

Do We Have an Evolutionary Theory?

Dear Editors,

The word *theory* has several definitions. To facilitate discussion I am going to define *theory* as follows. A theory *sensu strictu* is an hypothesis which, having been tested, has achieved a degree of support, thereby enabling it to make certain predictions. When this definition is applied to evolution some curious conclusions emerge.

I will present these conclusions first with respect to the two major hypotheses which have dominated evolutionary science for over a century. These are the Lamarckian hypothesis of the inheritance of changes produced during the life of the individual and the Darwinian hypothesis that Nature selects random changes in genetic composition resulting from undirected mutations. I will then consider the possibility that evolutionary mechanisms are not amenable to experimental analysis, a suggestion presented by Schindewolf. (1993). Having done so, I will then apply the same criteria to the Prescribed Evolutionary Hypothesis which I have recently offered and which was anticipated independently by William Bateson, Leo Berg , Robert Broom and Otto Schindewolf (Davison, 2005).

Are all hypotheses testable? This fundamental question has significance because it implies something that may not be amenable to realization. That is to say that if a result cannot be anticipated, the hypothesis simply does not exist. It is interesting to compare Lamarckism and Darwinism in this respect. Lamarckism is eminently testable because it makes highly specific predictions. As such it is a fine hypothesis. The classic example of the giraffe stretching its neck is an example and one considered by Lamarck. Of course we know now from certain African tribes that engage in this practice that the effects are not transmitted to the next generation. The failure of mutilations to be transmitted has been known since antiquity. Darwin's own *Pangenesis* hypothesis was tested by August Weismann in Darwin's own day with negative results. There is still no convincing demonstration that such factors have played a major role in organic evolution. However, let me say that since macroevolution is not demonstrable today, it remains conceivable that Lamarckian devices could have been of importance, perhaps even of great significance, in the past.

It is when we come to Darwinism that things become both interesting and revealing. Central to the Darwinian hypothesis is the notion that Nature does the selecting of that which is essential for evolutionary progress. Of course Nature is not subject to experimental control and so we have had to substitute artificial means of selection to simulate that which has been assumed to have been the mechanism. While there is no question that varieties can be produced through artificial selection, to the best of my knowledge such attempts have as yet never successfully exceeded the species barrier. This experience includes centuries of efforts on the part of animal and plant breeders to alter all kinds of domesticated organisms. Furthermore, since Nature is at the very least unpredictable, we are left with the conclusion that the Darwinian model does not qualify even as an hypothesis, a curious status for a view still widely accepted by the evolutionary establishment.

There is another reason to question the validity of the Darwinian hypothesis. Since Nature was somehow created, the question arises as to exactly when in the creative process did the Creator transfer the reins of the creative process over to Nature, that which had been previously created? My answer to that question is never.

Now we come to the hypothesis that evolution resulted from the expression of endogenous forces not directly subject to experimental analysis. This idea may be traced back first to William Bateson, then to Leo Berg and Robert Broom, next to Otto Schindewolf and finally to myself in the form of the Prescribed Evolutionary Hypothesis (PEH). I have recently reviewed the history of this idea and the evidence in support of it (Davison 2005). On the face of it such an hypothesis would seem to be untestable and as such would not seem to be of scientific significance. Yet, having dispensed with major alternatives, is it even necessary to apply an experimental criterion to evaluate its validity? Is it necessary to test the validity of Mendeleef's Periodic Table of the Elements or Galileo's Law of Falling Bodies just to pick a couple of examples? I answer no as such phenomena demonstrate themselves. When it can be shown that the simple rearrangement of chromosomal information can produce profound heritable phenotypic effects, in other words evolution, does that in itself not constitute a proof that the information was always there and required only to be unmasked? When there is no demonstration that allelic substitutions have ever played a role in macroevolution, does that not require the abandonment of the entire Darwinian paradigm?

I further propose that while such a predetermined evolution may not be amenable to experimental analysis as Schindewolf claimed, the fact remains that it has never been subjected to experiment. In other words whether or not Schindewolf was correct has yet to be ascertained. I first proposed such a test (Davison 1984) with the paper "Semi-meiosis as an Evolutionary Mechanism." To my knowledge the Semi-meiotic Hypothesis (SMH) has yet to be tested employing material bearing chromosomal rearrangements in heterozygous form. That hypothesis predicts that a female heterozygous for a chromosomal rearrangement will, following the first meiotic division of her oocytes, have gynogenetically produced normal diploid offspring half of which will be homozygous for the original karyotype and half homozygous for the new rearrangement. Until those experiments have been carried out, the PEH must be considered viable. Moreover, since the Darwinian establishment no longer tests its own hypothesis, it is understandable why it might not wish to test the SMH. Nevertheless, it cannot be dismissed without laboratory inquiry into its validity. The PEH and the SMH are two faces of the same coin and experimental support for either will be support for both.

So it would seem that we still do not have a working theory of evolution. What has been firmly established however is the total failure of the gradualist Darwinian model to survive the test of experimental selection and the undeniable realities of the fossil record. Until that paradigm is formally discarded, I see little hope for progress in evolutionary science.

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