



**External Selection and Adaptive Change: Alternative Models of Sociocultural Evolution**

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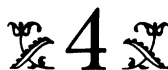
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*Two general approaches characterize current theories of sociocultural evolution. The “external selection” approach stresses the importance of intersocietal selection; the “adaptive change” approach, the importance of intrasocietal selection. This chapter identifies and critically evaluates the strengths and weaknesses of these approaches and outlines strategies for integrating these divergent approaches into a single evolutionary perspective.*



## EXTERNAL SELECTION AND ADAPTIVE CHANGE: ALTERNATIVE MODELS OF SOCIOCULTURAL EVOLUTION

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Current evolutionary theories can be distinguished from the “immanent” and “progressive” theories (Harris, 1968; Bock, 1978) from which they evolved by their convergent focus on the role of variation and selection in producing cumulative trends in the development of human societies (Campbell, 1975; Skinner, 1981). This formal convergence in theoretical structure has not

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produced convergence in substance and explanation, however, because there remain major differences and disagreements over the source of variation, the mechanisms of selection, and the levels at which these processes operate within and between human populations. Different theories consequently posit very different mechanisms and dynamics of change. Nonetheless, procrustean measures are not necessary to factor a number of currently prominent and developing theories into two coherent and largely mutually exclusive groups.

One group, the “external selection” approach, assumes that some degree of change is inherent in all societies but that the rate of innovation will vary over time and across societies depending on societal information-storage and information-processing capacities. Sources of variation receive less attention than information limits, and selection between societies is seen to be responsible for the major trends observed in sociocultural development. The process itself is viewed from an abstract macrosocial and intersocietal perspective, with very little attention paid to the reasons for technological change or adaptive adjustment to changing environments. Population size is argued to depend on the level of technological development, and it is seen as an important parameter of societal information-processing capacity. Prominent representatives of this group are the theories of Walter Goldschmidt (1959), Gerhard Lenski (1970), and Barbara Segraves (1974).

The other group, the “adaptive change” perspective, argues that technological innovations cannot simply be assumed to occur but must be explained. Two explanations of change are offered: (1) the benefits or reinforcement offered by innovations (Langton, 1979; Skinner, 1981) and (2) the coercive pressure of population growth or resource depletion (Wilkinson, 1973; Harris, 1977, 1979; Hayden, 1981). For both, however, cumulative sociocultural development is depicted as a product of selection operating at the level of individuals or their behavior. Evolution is viewed from a microsocial intrasocietal perspective, with attention directed toward the motivation for change and its reinforcement consequences for individuals. Adaptive change—behavioral selection rather than intersocietal selection—is seen as the key process responsible for sociocultural evolution.

Notable differences in the individual theories do not vitiate

the marked similarities within and contrasts between these theoretical clusters. Similarities in conceptual and theoretical focus produce common weaknesses within clusters, and comparison across categories reveals complementary strengths.<sup>1</sup> The chronological development of representative theories also suggests that, rather than attenuating over time, these shared differences actually may be growing more pronounced as the theories develop. The present chapter will examine the divergent trajectories of current theories, consider their respective strengths and weaknesses, and explore strategies for transcending existing conceptual and theoretical weaknesses by integrating the two approaches. A number of criticisms have been raised against evolutionary theories, but the fundamental divergence of these theoretical clusters has remained unexamined and unaddressed. It is not necessary to assume (prematurely) that a single perspective or theoretical approach will prove capable of adequately addressing all questions of cumulative technological and social development in order to see the importance of recognizing the existing gap and attempting to bridge or circumvent it.

### External Selection

External selection theories combine a focus on the internal process of accumulating technological information, in the tradition of V. Gordon Childe, Leslie White, and William F. Ogburn, with recognition of the importance of “external” competition between societies for finite resources and territory, perhaps in the tradition of Herbert Spencer and Thomas Malthus. Discussion of the process of intrasocietal selection, selection between competitive cultural items within societies (beliefs, technologies, behaviors, and so on) is largely overshadowed by concern with forces of selection operating between societies, intersocietal selection, because it is argued that the differential survival rates of differing sociocultural systems are responsible for the long-term trends and patterns of development observed in the *population* of human societies.

It is further argued that although the process of intrasocietal selection *can* be rational and deliberate and *can* affect overall system survival, more often than not, it is guided by shortsighted and

narrow interests. Hence it plays a somewhat inconsistent and unpredictable role in the process of sociocultural evolution. Ironically, choices made within a society may actually reduce the survival chances of the group as a whole (Lenski, 1970:90). The role of intrasocietal selection is even further complicated by the fact that even if decisions are made "rationally" in the apparent interests of the whole society, the final outcome may still be determined by forces outside the control or purview of the group. Therefore, the cumulative trend is not seen as a direct product of individuals and groups themselves but of the mechanisms that select from the variation generated by their actions (Goldschmidt, 1959; Lenski, 1970; Segraves, 1974).

The accumulation of technological information within societies, the variation on which selection "acts," is viewed in large part as a natural consequence of human curiosity, intelligence, and experimentation and the highly developed human capacity to adopt "superior" methods of satisfying human wants and desires when they are witnessed, discovered, or developed. This process is depicted as progressing most rapidly in areas of material technology where direct comparisons of utility are possible (Lenski, 1970:89-90, *pace* Ogburn, 1922).

The directional trend is produced by "external" selection, and in early versions of the theory, military power is explicitly identified as the major mechanism of intersocietal selection (Lenski, 1970:90). As Goldschmidt (1959:128) put it so forcefully, "The brute fact of the matter is that the policing of evolutionary development ultimately rests in the external selective process: the fact that each society lives in the context of other societies which offer an immediate or potential threat to the society, against which it must rally its forces." Later versions (Lenski and Lenski, 1974, 1978) have given more emphasis to the role of "information," thus increasing the generality of the theory and positing a useful, if necessarily incomplete, parallel between sociocultural and biological evolution. Systems that fail to survive or are destroyed, for whatever reasons (disease, famine, military conquest, and so on), it is argued on a more abstract level, perished because they lacked the requisite "information" that would have enabled them to meet the particular threat to their institutional integrity or survival (Lenski and Lenski, 1978:87). To avoid any confusion

on this point, however, it should be clearly understood that the "extinction" of a society for these theorists refers to the extinction of the *system* and does not necessarily, or even usually, imply the extermination of the society's population.

The focus on information and on the cumulative nature of technological development produces a concentration on factors that enhance the capacity of societies to accumulate, store, and process information in accounting for technological "break-throughs" and the uneven but generally increasing rate of technological change observed over recent millennia. Discovery, invention, diffusion, and the store of information they give rise to are seen to provide the basic parameters of variation on which external selection acts. "External" factors are seen to determine the relative survival probabilities of societies with differing stores of information and are seen, therefore, as being responsible for trends in *general* sociocultural evolution (that is, changes in the relative frequency of societal "types"). Little, if any, attention is paid to the question of what might *motivate* or induce individuals and groups within societies to systematically change or "adapt" their behavior to changing circumstances. Implicit in this perspective is the notion that technological "advance" is often, if not always, materially beneficial and is therefore self-evidently desirable to those implementing change.

At the abstract, macrosocial level, information accumulates at varying rates in different societies. More information makes for more possible combinations of ideas (inventions), and inventions may increase the resource-producing capacity of the group and enable the population to increase. A larger population means more information-processing units, more possibilities for experimentation and invention. Societal expansion may also increase intersocietal contact and cultural diffusion. The processes of cultural and technological growth are thus seen to be mutually reinforcing and largely self-generating. If intrasocietal selection is often shortsighted, "external" factors and intersocietal competition will select out those systems and those cultural repertoires that are most effective in coping with biophysical and sociocultural environments.

An even more abstract example of this approach is provided by Segraves's (1974) "probabilistic," "macrostructural" theory of sociocultural "transformation." Put simply, it maintains

that if the probability of an innovation that harnesses more energy (produces sociocultural "advance") is an increasing function of time (becomes more likely with the passage of time), and if the likelihood of an environmental "destabilization" (environmental crisis such as drought or plant disease) also increases with the passage of time, then those systems most likely to survive a destabilization because of redundancy in their resource base (backup sources of food and energy) are most likely to continue to survive and "advance" technologically. Ecologically generalized, or resource-redundant, societies should therefore constitute a growing proportion of societies over time. Aside from alluding to the fact that "loosely articulated," "more generalized" systems are more conducive to structural transformation than "tightly articulated," more "specialized" systems, however, Segraves's macrostructural approach considers even less of the internal dynamic of change than did Lenski's. Her primary focus is on one facet of "external selection"—the environment and the inevitable, if unpredictable, crises to which it is prone. She contends that more diversified systems are more likely to survive the loss or curtailment of a single resource and that they are consequently more likely to survive and by chance alone to discover, invent, or stumble on something that increases their ability to harness energy.

One point that is not especially clear in these theories is what it is that is evolving. The theories argue that a society evolves as information accumulates within it, but is it the information or the society that evolves? Diffusion, migration, and the physical encoding of information in symbols, tools, buildings, and so forth suggest that a particular society is only a temporary locus, or "carrier," of information. The continuity, apparent irreversibility, and transsocietal nature of information accumulation also suggest that it is a supra- or extrasocietal pool of information that has cumulated and evolved over time. The cumulative changes in social organization and development may merely reflect changes in it, rather than its reflecting changes in them.

This shared concern with external selection and with the size of the information and resource base available to societies may establish basic parameters of survival and innovation, but the lack of concern with features of the internal process of change leaves a number of important questions unasked and unanswered. Motivational and intrasocietal factors are merely assumed or are

made to appear unimportant in the grand sweep of sociocultural evolution.<sup>2</sup> As Campbell (1975) has noted, the parsimony of the theory can be increased by arguing that sociocultural evolution (like biological evolution) is a product of “blind variation” and “selective retention.”

However, this lack of concern with the dynamics of intra-societal change has led one critic (Houghton, 1976) to charge that these theories have merely identified “existential trends” in the structure and development of human societies without offering a sufficient explanation of *why* those trends occurred—that is, how change was generated within societies or, more important from Houghton’s point of view, why individuals were motivated to change their behavior.

From another quarter, this general approach has been taken to task by critics who question the assumption of self-evident benefits for the individuals and groups that implement new technologies. It is argued that technological changes have often entailed more labor hours and have generated more restrictions and demands on the populations that implemented them (for example, Wilkinson, 1973; Pfeiffer, 1977). It has also been argued that the “eureka” theory of the advent of horticulture (that is, its “sudden” discovery by women and immediate widespread implementation), which is prominent in these theories, is not plausible in light of the high intelligence of premodern humans and the increased work loads and social problems (such as maintaining domestic order) that accompanied horticulture and the sedentary life-style it required. For instance, Pfeiffer (1977) maintains that Neanderthal women were easily capable of understanding the “secret” of plant cultivation as many as 100,000 years before it was “discovered.” In addition, archeologists (Wendorf and others, 1979) have found evidence that knowledge of plant cultivation precedes its wide-scale implementation by thousands of years. The Wendorf study reports evidence that barley may have been “discovered” and used on a limited basis as many as 11,000 years before the “agricultural revolution.” The lack of accompanying social transformation lead the authors to characterize the “discovery” as “one of the great nonevents of prehistory.” Knowledge of techniques of cultivation may be a necessary, but apparently is not a sufficient, condition for its widespread adoption.

Boserup (1965) demonstrated that labor intensity in agricul-

ture *increased* with technological advance and population growth, and Wilkinson (1973) has argued that general increases in working hours and declines in living standards not only accompanied the industrial revolution but in many ways continue into more advanced levels of industrialization. These observations and arguments raise serious questions about the assumption that technological "advance" is always or usually desired by the individuals and groups adopting it. These questions are, of course, complicated by the fact that in stratified societies elites may benefit from the continued exploitation of nonelites. But it is clear that exploitation is limited by technological, environmental, and ecological constraints, and as Duncan (1964) and Marx (for example, 1972) have argued, technological "regimes" are inherently unstable.

Therefore, although it is possible to argue from this perspective that external selection is capable of producing the observed global trends in social organization and technological development *if sufficient change or variation is generated within societies*, theories employing the external selection approach may not be able to account for sufficient variation for selection to produce directional trends in technological development and social organization. If changes cannot be expected to occur simply because they are possible, or because of the lure of benefits they offer to those implementing them, then other causes of change will have to be identified and incorporated into the theory.

### Adaptive Change

Explaining and accounting for motivating factors is clearly the primary focus of the adaptive change theories. Harris (1977, 1979), Wilkinson (1973), and Hayden (1981) explain a number of basic evolutionary changes in terms of the ever-present, and at times acute, environmental and demographic pressures that societies have had to cope with in order to survive. In part because of the technological difficulties in controlling conceptions and births, population pressure has been, and remains in many areas, a major cause of resource depletions and a powerful motive for technological intensification and change within societies. Wilkinson (1973) and Boserup (1981) are quick to point out, however, that whether a particular society or set of societies controls its reproduction is

less important than whether *all* do. Population pressure can be imposed from without, and evidence exists that unstable technologies (for example, agriculture) are the most likely to be spread by forced migration (Rindos, 1980). Therefore, no group can ensure that it will not be subjected to population pressure or resource depletion simply by regulating its own population. The initial reaction to increased demand for resources (if out-migration and societal fissioning are not possible) may be to intensify production with existing technologies, but the deviation-amplifying feedback (Maruyama, 1968) of intensification may only increase problems and shortages by reducing remaining resources at an accelerating rate (Harris, 1977). Finally, “backed into corners,” societies—or, more accurately, the individuals in them—find it more advantageous to seek or to implement new, though more labor-intensive, technologies than to suffer the increasing hardships of shortages or increased costs that would result from continuing existing technological practices. For Harris (1977) in particular, *cost/benefit calculations at the individual level*, under the duress of population pressure and environmental degradation, are the simplest and most straightforward explanation of cumulative technological and social change. The observed trend of increasing amounts of energy harnessed by human societies over time is also seen by Harris (1977, 1979) and Wilkinson (1973) as a result of the increased difficulty of securing needed resources for ever-larger populations in progressively degraded environments. As the title of Wilkinson’s book suggests, this is indeed a poverty theory of progress.

Langton (1979), Houghton (1976), and Skinner (1981) share this microsocial perspective and concern with the motives of individuals to change their behavior, but their focus on reinforcement rather than environmental constraints or population pressure leads to a more optimistic assessment of the process. Langton (1979), in fact, offers a theory of “progress” based on the fact that through reinforcement individuals progressively learn to do things better over time (for example, to make more effective arrowheads). Langton appears to assume that the term *extinction* should be applied only to behavior that is no longer sufficiently reinforced and is therefore abandoned, not to the disappearance of people and groups. Skinner’s (1981) recent paper, however, though extolling the importance of reinforcement, is careful to

frame its argument within the context of selection and possible “extinction” of the organism, group, or society. Learning and reinforcement are obviously important features of the process of sociocultural evolution, but motivation and reinforcement without selection do not provide an adequate explanation.

Unfortunately, we may think we understand a process when we construct or reconstruct the subjective intentions and experience of the participants (Durkheim [1895], 1966; White, 1969). We may fail by this method to recognize the possibility that others may have thought and experienced the same things yet failed to survive. One cannot simply work back from successful adaptations. It is necessary to take failures into account (at least theoretically) to get an appropriate model of the process. A particular distribution of organizations or societies may appear to be the product of “adaptive change” when in fact it is the product of the relative birth and death rates of different organizational types (Hannan and Freeman, 1977). It might well be the case that in all systems, successful and unsuccessful, individuals were responding to reinforcement and environmental contingencies the best way they knew how—yet not all survived. It may be difficult to collect information about the variety of things that failed, but not recognizing the importance of “filters” in selecting out a small and perhaps unrepresentative sample of what was attempted may lead to the unsupportable conclusion that “solutions” were developed as specific and conscious responses to the problems encountered.

Further, in the case of reinforcement, one must assume that all populations of human beings have had the same general ability to learn and to experience reinforcement. Therefore, one is tempted to predict that, through reinforcement and learning, most if not all human groups would be able to adjust to their circumstances and persist. *Yet very substantial evidence indicates that most societies have failed to survive* (for example, Lenski, 1979: 13). In fact, high mortality rates appear to be characteristic of most forms of social organization (Mayhew, 1982, especially pp. 134–138).

Harris’s focus on behavioral selection based on costs and benefits structured by population pressure and environmental feedback overcomes some of the difficulties of the reinforcement theories, but it too leads to a deemphasis on the role of external

selection in the process. Harris does not directly dismiss it, but he does largely ignore it in his explanations of change. One can find references to it, but one can also find evidence that his increasing focus on behavioral selection is producing a progressive disregard for intersocietal selection. As the following passage (Harris, 1979: 60-61) indicates, to the extent that selection remains, it is in a highly individualized and behavioral form: "Another way to phrase this imperative is to assert that the selection processes responsible for the divergent and convergent evolutionary trajectories of socio-cultural systems operate mainly on the individual level; individuals follow one rather than another course of action, and as a result the aggregate pattern changes. But I don't mean to dismiss the possibility that many sociocultural traits are selected for by the differential survival of whole sociocultural systems—that is, by group selection. Because intense intergroup competition was probably present among early human populations, provision must be made for the extinction of systems that were biopsychologically satisfying to the individuals concerned, but vulnerable to more predatory neighbors, with consequent loss of certain cultural inventories and the preservation of others."

On further analysis, however, even this "group selection" turns out to be the "catastrophic consequence of selection operating on or through individuals." In addition, "if the sociocultural system survives as a result of patterns of thought and behavior selected for on the individual level, it is not because the group as such was successful but because some or all of the individuals in it were successful" (Harris, 1979:61). Intersocietal warfare is no exception, since "a group that is annihilated in warfare can be said to have been selected for as a group, but if we want to understand why it was annihilated, we must examine the cost-benefit options exercised by its individual members relative to the options exercised by its victorious neighbors" (Harris, 1979:61). This would appear to be a change from the position reflected in earlier (scattered) statements such as the following: "In culture, as in nature, systems that are the product of selective forces frequently fail to survive not because they are defective or irrational, but because they encounter other systems that are better adapted and more powerful" (Harris, 1974:173).

This extreme individualism and atomization of society and

social process appear to be a direct consequence of the focus on the role of individual decision making in the evolutionary process. Such individualism clearly avoids the problem of reifying "society," and we might split hairs over the distinction between processes that operate "on" individuals and processes that operate "through" them, but this reductionist requirement would appear to be, on the whole, both theoretically unnecessary and counterproductive. To fulfill this requirement, one would virtually have to consider the motives, decisions, and behavior of nearly everyone, everywhere, whose behavior (or inaction) hindered, helped, or merely permitted the survival or collapse of particular behavioral or sociocultural systems. Granovetter (1979) has ably described the difficulties of such an approach in accounting for "aggregate" and cumulative social outcomes (see also Nolan, 1981), and it should also be noted that Harris himself has been forced a number of times to go beyond the cost/benefit decisions of individuals and groups in order to explain certain evolutionary outcomes (for example, 1971:218, 1974:173). However, it appears that Harris is proceeding to develop an ever more individualistic explanation of sociocultural change. Additional evidence of this is offered by the more individualized explanation of "cow love" presented in later works (for example, *Cannibals and Kings* compared with *Cows, Pigs, Wars, and Witches*).

A concern with avoiding "metaphysical forces" in evolutionary theorizing is justified, but this need not imply that all evolutionary theories must be reductionist. Recognition of intersocietal competition, contact, and conflict contributes a great deal to evolutionary explanations, and it does so in a nonmetaphysical, nonteleological way. Certainly it makes sense to recognize that sociological phenomena *can* be traced through the behaviors of individuals, but this does not mean that theories must exclusively address problems at the individual level and build up macroevents and macroprocesses by assembling microbehaviors. Not only is there a principle of parsimony to contend with, but there is the additional danger of the functionalist fallacy (tracing back only successful adaptations). Systems and forms of organization are just as subject to selection as individual behavior is. Poorly organized systems are not as likely to continue as those more effectively organized. The organization of systems can be *expressed* in terms of

what the individuals in them are doing, but it is likely to be the *form* of organization that is extinguished by selection, not the individuals that constitute them. In this sense selection at the individual level is no more real or realistic than selection at the group level, particularly if one is concerned with the changing distributions of organizational types over time.

### Summary

The major differences between these theoretical approaches do not seem fundamentally irreconcilable or logically contradictory.<sup>3</sup> In fact, it can be argued that the primary difference is a focus on analytically separable but fundamentally interrelated aspects of a single process of change. The two theories' differing emphasis on adaptive change and external selection have, however, led to very different and in many ways complementary substantive developments. External selection theories, and Lenski's in particular, have assembled considerable evidence of major patterns and shifts in such things as settlement size, division of labor, structure of belief systems, ownership of capital goods, and the complexity and centralization of wealth and political power. Adaptive change theories, and Harris's in particular, have assembled a number of fascinating, if controversial, "explanations" of such things as how horticulture may have been both a cause and a consequence of population pressure, how reinforcement may explain progressive change in stone tools or in food sources, how warfare may reduce and stabilize population growth by convincing families that male babies are more valuable and important than female babies, and how the Aztecs may have been driven to massive institutionalized cannibalism by progressive environmental degradation and lack of a domesticatable herbivore.<sup>4</sup> Theorists from each perspective, of course, report and build on the research of many others, but their respective approaches weave the data into two very different patterns. Each appears to be telling a very different story. For one, societies, or the individuals within them, have successively adapted to changing conditions; for the other, more powerful systems have propagated themselves at the expense of, or despite the resistance of, their less powerful competitors. For one, it is a story of adjustment and change; for the other, a story of differential birth and

death rates. Each of these stories is both true and false. Each has something to contribute to our understanding of sociocultural evolution but by itself is inadequate and misleading. A combination or synthesis of the two approaches might not only avoid this dichotomy but enrich our understanding of the evolutionary process as well.

### Strategies for Synthesis

It would be impossible, in the space remaining, to effect a synthesis or integration of the two perspectives, but promising strategies and lines of development can be outlined and discussed. First of all, it seems fairly clear that the cost/benefit calculations of individuals and groups should be firmly lodged within the general framework of external selection, since in the long (or even the short) run, the motivation, will, or attempt to adjust is no guarantee of success. Motivation for adaptive change, whether from coercion or incentive, can be seen, however, as a factor responsible for increased variation and potential for change in societies. Sociocultural systems respond technologically to changing environmental circumstances, in part, when individuals and groups within them act to reduce threats to their standard of living or their supply of needed resources. This hypothesis, which, if true, *is true of all social groups*, does not promise an answer for all evolutionary questions; but it does introduce a set of mechanisms to account for greater variability and change in the pool of sociocultural candidates that are selected from by a variety of external factors. Recognition of the importance of motivation and adaptive change as sources of variation subject to selection would not require that cumulative sociocultural development be aggregated on the basis of innumerable unobserved, and perhaps unobservable, reinforcement contingencies and cost/benefit calculations. It would also keep clearly in focus the fact that, however rewarding or enjoyable the technological and institutional arrangements of a particular society, they are always subject to the possibility of unforeseen or "outside" disruption and interference. Thus it would seem that the process of intrasocietal change and selection should be nested within the process of external selection.

Further, to overcome some of the previously noted ambi-

guity, it might be useful to view the information pool as the primary factor that evolves, not the societies in which it is temporarily stored and modified through the actions of particular individuals and groups. Moreover, this pool of information should be clearly seen as being largely *supra- or extrasocietal*. This view is in line with the increasing recognition of ever more macro levels of information and economic organization (for example, White, 1969; Wallerstein, 1974), and it has the additional advantage of explaining a number of anomalies and puzzles confronting current theories, including the following: (1) Although individuals, groups, and societies implement and some add to the cumulative pool of technological information, the coming and going of particular individuals, groups, and societies rarely, if ever, *decreases* its content (Childe, 1936, 1951, 1954), and (2) the most highly developed societies at a particular technological level are not the most likely to break through to the next technological level; for example, the most advanced hunter-gatherers do not adopt horticulture, and the most advanced agrarians do not become industrial (Childe, 1954; Sahlins and Service, 1960).<sup>5</sup>

A suprasocietal conceptualization coupled with the observation that as size, complexity, and interdependence increase, systems become increasingly resistant to change (Spencer, 1967; Zipf, 1949) may help to explain these and other seeming evolutionary paradoxes. Information may increase most rapidly in the most “advanced,” largest, and most complex societies, yet this very complexity and “advancement” may make them incapable of effectively implementing fundamentally different technologies.<sup>6</sup> If information flows and accumulates across societal (though perhaps not social) boundaries, then those systems that have access to the information but that lack a tightly integrated technological/social structure may be able to implement fundamentally different, or “revolutionary,” technologies and thereby surpass the technological and economic achievements of the societies in which the requisite information developed. In fact, an externally generated crisis (war, economic stagnation, drought) may be required in order to reduce structural resistance sufficiently for major change to occur in large, complex social systems (Wallerstein, 1974, 1980; Skocpol, 1979).<sup>7</sup> Veblen’s (1915) “advantage of backwardness” and Sahlins and Service’s (1960) “law of evolutionary potential”

make much more sense when viewed from this perspective. It also vitiates Segraves's (1974) characterization of these ideas as "unscientific." Of course, they must be viewed as probabilistic statements, and one must assume that some minimum infrastructural development is necessary for implementation of a complex technology. One would not predict that a peripheral country would be likely to adopt and exceed the economic development of advanced core nations, but a semiperipheral nation certainly might—for example, nineteenth century Japan.

This conceptualization might also better focus the question of the causal priority of "within" and "between" processes. As the flows of people, goods, and information have increased over time, and as information has shifted to external and relatively permanent storage, the effective size of this suprasocietal information pool has grown enormously. As different "world systems" have emerged, expanded, and contracted (Wallerstein, 1974; Childe, 1954; Lenski and Lenski, 1982), the degree to which the information pool has been contained within a *single social system* has also varied. The modern world system is rapidly approaching incorporation of the entire globe into a single sociocultural system (Wallerstein, 1974), and therefore information and system boundaries are converging. To the extent that they do coincide, innovation and information growth occur within a single system, and change and adaptation within it may be more important than competition between and elimination of societies in affecting sociocultural evolution.<sup>8</sup> Yet in the past, there have been changes in the relative convergence and divergence of these boundaries. To the extent that the boundaries converge, change and adaptation *within* are more important in the process; to the extent that they diverge, competition and conflict *between* may be more important. As emphasized earlier, however, the essential issue in both situations, whether the units of analysis are parts or wholes, is survival, and external factors, outside the purview or control of individuals, groups, or societies, cast the final vote in determining the distribution of organizational "types" over time. The relative importance of processes of selection within and processes of selection between, however, varies systematically by states of this contextual variable.

In conclusion, what is proposed here is an even more macro

theory of the evolution of information (and consequently of the systems which implement, and whose structures and processes depend on, that information), which incorporates adaptive change, reinforcement, and cost/benefit calculations as mechanisms that increase variability and change within societies and, therefore, in the collective extrasocietal pool of information that is evolving. In the final analysis, the cumulative evolutionary trend is shaped not by the individual participants (be they individuals or societies) but by external selection. To adequately effect a true synthesis or complete integration, however, would require not simply that the adaptive change and external selection approaches be juxtapositioned or nested but that both be translated into a single conceptual framework. The progressive emphasis on information suggests the most promising line for accomplishing this. The concepts of information and uncertainty could be broadened to include the behavioral and crisis aspects of the component parts of the evolutionary process identified and discussed here, thereby making it possible to forge them into a single coherent theory of sociocultural evolution.

### Notes

1. The conceptual issues that unify and distinguish these theory groups are not peculiar to theories of sociocultural evolution. They are issues which distinguish sociological theories of all kinds and which have engaged the attention of sociologists with a variety of substantive interests. In their most general terms, they are: Should change be viewed as originating from within or from without sociocultural systems? Is a macro- or a microlevel approach best suited to explaining the process of change? Are human motives and values necessary for adequate explanation of any or all sociocultural phenomena? Are individuals and groups in control of their social development, or is this an "anthropocentric illusion"?

2. Rindos (1980) maintains that questions of "intentionality" and "motivation" may be avoided for at least one important technological transformation, the domestication of plants, by viewing it as one step in the "coevolution" of plants and humans. This process can be seen as one in which certain plant species (in

competition with others) further their "interests" by manipulating human behavior so as to ensure their survival and propagation. Only our reluctance to impute "motives" to plants prevents us from offering this as an explanation of the process, since, as Rindos clearly shows, it is equally capable of accounting for the events in question. This suggests that in some contexts human "motives" may be just as superfluous as plant "motives" are to an adequate explanation of plant domestication.

3. Although there appears to be no inherent logical incompatibility between them, where one perspective is dominant or ascendant, it seems to drive out the other. External selection appeared to play an important role in Harris's early theoretical arguments, indicating an awareness and appreciation of its importance and utility in accounting for major features of sociocultural evolution. Yet external selection has been progressively downplayed in succeeding formulations, perhaps reaching its lowest point in *Cultural Materialism* (1979). Lenski's most recent work (Lenski and Lenski, 1982) indicates an awareness of many of the shortcomings and limits of his original approach, and a number of changes and additions have been offered to improve it. But the changes fall short of an adequate synthesis of the perspectives, perhaps indicating the difficulty of bridging this conceptual gap.

4. Despite the theoretical centrality of intersocietal competition and warfare in Lenski's external selection theory, the theory is largely optimistic. Increasing information and energy may even enable human groups to control the evolutionary process in the future. Harris, in contrast, although he emphasizes the role of motivation and choice, sees every technological and social-structural change as creating the conditions that will necessitate more change. Every substitute resource and replacement technology is merely a temporary solution to an existing problem and is likely to be the source of many new ones. Hence, for Harris the promise of technology is a hollow one, its rewards fleeting and ephemeral. His outlook is thus more pessimistic, with poverty and problems the engine of change, and progress the ideological smokescreen of the privileged.

5. Most external selection theorists, especially Segraves (1974), because of the ambiguity of what they view as evolving, appear to assume that only the most advanced societies can con-

tinue to advance, because only they have the requisite information to do so.

6. Germany and Japan, in their ability to implement the most advanced automated technologies, are recent examples of this thinking. Lacking the structural resistance of an intact industrial structure (for example, tooling, organized labor), they have been able to advance more rapidly than the societies within which these technologies were invented.

7. If biological analogies were not nearly so often fatal to social theories, it would be tempting to liken this suprasocietal information pool to a disease. The survival and propagation of a disease are affected by changes in the host population, and vice versa; further, infection (implementation) may require a crisis or reduction in resistance. This analogy might also serve to clearly distinguish evolutionary "advancement" from "progress" (Granovetter, 1979).

8. This would address Hawley's (1979:29) recent charge that increasing interdependence of societies renders evolutionary theories otiose since elimination through competition will be less important than expansion and change in explaining future social developments.

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