DARWINIAN *VERSUS* NON-DARWINIAN EVOLUTION IN NATURAL POPULATIONS OF *DROSOPHILA*

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1. Scientific hypotheses: natural selection

The goal of science is to discover patterns of relations among recorded phenomena, so that a few principles can explain a large number of propositions concerning these phenomena [2]. The scientific value of a theory depends on its explanatory power, that is, on its ability to encompass many subsidiary hypotheses into a single comprehensive set of mutually consistent principles. But in order to be accepted in science the applicability of a theory needs to be demonstrated.

Demonstration, or proof, of a hypothesis or theory concerning the empirical world is a gradual process which is never irrevocably completed. The process of demonstration requires, first, to show that the hypothesis or theory is consistent with the relevant facts. Moreover, the hypothesis or theory needs to be confirmed by empirical tests. Empirical tests are experiments or observations which may conceivably have diverse outcomes only some of which are compatible with the hypothesis tested while most of them would lead to its rejection. If the tests are of such a nature that any conceivable outcome or state of affairs be compatible with the hypothesis tested they contribute nothing to the scientific verification of the hypothesis. The value of an empirical test is measured by the *a priori* likelihood of its outcome being incompatible with the hypothesis.

The synthetic theory of evolution, or the theory of evolution by natural selection has a considerable explanatory power. The central concept of the theory is the principle of natural selection—the differential reproduction of genetic variants. Natural selection is the main process directing the evolution of organisms by promoting their adaptation to their environments. The principle of natural selection, together with some subsidiary and generally well authenticated hypotheses, can explain a large number of facts concerning the living world; like the diversity of organisms, their gradual change through historical time, and their remarkable adaptations to the environments where they live. The synthetic theory of evolution by natural selection is, indeed, the single most encompassing biological theory.