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CULTURAL  
MICROEVOLUTION\*

Biological analogies and comparisons have frequently been used in our efforts to make cultural patterns and processes clearer, sometimes to our selves and sometimes to our students.

Those who put forth and defend these analogies and those who attack them share, in my view, the same basic weakness. Because their understanding, not of the cultural but of the biological, has been deficient, they have failed to use the proper analogues; that is, they have related the wrong biological concepts to the cultural concepts they wish to explicate. I hope to show here that if the analogues are correctly chosen, the analogy is in fact very strong indeed, and that when the analogy does finally break down it pulls together several different conceptions of culture and gives us a new insight into the nature of cultural change.

One example of a bad analogy is Kroeber's famous "Tree of Culture," which is contrasted to the "Tree of Life." Here we see that cultural "species," i.e., human cultures, differ from animal and plant species in that they can continue to exchange traits, or rather instructions for traits, after their initial differentiation. The analogue, then, is made between cultures and species, and the analogy is shown to break down at once.

Another bad analogy is that often used by functionalists, where a society is seen as the analogue of a single organism, with such system-maintaining features as regeneration of torn tissue. I cannot review here all the difficulties encountered by this analogy, but they are mainly due, I believe, to the fact that while an organism has an ontogeny, a society, like a species, has a phylogeny.

Developments in biology, which have recently begun to diffuse into physical anthropology, have made available some new concepts for our analogical purposes. The most important of these is the concept of population. Now, populations of a single biological species are separated from one another, in the main spatially, and they may be differentiated as well -- but they are in no sense reproductively isolated. That is to say, members of different populations can, and occasionally do, mate; and thus instructional material can and does pass from one population to another. The process is called "gene flow;" its effect is that a member of one population exhibits a certain trait heretofore limited to members of a different population. I submit that gene flow is exactly analogous to diffusion, and that biological evolution within a species shows not the brachiating pattern of the tree of life, but rather the reticulated pattern of Kroeber's "Tree of Culture." We could say, then, that human culture, like Man himself, has never speciated; like Man, it has evolved phyletically. Human populations

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can and do pass their genes around as well as their cultural elements; in fact, since people usually get their genes and their culture from the same source, gene flow and diffusion frequently go together.

Let us now explore the analogy, listing pairs of analogues. First, we have the basic analogy, between the population looked at genetically and the population -- it could be the same population -- looked at culturally.

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|-----|---|--|
| (1) | Population of Organisms<br>(breeding isolate) | Population of Culture-bearers<br>(social unit) |
|-----|---|--|

Next, we want to talk about that which changes during microevolution; that is, the traits, differences in which over time tell us that evolution is indeed going on.

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|---|---|
| (2) Phenotypic Trait<br>(detectable chemical presence<br>or observable structural de-<br>or behavior pattern) | Cultural Trait<br>(observable behavior<br>pattern or artifact) tail |
|---|---|

The processes by which new traits enter a population come next: These are gene flow and diffusion, respectively, as mentioned before.

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| (3) Gene Flow | Diffusion |
|---------------|-----------|

Now; gene flow refers to the transmission of genes from one population to another. The gene is sometimes described as a unit of instruction for the process of individual development to follow. There is nothing exactly comparable to this in the lexicon of cultural anthropology. We often speak of the diffusion of culture traits as if the behavior or artifact itself was being diffused, but I believe this is only a shorthand way of talking, a figure of speech. When we speak of the diffusion of the blow-gun, for instance, we really mean the diffusion of ideas or, better, of instructions, for the construction and use of the blow-gun. So I must beg leave to enter a provisional concept here, analogous to the gene, defining it as "that which is transmitted when cultural diffusion takes place." I call it the unit of cultural instruction, or \*UCI for short, putting an asterisk before it as a reminder that it is provisional.

An instance of gene flow, of course, is not in itself an instance of microevolution. Two other important steps are necessary: first, the new gene -- more properly, the new allele -- must become fixed in the receptor population; second, it must be selected for to cause a change in gene frequency. Since it is my aim to carry the analogy as far as possible, I want to discuss selection first, and then go back to fixing. Selection operates, as we all know, more or less as follows: If an allele confers some reproductive advantage on its bearer -- be that

advantage chemical, structural, or behavioral -- he will, on the average over the long run, have more descendants and more successful descendants than will his neighbors who lack that allele. Thus, that allele will become more and more common in the gene pool as time passes. This is, of course, the very model of biological microevolution.

Now, this very same process operates in culture. Put crudely: If an idea (\*UCI) confers some advantage on its bearer -- be that advantage technological, social, or moral -- he will, on the average in the long run, be more likely to survive than a person who lacks that idea. Thus he will have a better chance to propagate whatever ideas he has, including that idea. Ergo, that idea will, over time, become more and more common in the society. (This is not undocumented: Marshall Sahlins comes very close to this idea in his article on segmentary lineages, and Alexander Alland has suggested that it applies in some very subtle ways to practices surrounding childbirth.) So we have natural selection on both sides of the analogy.

#### (5) Natural Selection

#### Natural Selection

Finally, let us turn back to the question of the fixing of the novelty in the receptor population, a prerequisite for selection. In biology, such fixing seems to be entirely due to chance. As long as only one or a handful of individuals possess the novelty, there is an excellent possibility of its being knocked out of the population by accident, even though its selective value may theoretically be very high. This fixing through chance presumably operates in the realm of culture as well.

#### (6) Fixing through Chance

#### Fixing through Chance

In the realm of culture, however, there seems to be a positive factor operating in addition to chance. There is "something going on" which is a prerequisite to natural selection but which, like natural selection, provides a directional quality to microevolution. This something may determine that a novel \*UCI cannot be fixed in the population, in which case, of course, it cannot be selected for.

We know this something as cultural selection, in Ruth Benedict's sense of the term. A new Idea may be rejected simply because it does not fit into the culture as a whole; because it is contradictory or contrary to the basic themes or postulates of the culture; because there is no place for it in the configuration. This is an old idea, and a myriad of illustrations of it are present in the literature on acculturation. There is no analogue for this process in the biological realm. Since there is a place on a chromosome of the donor population for a certain allele, there must be the same place on the same chromosome for it in the receptor population. Thus there is always a chance for the allele to become fixed in the receptor population, even though it may subsequently be selected against. If this is not possible, then the two populations are of different species, and no gene flow can occur at all

The true biological analogue for cultural diffusion, in other words, would have to be a sort of selective gene flow.

(7) ----- Cultural Selection

I would like now to suggest a theoretical framework for explaining this difference between biological evolution and cultural evolution. The gene pools of two populations have a common rigid structure, in spite of the connotations of the word "pool." (A chromosome map is, in effect, a picture of this rigid structure.) Between the cultures of two populations, on the other hand, there may be variation in structure, such that some units may be successfully transferred and others may be rejected.

Furthermore, it is reasonable to suppose that this variation in cultural structure is itself due to change over time, in fact to evolutionary modification of an ancestral cultural structure. Now this modification of structure, and its direction, has presumably had many determinants. Very important among those determinants, I hypothesize, has been the sequence of adoptions and losses peculiar to that population and its history. I reason thus: A structure does not exist apart from its constituent elements; hence structure time 2 is determined in part by the elements which have been added since time 1. But which of the available elements have been added depends, of course, in part on the structure at time 1. In other words, acceptance of new \*UCI's which are compatible with a present structure may result in a modification of that structure. That modification, in turn, may mean that different \*UCI's are now acceptable (or rejectable). It can be seen that, under conditions of sustained cultural contact, cultural adoptions and losses will follow a natural sequence -- a sequence that is, in principle, predictable.

Although I have recently been able to provide empirical support for this last statement, and I intend to continue to establish and describe sequences of cultural adoption and loss in various situations of cultural contact, I think that more attention should be directed to the theoretical problem of the nature of the unit of cultural instruction (the \*UCI) and the principles by which \*UCI's and cultural structures interact in the ongoing process of cultural microevolution.