions, most probably be skewed in the direction of unfavourability.

In any case, under the neo-Darwinian assumptions, mutations favourable to increased complexity would, at best, only be sporadic (or sparse), i.e., insufficiently frequent to allow for any signficant process of convergence towards greater complexity resulting from the operation of natural selection. Indeed, to achieve multigenerational convergence towards complexity, one needs much more than an occasional favourable mutation. One needs a certain minimal, trans-generational rate of favourable mutations within the same population for a considerable length of time (e.g, as in Dicks' hypothetical example of a 1% constant rate). Moreover, in order to have a process of complexification, one would need a consistent string of favourable mutations within the same (increasingly narrow) mutant subpopulation. This requirement multiplies the (already infinitesimal) probabilities for individual favourable mutation-events, thereby further and significantly reducing the probability that such a process could occur spontaneously.

Finally, the alternation between long periods of stasis and short periods of rapid change towards complexification, which the fossil record seems to show, shortens considerably the time interval during which successive processes of complexification occurred. This, again,

decreases dramatically the probability values in favour of a spontaneous increase in complexity.

Thus, to sum up: according to the neo-Darwinian theory, the only source of new forms (and thus of upward movement) in the process of evolution is mutation, and mutation is assumed (perhaps optimistically) to be purely random. Thus, in spite of the operation of natural selection which, under certain circumstances, can positively select newly-generated genotypes, the movement towards greater complexity in evolution is nevertheless confronted with the essentially pure randomness of mutation. The neo-Darwinian theory does not, therefore, really diminish the force of 'Abdu'l-Baha's argument (or my reformulation thereof).

Let me say a closing word about another pertinent point raised by Dicks, namely the question of the selectivity of complexity. It is fairly easy to see that, in most instances, evolution towards a more complex form would have a negative selective value during the initial stages of the process. For example, a complex and flexible organ like the eye has a positive selective value only when it is more or less fully formed. Let us imagine the process of evolving an eye beginning with, say, a mutation-generated light-sensitive spot on the skin. Under most conceivable environmental circumstances, such a spot would increase the vulnerability of the organism without conferring any immediate selective advantage, and such would be the case for an unimaginable number of generations, during which an incredible number of further, favourable mutations would have to occur. Moreover, the subsequent favourable mutations would have to occur among the already mutated population for there to be any evolution towards higher complexity. As in the above, this requirement multiplies the individual probabilities for mutation, rendering such a process even less likely (and to a significant extent).

Similar arguments can be given to show that such characteristically human capacities as the propensity for abstract thought (with its requirement of temporary suspension of practical activities) would have had a strongly negative survival value at any stage of biological evoution. (See my discussion of this point in Logic and Logos, pp. 14-17).

In recognition of this fundamental weakness in neo-Darwinism, some neo-Darwinian theorists (e.g., Hans Mohr, Structure and Significance of Science, p. 200) have argued that a mutation-generated change in physical characteristics (e.g., a light-sensitive spot) must have also been accompanied by a parallel mutation of the central propensity structure of the organism's nervous system, thereby fortuitously endowing the organism with the capacity to use

the newly-mutated characteristic in a positive way. Such gratuitous assumptions do not buttress neo-Darwinian theory but rather are logically equivalent to postulating the existence of the evolutionary force (i.e., as the unseen cause of the necessary combination and sequence of favourable mutations).

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