The Strategy of Social Evolution*

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RÉSUMÉ

Cet article est un essai de classification des différentes voies de recherche scientifique qui ont été employées dans l'étude du concept de l'évolution sociale. Il y a deux sortes de définitions de l'évolution: (a) celles qui mettent l'accent sur la forme et sur les changements de forme, et (b) celles qui portent en évidence le processus de l'évolution et qui font découler les changements de forme du processus ou des processus impliqués ou explicités dans la définition. En mettant l'accent sur la forme, on en vient à la voie inductive, alors qu'en soulignant le processus, on est conduit naturellement à la voie déductive.

Les études sur l'évolution comportent une autre dimension importante, celle du temps. Dans ces études, les différentes périodes de temps envisagées peuvent se grouper selon trois catégories: (a) les études à grande échelle, portant sur des périodes de 500 années et plus, (b) les études d'échelle moyenne, envisageant des périodes entre 25 et 500 années, et (c) les études à échelle minime qui se limitent aux changements sociaux s'effectuant à l'intérieur d'une période de 25 ans.

A ces trois types de dimension temporelle, on joint les deux méthodes d'approche mentionnées ci-haut, ce qui donne en tout six voies de recherches sicentifiques. Chacune de ces voies est illustrée d'un exemple.

Enfin, l'analyse et la critique de ces différentes méthodes de recherches veulent indiquer la direction dans laquelle devront se faire les nouvelles études si on veut en obtenir des résultats positifs.

The expanding interest in evolution within Western anthropology in the last decade has now placed this subject near the forefront of contemporary anthropological thought. In the recent past, symposia and books on evolution have appeared in an almost steady stream; sessions at annual meetings of anthropological

* The author would like to thank Professor F.W. Voget for helpful comments and suggestions. Responsibility for the final version rests however solely with the writer.

societies have been given over to evolution, and younger writers feel constrained to point out the evolutionary significance of their latest papers, whether or not an evolutionary perspective was contained in their original research objectives. In conversation, a colleague from England has recently pointed out that, although it is often forgotten, Radcliffe-Brown was most definitely an evolutionist.

The reasons for this almost faddish respectability of evolutionary study in social and cultural anthropology, after its half-century of ill-repute are complex. However some of the obvious factors can easily be summarized. The rapid social change in the non-European areas, and the avowed evolutionary goals of the new nations have forced all social scientists to think in more dynamic terms. Anthropology, with its intimate disciplinarian connection to biology, and an evolutionary stress within the history of its own development, has been especially prone to turn to the evolutionary method of conceptualizing the contemporary world situation. Furthermore, especially in America where anthropology has maintained a broad eclectic front within the purview of its intellectual outlook, there is a need for some unifying theoretical approach that might bridge the gap between the constantly specializing and differentiating sub-branches of the discipline. Evolutionary theory not only unifies, it is a success, and it is therefore even more attractive as a generalizing and scientific approach which has already produced legitimate results in biology. Indeed proponents of the evolutionary approach go even further and suggest that not just anthropology but all knowledge should be organized around an evolutionary perspective. Huxley (1945: 88) claims that, "All reality is in a perfectly real sense evolution, and its essential features are to be sought not in the analysis of static structures or reversible changes, but through the irrevocable patterns of evolutionary transformation." Jenkins (1959: 102) postulates that all human activities — art, science, and artifacts — are each ultimately and fundamentally adaptive in nature. He assumes man and everything he produces to be subject to evolution.

Ideally then, evolution is a method of coping intellectually with a changing world, and a theoretical framework for synthesizing and unifying disparate and differentiating aspects of knowledge.

What is evolution more precisely? Sahlins and Service (1960) have discussed the problem of definitions and classified these into two varieties. The first and most widely used calls attention to forms and the changes that occur in them. The classic case in point is Darwin's own definition — evolution is descent and irreversible transformation through time. Secondly, writers like White (1960), Harris (1959), Cottrel (1955), Sahlins and Service (1960) and their students, use a processual definition more akin to that used by Julian Huxley (1943) the biologist. These definitions, as far as I understand, them are a postulated reversal of the Second Law of Thermodynamics. This law states that "inorganic evolution proceeds towards a decrease in organization, culminating in homogeneity, and the random distribution of matter and energy" (Sahlins and Service 1960: 7). On the other hand these same authors define organic and cultural evolution as moving in the opposite direction such that there is a continuous increase in organization, higher energy concentrations, and for the most part increased heterogeneity. White (1960: 39-40) assures us that this is not really a contradiction.

> If, however, the process of cultural development moves in a direction opposite to that specified for the cosmos as a whole by the second law of thermodynamics, the operation of culture within the system of nature is in perfect accord with the cosmic process. In the process of utilizing the energy that it harnesses, culture reduces it from higher to lower levels of concentration, contributing to a more diffuse distribution of energy in the cosmos. Thus food is transformed and diffused as heat and work and reduced to lower levels of organization, i.e. to inorganic matter. In the burning of coal and oil, energy is transformed from compact, concentrated forms to loose and more diffuse forms. And in harnessing the energy of atomic nuclei, energy in even more concentrated form is released and diffused. Thus *within* the system that is culture, we find a movement and a direction opposite to that specified for the cosmos by the second law. But in relation to the rest of the cosmos culture is but a means of furthering the trend described by this law. The cultural process is therefore but an infinitesimally tiny eddy in the vast cosmic flow of things.

Any implication that the emphasis on form is less processual than the definition put forward by Sahlins and Service (1960) is erroneous at this stage of our knowledge. Both of these definitions view form as the result of process, indeed this is the essence of the evolutionary viewpoint. However the one approach starts

with form and derives process inductively or inferentially from it, while the other starts with what is usually a deductive outline of process and then derives or infers form from the processual principles.

Use of the words inductive and deductive can lead to interminable chicken-and-egg questions about which comes first, and whether these are in fact two different methodological perspectives. It is assumed here that no induction is possible without some deduction and vice versa, but that in any particular instance of research there is always a predominance of one over the other in the methods employed. Since this inductive/deductive distinction is basic to the understanding of current strategy in evolutionary studies, it is clarified below with a few examples.

Most nineteenth century evolutionary writers, such as L.H. Morgan, Sir Henry Maine, and J.F. McClennan arranged their empirical data in order to illustrate a deductively derived process of evolution. To them morphological distinctions in social or cultural data simply illustrated the "law" of evolution. Thus McClennan (1896: 9) states that "the history of human society is that of a development following closely one general law and that the variety of forms of life — of domestic and civil institutions — is ascribable mainly to the unequal development of the different sections of mankind." These early writers ordered their material by arranging it to illustrate their "general law." Later writers have used more sophisticated "laws" but utilize the same technique for presenting their arguments. Thus Ellwood (1927: 76) deduces a principle of cultural evolution which he claims is "applicable to all phases of culture." He argues that cultural evolution is "a process of active adaptation on the part of individuals and groups, carried on by the human brain as an active adaptive organ by means of intercommunication among members of human groups." Using this principle he attempts to show that a similar growth and development has occurred in tool use, food processing, agriculture, war, clothing, bodily decoration, housing, the fine arts, property, the family, law and government morality, religion, and education. The more widely known contemporary writings of L.A. White are based on the same logical techniques. In his most recent book White (1960: 40) states his deductive principle:

> As the amount of energy harnessed by sociocultural systems increases per capita per year, the systems not only increase in size, but become more highly evolved, i.e. they become more differentiated structurally and more specialized functionally. We shall see this principle abundantly illustrated as we survey the evolution of culture in general.

White expresses this deduction in a formula _ E x Tx V→ P – where E is energy, T is technology, V is the environment, and P is the product which can stand for an institution or a whole culture (1960: 49). He then reviews a large gamut of social and cultural institutions showing how his principle actually operates to produce the various forms of social and cultural prenomena.

The most recent application of this method is being carried forward by the followers of White under the leadership of Sahlins and Service. Although they distinguish the general evolution of human culture as a whole from specific adaptations made by particular societies or social forms, they still use the deductive approach. This is provocatively applied by Service in his essay on the "Laws of Evolutionary Potential" (Sahlins and Service 1960: 93-122). He first states his deduction which he says is a simple one, namely that, "The more specialized and adapted a form in a given evolutionary stage, the smaller is its potential for passing to the next stage." Those familiar with biological evolution will recognize the source of this postulate. Service then applies the law to various known cultural sequences such as writing, progress in science, and middle American, as well as old world culture history. After this "validation" he uses the law to analyse the evolution of national states in the modern world. He concludes that both Russia and the West are more specialized than the new countries in older methods of industrial and agricultural production. The new countries will thus, by dint of aid and effort, eventually surpass the older nations through the utilization of more advanced technological innovations developed after industrialization was well established in the older countries.[1]

[1] This assumes that foreign aid and internal efforts in the new countries will equal or surpass capital investment and mordernization in the older industrialized countries — a statement that is open to some debate.

Starting with a definition that emphasizes form, the methodological approach is almost necessarily inductive, and usually historical. Here the researcher begins his work with a description of forms arranged in a temporal sequence, and then attempts to construct theories or generalizations to explain the empirically derived progression. Within this approach, evolutionary theory characteristically develops from comparative analysis of different historical sequences, although generalizations can be posed as explanatory hypotheses for one case, then tested later on others.

An early representative of this approach, Buckle (1860), attempted to show that regularities occur through time in history. Under the influence of J.S. Mill and Comte he claimed that "the actions of men being determined solely by their antecedents, must have a character of uniformity, that is to say, must under precisely the same circumstances, always issue in the same results," (in Gardiner 1959: 114) and it is the task of the historian as scientist to explain such regularities. After considering historical regularities, such as the constant murder rate in France between 1826 and 1844, he concludes that climate, food, soil, and the "general aspect of nature" are the main factors which combine to cause the peculiar course of any local historical tradition.

Buckle's work indicates that what we have called the inductive evolutionary perspective has a respectable age. However not many historians have followed his lead. Although Toynbee is more widely known, F.J. Teggart's work is more clearly in the evolutionary tradition. Starting in the early part of the century Teggart 1916) and continuing through until the late 1930's, he has consistently argued for the examination and explanation of recurrent historical phenomena. This approach is most carefully applied in his book *Rome and China: A study of correlations in historical events* (1939). In this study he isolates all data pertaining to barbarian invasions in the Chinese and Roman empires between 58 B.C. and A.D. 107. These researches lead him to the discovery that "every barbarian uprising in Europe followed the outbreak of war either on the eastern frontiers of the Roman Empire, or in the 'Western regions' of the Chinese," (Teggart 1939: vii). He then attempts to explain this correlation by another one in which he shows that these warlike outbursts were caused

by interruptions of the Chinese trade. From this he concludes that China and its development are a necessary factor in the development of Western civilization.

In anthropology, as Bagby (1958) has pointed out, the culture historians in America have a long tradition of attempting to make inductive generalizations from recurrent diachronic patterns of cultural materials. In English anthropology, this approach is more recent, although certainly the work of Barnes (1954) and that of Smith (1960a) on political history in Africa, and of Worsely (1957) on millenarian movements in the Pacific falls into this same category. Kroeber's study with Richardson (1940) on three centuries of women's dress fashions is a classic example of this particular line of approach. After discovering that the feminine dress styles of Europe alternate between certain definable points on the average of every fifty years, the authors attempt to explain this occurence by advancing an hypothesis which posits an evolutionary tendency or direction for womens' dress in the culture that is broken periodically by unsettling features in the society.

This is not meant to suggest that all culture historians are by definition, inductive researchers. In the early part of the century, Wissler (1907) used the deductively derived age-area theory for obtaining chronology from distributional evidence to reconstruct the rise and elaboration of horse culture on the American plains. Recently Spier (1958) has derived several hypotheses from the literature on habit-channeling and then tested these on tool acculturation among the nineteenth century Chinese of California. His test indicates that habit-channeling, previously assumed to be a constant or least a stable conservative aspect of culture is in fact dependent upon variable and predictable factors in the acculturation situation.

These, then, are the two basic intellectual approaches to the study of evolutionary phenomena. Both are processual, both are, or can be, empirically used. It should be noted that many functional types of study, such as Murdock's (1949) work on social structure in which correlations are used as a basis for evolutionary statements are not historical, i.e. they do not use time as an independent variable and they do not involve irreversible trans-

formations (DeLint and Cohen 1959). If correlation studies meet these requirements, as indeed occurs in Murdock's (1937) work on temporal priority of matrilineal over patrilineal institutions, then they can be included in the corpus of evolutionary research. One further proviso should be made concerning correlational studies since their future looks a good deal brighter than their past. Using the theoretical assumptions of Robinson (1951) and Brainerd (1951) concerning lenticular distribution it is now possible to arrange cultural materials in temporal sequences such that evolutionary hypotheses can be tested. This method has been utilized to great advantage in archeology, and in social anthropology by Driver and Massey (1957) who tested Murdock's hypothesis of evolutionary progression in social organization with positive results. Thus they were able to show that the most probable order of change in kinship is from division of labour to residence pattern, to land tenure to descent, to sister-cousin terms, to mother-aunt terms (Driver and Massey 1957: 434). Another method for testing the validity of causal inferences, i.e. correlations involving the temporal priority of one or more variables over one or more other phenomena, has been suggested by Blalock (1960). However as he himself admits, his method does not preclude other logically coherent causal theories, and temporal sequence is not a resultant conclusion of his method.

We shall return to an evaluation of the two methodological approaches after considering the problem of scale.

If the evolutionary perspective is to serve any useful purpose as a catalyst in the creation of synthetic theory uniting the various branches of anthropology, then at some point in our discussion we must come to grips with the problem of scale. What kind of theory, with what kind of assumptions, and units of analysis can embrace within its logical confines the work of the comparative archeologists who may wish to use time scales of thousands of years, and the work of the social anthropologist immersed in a community in which transformation may be occurring within the space of a few months or years. In order to review the problem, and to analyze the kinds of contributions to evolutionary knowledge that are possible at varying levels of scale, we have classified varying temporal magnitudes into three categories. Large scaled

studies are those dealing with a time dimension of roughly 500 years or over; middle scaled ones refer to periods from 25 years (roughly just over one generation) to 500 years; small scaled studies deal with periods ranging from only a few minutes to 25 years (or within the compass of one generation). Within each of these scales, studies may be primarily deductive or inductive as these approaches are defined and identified above.

Large Scaled Studies

(a) Deductive

As we have pointed out, many of the nineteenth century evolutionists were deductive in their approach. They embraced as much of the temporal dimension as possible hoping to show what were the major phases of social and cultural evolution. These workers thought of themselves as operating within a time span which they referred to as "human history" or "the development of human institutions." There was no attempt except in the case of Sir Henry Maine (1861), to actually date the inception of these various periods, empirically. This hampered their work, since they could obtain no realistic understanding of rates of development. Furthermore, the unilineal quality of their evolutionary deductions combined with the simplicity of their diagnostic features made them an easy prey to later writers who had more data. Thus if a schema had, for example, six periods and only one or two diagnostic features for each succeeding layer, then any demonstration of "higher" traits in a "lower" society or vice versa cast grave doubts on the schema, especially since the early writers usually assumed that societal integration required the same level of development throughout the institutional framework of the society. More sophisticated work has been possible with the larger amounts of archeological data available in the present century. Thus White (1960) and Childe (1954) using simple deductive principles have been able to "explain" large scale evolutionary progressions in human history.

Many of these large scale deductive theories, such as that of Childe (1948; 1954) rest on the validity of the surplus theory of evolution. This is the postulate that given an increase in productive capacity there will be a corresponding increase in

population size, density, and organizational complexity. Harris (1959) has answered critics of the theory (Pearson 1957) by attempting to show that a surplus is measurable in absolute terms while Sahlins (1958) has tried to test the thesis on Polynesian social evolution. Neither of these attempts is totally satisfactory. Sahlins finds it difficult to measure surplus productivity without reference to social stratification and vice versa. In the end, he uses the same social action, namely the chief's redistributive functions as a measure (among others) of both productivity and stratification. Dalton (1960) has criticized the logical and empirical underpinnings of Harris' (1959) approach by suggesting (a) that even if surpluses are measurable they may not necessarily induce social change, (b) the theory is incapable of an empirical test, and (c) it stems deductively from insights into market as opposed to non-market societies.

The strength of large scale deductive method lies in the synthesis of vast amounts of data that writers in this category seem to accomplish. Most obvious in this respect is the work of Childe. On the other hand, there is often the possibility that only those data that confirm rather than disconfirm the deductive principle are being utilized to illustrate the thesis, or that closer examination of each case would lead to a less convincing argument. An example of this is the case of Meggers (1954) and her law of environmental potential. She feels that environment through its effect on agricultural productivity controls the extent to which a culture can develop. By looking more closely at the concepts and using refined categories of analysis on a wider comparative basis, Ferdon (1959: 12) has shown that "there is little, if any, correlation between (agricultural) potential rating and cultural achievement." However it is to Meggers' credit that her "law" was testable.

(b) Inductive

Many large scale syntheses in archeology utilize an essentially inductive approach. Thus Willey and Phillips (1955) derive a few descriptive concepts, and then use these to arrange the data of New World archeology into a schema that is partly historical and partly developmental. Although this presentation is caste in

a deductive mode i.e. concepts first then data, the scheme actually emerged after comparative considerations. The authors admit that one of their stages, the Preformative, emerged because there were "so many instances where agriculture and one or more other elements of the Formative had penetrated without affecting any configurational change from the preceding Archaic..." (Willey and Phillips 1955: 790). Evolutionary generalizations are difficult to come by in their study, although certain trends are pointed out. Thus the work neatly discards any simple schema assuming a tight integration such that any single marker registers an evolutionary type. They also show the "lack of celerity of the 'Agricultural Revolution' in the New World" (Willey and Phillips 1955: 792), and posit the influence of trade in inducing the later aboriginal developments on the coast of Ecuador. As these and other generalizations suggest, the evolutionary results are for the most part descriptive rather than 'causal'. Furthermore because of the wealth of historical data used by these writers, widely applicable generalizations about sequential development are not easily arrived at. The best known work by a cultural anthropologist in this field is that of Julian Steward (1955), who compares various phases of development in independent cultural traditions around the world. After demonstrating that there are recurrent large scaled series of cultural "layers", he offers a few hypotheses about the processes which bring about this regularity of development. He suggests that in semi-arid regions, the interaction of a need for irrigation works and a subsequent need for social and political control of these water projects produces a dynamic situation that moves society into a more complex level of socio-political integration. Previous religiousity fore-ordains that the new complexity will be at least in its initial phases a theocracy, and finally increased population pressure and continued trends in social stratification bring forth a tendency for the developing state to expand into an empire at the expense of its neighbours. Leaving aside the validity of this thesis, it has come under criticism recently (Adams 1960; Woodbury 1961), it is inductive and perhaps more importantly, it is a sequential series of stages and is testable on empirical data. Murdock's (1939) establishment of the various time-depth correlates of matrilineal and patrilineal kinship factors is one of the most sophisticated

and conclusive studies ever done in this area. To establish time-depth Murdock uses social and cultural phenomena whose appearance earlier or later in history is already established. He then correlates analytically derived sub-qualities of patrilineal and matrilineal kinship with these in order to get some idea of their temporal relations. This is a method that could be fruitfully applied across a wide spectrum of socio-cultural phenomena, yet very little follow-up has occurred.

The obvious strength of the inductive large scale approach is its strong empirical basis which forces the careful researchers to remain close to the known facts. The method also orders the data of human development for us so that we are today becoming progressively more aware of the general phases and sub-phases of cultural growth from its earliest beginnings to the present in various parts of the world. The basic weakness in the method is the difficulty it presents for obtaining adequate hypotheses for testing. Basically it is a descriptive synthesis that is aimed at, rather than a theory of development whose constituent postulates explain the development being described.

Middle Scale (25-500 years)

(a) Deductive

In this approach writers apply a deductively derived process to a known historical sequence, usually within one phase or stage of evolutionary development. Thus the Wittfogel (1939) thesis can be applied to Hohokam irrigation works, many of which are believed to be within a 500 year span. However Woodbury (1961) suggests that the canals here were probably built without large scale socio-economic organization. It seems likely that the time span is a crucial factor here. Given similar size of irrigation works, long building periods are probably indicative of less complex organization while shorter building periods reflect highly organized works projects. A classic example of this kind of study is White's (1949) analysis of Iknahton. He reasons that in the evolution of the state there is always power rivalry between any differentiating temporal and ecclesiastic institutions. He then attempts to show how the known facts of

Iknahton's rule are in accord with this deducation. Meggers (1960) has applied the same kind of analysis to Apache material in order to show that separate groups of these people with different subsistence techniques have correlated differences in social organization. In the realm of kinship, Service (1960) has worked out a deductive schema for the evolution of kin terms. More recently Sahlins (1961) by using a derived principle of adaptation, and data on the range of social solidarity in disputes, has attempted to show that Nuer and Tiv expansionism is a product of their feuding patterns as contrasted with those of their neighbours. This results in a large number of Tiv or Nuer opposing a much smaller group from a contiguous tribe.

The strength and weaknesses of this method stem from the same sources, viz. the adequacy of the historical material. Thus Meggers' (1960) hypothesis was strangly criticized by Opler (1961) for having very little factual basis. It may be difficult to test the Service (1960) schema of terminological development in kinship because of the paucity of full kinship terms through any time-depth for any one cultural tradition. (This may be a case where cross-cultural correlations using relative time-depth as in the case of Murdock (1939) could prove useful). On the other hand, if there are good historical data, then this method can be used to test almost any hypotheses or theory of development which may arise from other research or from armchair thinking. The work of Spier (1958) referred to above is a case in point.

(b) Inductive

This is the range of scale usually encompassed in acculturation studies and descriptions of known historical cultural and social changes in time spans up to about 500 years. The work of Kroeber and Richardson (1940) referred to above comes under this rubric as does that of Smith (1960a; 1960b) on Zazzau and Kagoro, as well as that of Worsely (1957) on millenarian movements. Smith's Kagoro study is a dramatic example of this kind of study since he outlines an historically documented transformation from one type of socio-political form to another and then applies an evolutionary generalization to account for the change.

In acculturation studies, beginning with the early statements on this phenomena (Redfield, Linton, and Herskovits 1936; Malinowski et al. 1936) and continuing through to the recent SSRC seminar, general postulates on the nature and result of cultural and social change resulting from contact have been published along with an ever-increasing body of empirical literature. Some of this work has been comparative as in the case of Linton (1940) and recently Spicer (1961). The latter has tried to use very detailed historical analyses and emerge with some improved generalizations concerning culture contact and the transformations it creates. In history, Colbourn's work on feudalism (1956) and its development, although somewhat narrow in the numbers and kinds of cases utilized is an attempt to use this method for purposes of generalization.

This particular strategy is the most accurate factually for documenting case studies of actual evolutionary occurrences at the socio-cultural level. Comparative work using this method should therefore bring forth the most adequate generalizations we have in social science. Unfortunately this rarely seems to be the case, generalizations are usually accurate within the confines of the data but hardly profound. Thus after Smith's (1960b) penetrating analysis of Kagoro social evolution, he brings a generalization from his other work on Zazzau (1960a) to explain the development. He postulates that the evolution of centralized government in Kagoro was in accordance with the processual principle which states that elements of a system under equal pressure to change, change in inverse order to their "significance for the persistence of the system in its current form" (1960b: 149). In other words, if part of a system is very important for the operation of that system it changes more slowly than a part that is less important. Such teleological generalizations are simply too general to provide any insights into other historical sequences, or stimulate an ongoing research enterprise. On the other hand, Spicer (1961) and his seminar group, by going deeply into the details of six American acculturation sequences, found generalizations being refined more and more into specific cases. Thus they distinguish between mission and reservation communities, but then indicate that Pueblo and Yaqui acculturation differed because

of Jesuit-Yaqui contact as opposed to Fransciscan-Pueblo ones. However Spicer does at least try to go beyond this impasses by abstracting out three factors, systematic linkage, i.e. the nature of the contacts, role and sanction patterns in the contact situation, and the structural stability of the systems in contact (Spicer 1961: 524-528). These are still far from being an operational set of theoretically interrelated variables, but they seem to be a step in that direction. This brings out the basic difficulty with this particular approach. If inductive work is to bring any results there must be some clearly defined set of widely comparable variables whose interrelationship is posited theoretically such that both comparative analysis, and the detailed description of particular case studies can provide an ongoing refinement and development of the theory. This point is crucial, and we will return to it later.

Small Scale (0-25 years)

(a) Deductive

At this level of evolutionary study the focus is on transformations which occur within the space of one generation. Very few well worked out deductive studies have been carried out at this level of scale in anthropology. In sociology the most controlled area of research, that of small groups, allows for deductive work. Indeed this is almost implicit in the nature of such work, since the experiments must be designed first, and thus systematic theory characteristically precedes observation. Although much of this research is pregnant with evolutionary significance the work of Bales (1949) stands out in this respect. He deduces a general principle of group social process in which social systems are viewed as moving back and forth between theoretical poles; "optimum adaptation to the outer situation at the cost of internal malintegration, or optimum internal integration at the cost of maladaptation to the outer situation (Bales 1955: 128). From this general idea he deduces a number of specific hypotheses about the behaviour of groups and members in groups, as well as a methodology for observation and measurement of relevant variables. The important point for present purposes is that Bales' theoretical and empirical work operates through a

time period in which role differentiation, leadership, and even a kind of "scapegoating" (Bales 1955: 452) actually emerge in the groups. He thus theorizes about and investigates the microscopic conditions of group behaviour which combine to produce ongoing social systems.

Cohen (1962) has tried to illustrate a deductive model of organizational behaviour derived from Frank (1959) which predicts behaviour in a social milieu involving conflict. Here individuals respond to pressures rather than to rules, and there is variation in behaviour resulting from the conflict among enforceable standards of performance. Because individual members respond to superiors in the hierarchy, superiors can act as selective agents, and introduce innovations which are accepted. Thus the hierarchy is seen as a constantly changing entity in which selection acts on variation brought about by inconsistency.

For anthropology, the difficulty with such an approach is the paucity of contemporary theory, and the norms of the discipline itself which create conditions for the continuation of such scarcity. The standardized procedures for doing small scaled research involve an immersion by the worker in a semi-exotic area in which at least part of the task is an understanding of the unfamiliar elements of the native culture. Thus the application or creation of deductive theory is held back because of a lack of control over the nature of the empirical material. Methods by which this difficulty can be overcome will be discussed later, as well as the positive aspects of this particular approach. Suffice it to say here that if larger scaled morphological changes can be shown to articulate with posited and consequently established smaller scaled ones, then deductive theory at the small scale level stands in a causal genetic relationship to the rest of evolutionary study.

(b) Inductive

At this level of study, small scaled changes are documented and attempts at generalization are made in order to explain significant regularities occurring in the time period. Almost all of the work in social anthropology dealing with observable changes within one generation come under this rubric. Syntheses of such

work are under way although this is still an underdeveloped area of the discipline. A good example of the research itself and its synthesis can be seen in the recent set of studies of *Social Change in Modern Africa* edited by Southall (1961). In this combined effort a number of scholars report on particular instances of change, and a few namely Southall, Gluckman, and Mitchell attempt to bring together work already done in order to make some generalizations. In his case study of Freetown, Banton shows that urbanization involves a shift from social relations based on kinship to ones based more often on contractual relations. In a more general fashion, Mitchell by reviewing the literature shows that urbanization will increase the divorce rate for traditionally patrilineal groups in Northern Rhodesia. Finally Southall by reviewing a large area of research in both East and West Africa is able to make a whole series of generalizations about change which should serve as a base-line for study in the coming years.

Similar work is going on in other parts of the world, although on an impressionistic basis it seems apparent that Africa is at present getting a relatively higher proportion of attention than almost any other area.

Sociologists have also devoted a good deal of research time to the description and inductive analysis of small scaled social change. An interesting example of such work is the study of changing recruitment practices in the organization of large law firms (Smigel 1960). The writer describes the law firms before the stimulus to change occurred, and gives the criteria for recruitment. He then shows how a shortage developed in the numbers of recruits, and then in a detailed fashion shows how the organizations had to change culturally and socially in order to adapt to the new situation of shortage. Changes once introduced, and adjusted to, provided a basis for role differentiation in the law firms and for changes in the recruitment criteria which bring about cultural changes in the firms in the long run.

The strength of such an approach is its comprehensiveness. Workers dealing with specific cases are usually concerned to obtain adequate understanding and explanation for the changes in their own particular case study. Synthesis thus has a wide body of data from which to extract generalizations. The primary

weakness of the method is its usual confinement within areal and sub-areal geographic regions, and thus theory construction is often tied to limited sets of data. This leads to duplication and less generality than the body of social science literature as it now stands would lead us to expect. The strategy implications of such limitations will be discussed below.

The foregoing has been an attempt to summarize in analytic terms the major strategic approaches to evolutionary problems. It is in no sense a systematic review of concepts and research results. Indeed such a task would take several volumes, since evolutionary study is not a separate, bounded, area of scholarship, but rather a perspective or viewpoint. Thus any study focusing on some kind of change in the form in man's social life comes under the generic classification of evolution. The studies cited in this paper are used simply to illustrate a particular strategy, and each reader can probably think of many more that would fit into any of the six categories which have been delineated. These categories have proved useful to the writer in trying to order the various kinds of evolutionary studies. Recapitulating for a moment, we have suggested that there are basically two types of definitions of the evolutionary process extant at present, one of which implies a deductive, and the other an inductive attack on the data. These two types of research strategies are applied at varying degrees of time scale which we have divided into three magnitudes.

Discussion

Given the heuristic value of this schema, it is necessary to show what, if any, are the relationships between the various categories. Let us start with time scales. In order to do this it is necessary first to overgeneralize somewhat and assume that the classification of units of study given in the following table is a universally applicable strategic approach for each level of scale. Actually, each of these units can on occasion be utilized for other time scales. Oversimplifying in this way will however enable us to see some of the major relationships between varying temporal magnitudes.

Units of Study in Varying Time Scales

Scales of Study	Units of Analysis	Example of Units
Large (over 500 years)	Societies as wholes	hunting and gathering society, feudal states, etc.
Medium (25-500 years)	Institutions, long term environmental trends	political organization, the market, warfare, desiccation, etc.
Small (0-25 years)	Interacting groups, short term environmental trends	communities, families, floods, famines, epidemics, etc.

In all large scale studies with which the writer is familiar, any theory of evolution always utilizes dynamic interrelations between units from the other time scales. Thus Steward (1955: 202) in discussing the growth from an Incipient Agricultural stage to a Formative one shows that "a national religion and a priestly class developed because increasing populations, larger irrigation works, and greater need for social coordination called upon religion to supply the integrating factor." Beardsley et al. (1956) discuss the dynamics producing their "simple nuclear centered" type (roughly equivalent to Steward's Formative) in terms of the development of conservational agricultural techniques, a ceremonial and market center which links a number of communities, and a dependable surplus in production. Thus large scale studies can develop no explanatory theory of evolution *sui generis*. Society considered as a unit cannot cause itself to evolve, rather the relationship of its various parts one with another and with external forces bring about whatever developmental regularities we are able to isolate. Large scale evolutionary theory is therefore essentially reductionist. Researchers wishing to understand large scale developmental regularities must familiarize themselves with the nature of causal forces and the interrelationship of units of analysis at the smaller scaled levels.

Middle scaled studies generally arrange institutions into series of chains through time. Sometimes whole societies are treated, but even if this is the case the sequence will be viewed through a series of documented changes in the constituent institu-

tions. Dark (1957) has summarized the kinds of work done here and it would be repetitious to go over it again. Important to the present discussion is the nature of explanation at this level. Factors put forward as determinants of change in institutions range across the entire gamut of variables encompassed by both the middle and small scaled approach. Historians often detail the impact of one institution e.g. "the church" on another e.g. "the monarchy." Social commentators discuss the relationship of the "military establishment" to the "state department" and the result of this relationship for the formation of foreign policy. In anthropology Wedel (1953: 511) has outlined how environmental factors affect the development of socio-cultural types in one area. He claims that the "spread westward of early Woodland hunters and of later maize-growing peoples may have been encouraged by a sustained westward shift of agriculturally favorable climatic conditions, that is, of rainfall zones, only to be discouraged by recurring drought periods." Imbedded in the welter of historical writing on the effects of "great men" on institutional change are many small scale sources for middle scaled transformations. Examined more closely, middle scaled causal forces at this level break down into two major categories. First there are the ideal goals and functions of the institution which tend to influence the behaviour of members of these institutions such that they will act to further these goals even if this means doing so at the expense of the other institutions in the society. Secondly, environmental trends in the situation such as geographical factors, or relations with other societies tend to promote or hinder the advancement of particular institutions or tendencies within these institutions over time within any one society. Small scaled causal factors if continued through time can also bring about transformations at the middle scaled level. Thus, for example, role conflicts within institutions which produce tensions and informal adjustments in short time spans, tend to stabilize or traditionalize the informal system over longer periods (Cohen 1962).

At the small scale level itself the range of possible causal factors is very large. Factors such as demography, social structure, values, scarcity, surplus, conflict, power seeking, status rivalry, personality patterns, and many others have been used

to explain small scaled transformations. What is obvious in both sociology and anthropology is that no satisfactory theory of social change exists at present which could be utilized for evolutionary purposes. Such a theory requires that small scaled changes not only be explained, but that the manner of their articulation with larger scaled changes be predicted as well.

The entire problem can be analogically compared to a set of interconnected gears of varying sizes, each of which, except perhaps the largest, has its own motive power[2]. Revolutions of the smaller gears are more rapid than those of the larger ones, but cause movement throughout the entire system. Our problem is to understand what gives the system its motive power and how this energy is transformed into movement (or evolutionary change) throughout the variously scaled parts of the system.

With these properties of the various scales in mind, let us now turn to the problem of approach or research strategy and see which of our six categories of analysis will yield the best results.

First of all, should the approach be deductive or inductive? Anthropology with its emphasis on field work has always leaned heavily on inductive work. On the other hand, theory development requires more and more refined generalizations which are tested empirically but controlled intellectually *before* empirical research begins so that the investigation is carefully directed towards proving or disproving theoretically derived generalizations. Greater concentration on inductive work will simply turn up more and more undigestible facts for a discipline that is already bursting with literature. This means that a few anthropologists and their students must breakaway from the field-work-equals research axiom of our discipline in order to found a specialist corps of synthesizers who will bring together comparative materials and publish their findings at the various levels of scale. Indeed, this seems to be happening already at the University of Michigan. Such activity is bound to lead to an acceptable taxonomy at the large scale level that can serve as a framework for smaller scaled studies. It should also lead to the

[2] I wrote this paragraph before reading Gray's (1961) article on epicycles, but the similarity is striking. (Cf. Gray 1961: 1015).

development of theories and models of evolutionary process at the middle and the small scale levels such that empirical work will have some guide-lines within which to plan particular case studies.

As we have already said, deductive work requires greater control over the materials being studied. Since this is by definition difficult for anthropologists who often as not must familiarize themselves with the outlines of an exotic culture, methods must be sought for obtaining greater control over what is included and excluded from any particular study. Two approaches already in use seem pertinent in this respect. First there are the Human Relations Area Files, now available in a microfilm series. Use of this research instrument may not give as much depth as a case study, but it does allow the investigator a relatively high degree of control over his comparative materials. Like all mechanical tools the files can be utilized best to test a wide range of relationships conceptually worked out prior to investigation, rather than being used as a source of new relations. As we have seen time scales can be constructed from ethnographic data and answers to a number of questions can be obtained. Secondly, and in a more continuous line of development with previous research techniques, longitudinal studies of limited geographic areas will give anthropologists a chance to (a) observe small scaled transformations as these occur, and (b) give more adequate grounds for testing deductively derived hypotheses, since the exotic quality of the area can be controlled for, by long term association with it.

One more observation about deductive and inductive work should be made at this point. Although progressively more deductive research is of greater value theoretically in the long run, it is obvious that the two are intertwined in any ongoing research enterprise. Theoretical thinking must always be re-adjusted by empirical study and the latter should always be planned with some theoretical motive, if any intellectual progress is to be achieved in evolutionary work.

An even more important question is that of scale. At what level of scale should our primarily deductive attack focus in order to bring the best results. Any theory that eventually develops will have to explain changes that take place at all levels of

scale so that the entire evolutionary process can be seen as a whole. It must be remembered that these scale levels have no objective reality as entities, they are simply taxonomic conveniences. If social evolution is part of the grander evolution of all organic reality then it seems logical to begin our thinking about deductive theory in a way that does not depart, at first from the general theory of evolution used in biology. Later facts may emerge that will force the theory towards a more unique position. But the cosmic view should be dropped. No one in biology working on evolution is directly concerned with the second law of thermodynamics or its possible reversal. Such a cosmic view produces only vague, broad outlines whose time depth is so large that their relationship to human events becomes obscure. For example, the fact that the sun's energy will eventually give out, does not in any conceivable way effect the development of cities, or the growth of specialization and role differentiation in society. No stretch of the imagination can at present logically bridge this gap and place human history into the immense framework of cosmic entropy.

The conceptual bases of evolutionary theory are quite simple. The process can be cut at any point and examined, or viewed over a stipulated time period long or short. Causal connections within the process are interactive and multiple so that in reality there is no beginning or end merely a constant interplay of factors, all having some determinative power in producing the observed effect at any one time. However, as we have said above, for heuristic purposes it is necessary to speak of the evolution of a phenomenon, not all of reality. It is useful to approach the problem from a reductionist point of view and regard the process from the position of an evolving phenomenon. Then factors within the phenomenon are said to interact with one another and with the external world to produce changes in the phenomenon as a whole. In biology the phenomenon is referred to as a population with specific species characteristics; in human affairs the population would be some kind of society having specific structural characteristics. It is not the patterned features of the population that interest the evolutionist, these are simply its identification labels. Evolutionary process is fundamentally a relationship between a group of determinant external forces operating on the

indeterminant or random variations to be found within the population (society). In terms of both biological and social evolution these external forces can operate at *any* scale level. Long term soil depletion can be producing changes in the evolving unit at the same time as a sudden change in technology or a new culture contact. In biology all the forces of change, or selective factors, no matter what their scale, operate on the same phenomenon, the population, at a micro or small scale level. This I believe is a fruitful idea for social evolution as well. What we need is a set of phenomena analagous to the genes. The gene pool is that set of features in a population which determines its characteristics and their variance. Unfortunately we do not have such a neat bundle of variables in social evolution. Nevertheless we do have variance and indeterminacy, but with the intense effort to uncover regularity in social science we often forget that these randomizing factors might have theoretical significance. For example, at the small scale level, the presence in any society of a range of personality types insures a pool upon which new and changing pressures can operate in order to select out the dominant, or most adaptive varieties. Again, the factors of birth, death, recruitment and replacement of roles in society maintain a constant variation in the traditionally patterned character of interpersonal relations in any social structure. No two people act out a role in the same way, and no one is immortal, or even constant during his own life span in his role behaviour. Upon these, and perhaps other natural variations, selective factors such as demography, technology, geography, social structure and ideological forces, all operate to select out the dominant types of adaptive solutions for any particular society in any particular time and place. In other words the problem of scale may be solved when we consider all levels of scale as possible and simultaneous sources for selective factors that operate through small scale processes in society to promote the multiplicity of adaptations that human history has witnessed. Although this is only the barest hint of a "genetic" theory of social evolution, I would conclude that it is within this kind of approach that future work will find its most fruitful growth.

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