

GENETIC VARIATION, LIMITLESS OR LIMITED?

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Among organisms, living and fossil, two striking phenomena exist, namely genetic variation within, (microevolution), and discontinuity (gaps) between basic types. A biological principle of limited variation pervades: genetic variability in organisms can go no farther than to produce new variants within already existing basic types. No exception has been demonstrated.

The surface of our earth is literally moving or blooming with living forms. According to the late Theodosius Dobzhansky,¹ on our planet we have 1,071,500 species of animals, 368,715 species of plants, and 3,230 monerans (blue-green algae, bacteria, viruses). Sabrosky² tells us that the arthropods constitute about 82 percent of all animal species; among the arthropods some 92 percent are insects; and among the insects about 40 percent are beetles.

The species groups referred to above present a heterogeneous lot, arising from the intermingling of at least three taxonomic concepts—the typological-morphological species concept, the nondimensional species concept (that of the local naturalist), and the interbreeding-population concept.³

For practical purposes in this article I shall refer to the various larger populations of different plants and animals as *basic types*. *The individuals of any one of these basic types will be closely similar morphologically and will be capable of interbreeding.* These are the easily distinguished kinds which we see in our environment. Examples of basic types are men, horses, cows, cats, dogs, prairie dogs, grasshoppers, snakes, corn, wheat, maples, oaks, roses, and so on. The basic type is apparently the larger natural unit to which reference has previously been made by Kleinschmidt (*Formenkreis*, 1900); by Rensch (*Rassenkreis*, 1930)—groups for which Huxley, in 1940, suggested the names *monotypic species*—one not divided into subspecies—and *polytypic species*—one which contains two or more subspecies; by Mayr³ (*polytypic species*); and by Dobzhansky¹ (*biological species*).

Variation and Discontinuity

Two striking phenomena in our living world are *morphological variation* not only *among* the basic types but also often *within* most types, and *discontinuity* (gaps) between basic types. Living things in their multitudinous varieties cannot be arranged in a continuous unbroken series from simplest in structure to most complex. Nor can one variant be traced through a continuous series to a markedly different variant. Instead, we observe that the variation is *discontinuous*. Rather than a graded series of individuals, we find separate clusters of similar forms, intermediates between which are absent. Regarding this situation Dobzhansky has remarked, "Biologists have exploited the discontinuity of variation as an aid in the construction of a classification of the living world. . . ."

Biological classification is a man-made system of pigeonholes, serving the pragmatic purpose of recording observations in a convenient manner; it is also a reflection and an acknowledgment of the ubiquity of discontinuity in the living world.¹ Generally it is not difficult for even the man in the street to distinguish the basic types. Who cannot tell a tiger from an elephant, a rose from a cabbage or even a *Culex* from a *Drosophila*?

Microevolution

In the Middle Ages, it appears, scholars would not admit that there was variation within basic types. However, today we think life is getting dull if we cannot obtain a new variety of this or that plant, or a new breed of animal. Man is constantly inventing these variants; and nature, all on its own, produces them almost "as easy as the cook makes pancakes" (to borrow Darwin's expression).

In the biological literature we refer to the processes which produce these variants within the basic types by the philosophical and inappropriate term "microevolution" (actually nothing basically new is appearing). Our taxonomic experts list for us 64 species of blue grass and 160 species of panic grass in the United States;⁴ 17 species of the common thistle and 51 species of violets;⁵ 24 species of willow, 54 species of oaks, and 153 species of hawthorn;⁶ 66 subspecies of deer mice, and 214 subspecies of the southern pocket gopher;⁷ 13 species of true cattle in the world;⁸ more than 30 races of the song sparrow in the United States;⁹ and 160 distinct breeds of man on the earth.¹⁰ And is there anyone who wishes to attempt to tell the number of varieties of our domesticated plants and animals?

We are obliged to Darwin for calling our attention to the fact of variation. But the pity of this was that Darwin fell a casualty to his own discovery. Close observer though he was, he still failed to see any natural bounds or limits to variation. He concluded that all nature needed was merely enough time and the simple would produce the complex and generalized.

From Darwin's time to ours a full century of careful laboratory work has been done on processes of variation, and on the paleontological record. The problem for the biological scientist now is to build a new, a true, science in which more open-minded study is given to the factual part of natural science. This science consists of two parts: (a) demonstrated facts, laboratory proofs—the compulsive phase of science, and (b) the speculative—determining the significance of the natural facts. In this latter part is where Darwin failed. The danger is that scientists today will be

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unable to break away from the inaccurate conclusions to which Darwin led them. Agassiz had, to a certain degree, good advice here, "Study nature not books."

The problem to be solved is: Can microevolution (variation within basic types) produce macroevolution (organic evolution)? The outstanding geneticist Richard Goldschmidt put us on an alert here by declaring ". . . the facts of microevolution do not suffice for an understanding of macroevolution."¹¹

Genetic Process of Variation

He who thinks that microevolution has gradually produced new basic types needs seriously to study the laboratory findings regarding all genetical processes which result in variation: (a) recombinations, (b) gene mutations (visible, biochemical, and lethal), (c) chromosomal aberrations or mutations (changes in chromosome number—ploidy), and changes in chromosome structure that alter order or number (deletion, duplication, translocation, and inversion), and (d) hybridization. Then there are the findings from physical manipulations such as exposure to chemicals, to ultraviolet rays, and to maximum or minimum temperatures. The results from all these experiments are quickly told; in no case was anything more produced than new variants *within* existing basic types. To an open-minded scientist all these results lead to an agreement with Goldschmidt; microevolution can never break the barrier (the discontinuity) of the basic types so as to produce a new basic type. This is demonstrated science, not speculation.

Fossil Record

Turning from the living world, we review some facts disclosed in the records of the past. Perhaps paleontology is a little less familiar to us who are surrounded by the living organisms. I will admit that when it comes to studying the fossil record I feel a puzzlement over whether a student of the fossils is endeavoring to uncover all the facts or is he merely trying to prove an hypothesis. Here the requirement of the scientist for an open-minded approach appears peculiarly applicable.

Some years ago when Austin H. Clark, a starred man in *American Men of Science*, was with the National Museum he made this statement, "Since all the fossils are determinable as members of their respective groups by application of definitions of those groups drawn up from and based entirely on living types, and since none of these definitions of the phyla or major groups of animals need be in any way altered or expanded to include the fossils, it naturally follows that throughout the fossil record these major groups have remained essentially unchanged. This means that the interrelationships between them likewise have remained unchanged.

"Strange as it may seem, the animals of the very earliest fauna of which our knowledge is sufficient to enable us to speak with confidence, the fauna of the Cambrian period, were singularly similar to the animals of the present day. In the Cambrian crustaceans were crustaceans, echinoderms were echinoderms,

arrow-worms were arrow-worms, and mollusks were mollusks just as unmistakably as they are now."¹²

This statement involves the entire fossil record, and one cannot deny that for these relationships to hold from first life to our day considerable stability and even fixity would be required. We are led to suspect that some special principle existed throughout nature which assured the continued purity of basic types from the time of their origin, and at the same time prevented the development of new basic types.

We have already noted the presence of discontinuity in the living world. Did it exist in the past? Consider this statement by Norman D. Newell, "These finds (of assumed connecting links) are, however, rare; and experience shows that the gaps which separate the highest categories may never be bridged in the fossil record. Many of the discontinuities tend to be more emphasized with increased collection."¹³

Additional statements follow: "The sudden emergence of major adaptive types as seen in abrupt appearance in the fossil record of families and orders, continued to give trouble. The phenomenon lay in the genetical no man's land beyond the limits of experimentation. A few paleontologists even today cling to the idea that these gaps will be closed by further collecting, i.e., that they are accidents of sampling; but most regard the observed discontinuities as real and have sought an explanation for them.

"But the facts of paleontology conform equally well with other interpretations . . . e.g., divine creation, innate developmental processes, Lamarckism, etc., and paleontology by itself can neither prove nor refute such ideas."¹⁴

"The face of the record thus does really suggest normal discontinuity at all levels, most particularly at high levels, and some paleontologists . . . insist on taking the record at this face value."¹⁵

Discontinuity, Past and Present

We do not have space here to quote further. Suffice it to say that discontinuity, i.e., gaps between basic types, is a most important and easily observed phenomenon, both among living and fossil forms. It is possible that we have overlooked the fact that for each basic type (cats, dogs, horses, roses, petunias, etc.), to reproduce according to its own type means that a basic biological principle is involved. Because laboratory science has shown so completely that every living type *always* produces nothing other than its own type, this performance should have become axiomatic in our day.

Macroevolution or Microevolution?

Too frequently today students of variation, in an endeavor to demonstrate that *new* basic types do originate (macroevolution), have instead used cases of microevolution in their efforts. Illustrations of this are (1) Ruth Moore's book *Evolution*,¹⁶ in which variants among lizards, tortoises, finches, pigeons, begonias, roses, dogs, horses, and men are used beautifully as proof for macroevolution. As exhibit No. 2 is Sir Gavin de Beer's still more beautiful book *Atlas of Evolution*,¹⁷ in which he displays very exact photos of variants of horses, dogs, rhinoceros, ammonites, star-

fish, pigeons, the great tit, gulls, salamanders, and men. Let us state that we believe these illustrations are given honestly in the belief that they are examples of actual origin of new basic types. However, every such case used merely shows more completely that variants within basic types *do* occur, *but* there is *no known demonstration* of the origin of a *new* basic type. It is popular to say, "The origin of new basic types is a demonstrated fact" (and you will be shown pictures of variants within types to prove it), but the *natural facts* of science tell us, "Microevolution, yes. Macroevolution, *no!*" This is a natural scientific fact (i.e., it can be demonstrated) of tremendous importance, one which merits deep and thoughtful study.

Valiant efforts of paleontologists to demonstrate the origin of species often fall into the same category as that portrayed above. Simpson's¹⁸ best case of supposed speciation, that of the study of *Kosmoceras* (ammonites) by Brinkman,¹⁹ through 13 meters of sediments, and today P. G. Williamson's²⁰ fine study of speciation in snails and mollusks through 400 meters of sediments, are heralded by some as a demonstration of macroevolution. But let us not confuse the origin of possibly good species within a basic type with origin of new types. Brinkman's study of new species of ammonites merely began with ammonites and ended with ammonites. Williamson's study began with snails and clams and ended with snails and clams. That is not the program assumed by macroevolution. The development of new species *within* a basic type (ammonites, or snails, or clams) is not the development of new basic types. Proclamation by the uninformed that the development of new basic types is a demonstrated fact adds to the sad confusion of many eager students.

Conclusion

The paragraphs of this article are concerned entirely with items proven in the laboratory. We as natural scientists deal with natural truths. If a morsel of knowledge is presented, the modern scientist (he tells us) will refuse it unless it has been demonstrated in the laboratory to be naturally true. The items in these paragraphs are completely mundane. Therefore, they should not disturb anyone who claims to be a modern scientist. With this understanding I present the following biological principle which should have been recognized and put in use many years ago:

The Principle of Limited Variation: Genetic variation (variability) in animals and plants can go no farther than to produce new variants *within basic types already in existence*.

No exception to this principle (law) has been demonstrated. Its truth is verified every time a new organism is born, hatched, or sprouted. We live in a cosmos where natural principles cannot change with the passing of time. If any of these principles changed a chaos would immediately ensue. I welcome the opinions of my scientific colleagues.

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THE NECESSITY OF CONTINENTAL RE-LOCATION IN THE CREATIONIST MODEL

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Ever since Alfred Wegener offered his theory of continental "drift" in the early twentieth century there has been a continual controversy about whether or not the land masses we consider the Western Hemis-

phere and the Eastern Hemisphere were once joined and later split to form the Atlantic Ocean Basin. During the 1960's, research dealing with the spreading of the sea floor added credibility to the idea that sections of the earth's crust, called plates, not only moved in the past but still are moving, although at barely

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