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On the Developmental Theory of Languages: Reply

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which cognition must be studied as a genetic and evolutionary process. I also agree with the thesis that language is but one manifestation of a general symbolizing function (vide Cassirer and Langer). At the same time, I find it dangerous to reduce evolution to something which resembles progress, without taking into account the possibility of cyclical or even haphazard transformations, and also to reduce the genetic and evolutionary description to a single criterion.

EDMUND S. GLENN, *Department of State*

#### REPLY

Sir:

We are grateful to Mr. Glenn for his critical comments on our recent paper (1956), and to the editors of the *AMERICAN ANTHROPOLOGIST* for affording us the opportunity to amplify the major points germane to these comments. We limit ourselves to the general criticisms raised by Mr. Glenn, since an answer to questions of detail, e.g., the formation of "clusters" in English, would involve a lengthy excursion into specific propositions and experiments in general perception as well as developmental theory.

We feel that much of Mr. Glenn's criticism is directed toward views we do not hold and derives from the persistence of ambiguities we had sought to expose and eliminate in our original article. It may be worthwhile to cite certain paragraphs from this article, before further evaluating Mr. Glenn's remarks.

On p. 866 of our paper, we introduce the orthogenetic principle of developmental theory and characterize it as follows: "Wherever development occurs, it proceeds from a state of relative lack of differentiation to a state of increasing differentiation, articulation and hierarchic integration. . . . Though itself not subject to empirical test, it (this principle) is valuable to developmental psychologists in directing inquiry and in determining the actual range of applicability with regard to the behavior of organisms."

On p. 868, in exposing the confusion between the temporal and logical criterion of primitivity, we remark: "From the viewpoint of developmental psychology, the developmental progression is defined not by chronological sequence, but by the principle of increasing differentiation and hierarchic integration. It is empirically true that the processes emerging in the actual time sequence frequently conform to the developmental sequence; what occurs earlier in time often involves a greater lack of differentiation than what occurs later. This empirical relationship, however, does not entail the proposition that temporal order of emergence and developmental sequence are of the same logical character."

In light of the above remarks, one may question Mr. Glenn's suggestions that we espouse either (a) the general thesis that all changes over time (evolution, in his usage) are in any single direction, or (b) the specific thesis that such "evolutionary" changes are in the direction of increasing progress. These suggestions rest on the supposition that we identify the developmental progression with changes over time, an identification Mr. Glenn apparently maintains but one that we expressly repudiate in our article.

Also, in light of the quotations from our original article, it should be clear that Mr. Glenn's contention that we describe the direction of evolution (*qua* temporal change) in terms of a tendency to differentiation is again based on a misinterpretation of our viewpoint. First, we do not describe any general direction of changes over time. Moreover, we do not even characterize developmental progression solely in terms of differentiation; we explicitly define the orthogenetic principle as involving both increasing differentiation and hierarchic integration, i.e., integration of articulated components in

ever higher syntheses. From this there can be little doubt that, far from being in opposition to Hegel and Whitehead, we are in close affinity to their views of development.

We had hoped that it was clear in our article that, for us, the orthogenetic principle was not an inductive generalization (as is, for example, Jespersen's statement concerning the evolution of languages, to which Mr. Glenn cites exceptions) but a "law" designed to bring order into the flux of empirical phenomena, an interpretative principle which is, by definition, a universal and necessary proposition. May we add, moreover, that it is a principle of formal organization intended to apply to the structural features (part-whole relations) of all types of processes in which living organisms are involved, e.g., ontogenetic change, phylogenetic change, cultural change, etc. in their specific as well as generic manifestations. In other words, it applies to the ontogenetic course of specific individuals (irrespective of material differences) as well as to ontogeny in general.

We should not be misunderstood as saying that the orthogenetic principle is sufficient to order all features of any domain of human behavior, let alone all domains of organic activity. Other principles have been formulated and still others must be introduced to order other aspects of events in which organisms participate. The orthogenetic principle is designed only to direct inquiry to those aspects which are here defined as developmental in nature. (For further discussion of the orthogenetic principle in relation to some of the complex problems confronting developmental psychology, see Werner 1957.)

In conclusion, we should like to state that the ordering of events within the developmental framework is seen by us as only one of several complementary approaches to the analysis and organization of the data of the social and life sciences. As is now being realized, we may have to abandon, even in the exact science of physics, the notion of ever achieving complete theoretical interpretation by only one set of basic concepts. We believe with Max Born (1956:235) that "The fact that in an exact science like physics there are complementary situations which cannot be described by the same concepts . . . must have . . . a welcome influence on other fields of human activity and thought." With this view, we are sure Mr. Glenn will agree.

HEINZ WERNER AND BERNARD KAPLAN, *Clark University*

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