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MYRDAL'S AND SMELSER'S THEORIES OF
SOCIAL CHANGE: AN EXPLICATION AND APPLICATION ¹

Ray Mosely
Eastern Illinois University

Mid-American Review of Sociology, 1978, Vol. 3, No. 1:39-61

This essay defines the concepts of modernization, development and progress, and identifies other concepts used in explaining social change at various levels of abstraction. Three theoretical perspectives are described, two of which, Smelser's value-added determinants of collective behavior and Myrdal's accumulative causation concept, are combined for use in analysis of case studies. These cases center around developing countries and regions, covering a variety of failure and success combinations with respect to directed change. The conclusions suggest that: 1) change will always occur; 2) accumulative or circular causation is a useful explanatory concept; and 3) systems have a structure such that elements of functional theories can be used to analyze and direct changes, and where such changes have failed in the past, it is usually due to a lack of this type of analysis.

The subject of social change has been intriguing to many social scientists. Gunnar Myrdal looked at social change from an economist's viewpoint as early as 1944 in his book *An American Dilemma*, a study of black Americans. Theorists have long sought to explain social change, social movements, collective behavior and other patterns of social interaction. According to Cameron:

Men apparently become most concerned with problems of social control and social change precisely at those times when . . . the patterns of behavior are changing. Plato lived in the midst of political chaos. Hobbes, Locke, and Rousseau all witnessed political upheaval. Since the culture of any modern society seems likely to change, we might profitably study some of the processes by which changes occur . . . (Cameron, 1966:3).

Many theorists have taken the view that social change is normal. However, directed change is sometimes bound to fail because of certain characteristics of the social structure, and because cause and effect are often so mutually interrelated and interactive that they become indistinguishable. The main purpose of this paper will be to explore some of the factors which influence patterns of change and stability. Specifically, I will: 1) examine several definitions of some social change concepts; 2) outline some major theoretical considerations used by Gunnar Myrdal and Neil Smelser in studying social change and stability; and 3) apply these theoretical considerations to several case studies.

THE CONCEPT OF SOCIAL CHANGE

Social change occurs when the relationships within a society are modified to the extent that the structure of the social system is viewed as different from its prior state. Depending on one's viewpoint and varying vested interests, this modification may be seen as regressive or negative in nature, but it also may be seen as progressive or developmental. This section will introduce some definitions of key concepts used in examining social change with short examples of how such concepts are used.

Before proceeding to a more detailed discussion, it might be useful to first point out the general connections among the concepts which will be discussed. "Modernization" subsumes other concepts in its generality. One part of the modernization concept is development, or the increase of complexity of institutional relationships, especially manifest in the economy. Technological change differs in that it refers to mechanical innovations, more often than it refers to societal innovations. In this sense, it applies to a cultural aspect of social change.

The term "development", in a broad sense, refers to a historical process of change from primitive and traditional societies into contemporary, complex societies (Fickett, 1966:1). Traditional societies may be described as those in which:

Behavior is governed by customs, not law. The social structure is heirarchal. The individual's position in society is normally inherited rather than achieved. And . . . economic production is low. A traditional society, in short, tends to be custom-bound, heirarchal, ascriptive, and unproductive (Hagen, 1962:55-56).

Development, as elsewhere used in reference to technological change, is defined primarily in economic terms such as "the establishment of increased wealth . . . for the broad masses of society", the creation of adequate means to attain this goal, and "the restructuring of society so that there is persistent economic growth" (Havens and Flinn, 1975:469).

In general, the concept of modernization is associated with increasing structural differentiation and specialization of labor, broadening of societal adaptability, and industrialization. A typical technological definition may involve ratios of inanimate power and animate power resources: "a society will be considered more or less modernized to the extent that its members use inanimate sources of power and/or use tools to multiply the effects of their efforts" (Levy, 1966:11).

A social definition of modernization includes ideas such as: "The processes associated with structural or institutional modernization which are most often cited are mass education, urbanization, industrialization, and extension of the mass media" (Miller and Inkeles, 1974:171). A psychological state of "modernity", characterized by such traits as "subjective efficacy, openness to new experience and change, valuation of planning and punctuality, acceptance of the findings of modern science and medicine, granting women rights and equal treatment, autonomy in the face of traditional kinship obligations, and acceptance of family size limitations", is also thought to accompany modernization (Miller and Inkeles, 1974).

Irwin's (1975:597) attempt to operationalize an economic definition of modernization has led to a formal, mathematical model based on two traditional indices, that of GNP (Gross National Product) and Gross Energy Consumption, inserted into a modified Euclidean distance formula. This is not a viable definition, as it lacks the use of the referents found in other

definitions. It does, however, reaffirm a traditional view of the importance of GNP and energy consumption as indices.

Bull's conception of modernization subsumes most of the points made in the definitions discussed above. His use of the term embraces economic progress in relation to certain goals, such as accumulation of capital, industrialization, and per capita income. Social goals in terms of progress in education, health, housing, and land tenure are also incorporated. Finally, political development is defined as "the rationalization of authority (i.e., the replacement of traditional authorities by a single, secular, national authority); the differentiation of specialized political functions and structures; and the increase in the number of people playing political roles" (Bull, 1972:100-101).

The major social institutions—the economy; the polity and government; family and kinship patterns; religion, exemplified here by certain cultural habits; and often the educational system; and their interrelationships—are prime candidates for being affected by technological change because their pervasiveness in the social structure causes them to be a controlling factor in the conduciveness of that structure. Botting's scheme for categorizing developing nations, in terms of these major institutions in social, political, and economic configurations is a more elaborate version of Bull's (1972) concept of the modernization process.

In Botting's scheme, traditional, or those close to traditional, stages of societal development are characterized by initial politization of the masses, low levels of literacy, and the bulk of the economy being comprised of near-subsistence farmers whose economic focus is on the village. An example cited is the bulk of sub-Saharan Africa with the possible exception of the Union of South Africa. The next category in the scheme contains those societies with a minimal infra-structure which is insufficient for sustained growth. Some nations noted to be in this niche are Egypt, Iran, Iraq, and Burma. The last category in the scheme includes nations at the "take-off" stage where there is a multiplicity of programs: building school systems, creating capital markets, improving transportation, and supplying an effective agricultural extension service. The political pattern of these countries is basically stable with possible intermittent organization

of violence. This pattern is noted to have been a normal one in the initial stages of industrialization of such countries as Great Britain during the period of the Revolutionary War and the United States during its Civil War. Nations cited in this category are Chile, Mexico, and Colombia (Botting, 1975).

The case studies referred to in this paper are characterized by the more comprehensive definitions of modernization, where "modernization", "development", and "progress" are all viewed in more or less the same light. Under-developed and undeveloped countries are those seen in the more usual manner of striving toward a Western world model as the ideal, as opposed to some recent attempts to view all nations as developing (cf. Guerreiro-Ramos, 1970).

In their analysis of planned change, Lance and McKenna give a list of four change goals which fairly well summarizes the types of technological change. First, mechanical innovations, which include utilizations of new material objects such as wagons, wells and other devices. Second, agricultural changes, which incorporate new methods of farming and organization. An example of agricultural change found in the "Green Revolution" is the development of hybrid plants, particularly grains, coffee beans and other plants. Third, various medical introductions, which include such ideas as personal hygiene. Fourth, different types of educational efforts, such as vocational education through technical clinics, welding and mechanical repair clinics, and attempts to increase literacy (Lance and McKenna, 1975:89).

THEORETICAL EXPLANATIONS OF SOCIAL CHANGE AND STABILITY

There are many theoretical explanations of social change, as well as a plethora of concepts of the type just sampled. Gluckman (1968:219-237), for example, attempted to use a structural-functional approach in studying social change. This section will be concerned, first, with describing and rejecting the structural-functional approach, and second, with showing how a synthesis of Myrdal's systems theory approach and Smelser's functional approach may be used in explaining social change.

Myrdal has presented a parsimonious method of analysis which has been elaborated by later social scientists (cf. Buckley, 1967). Smelser offers a heirarchal set of structural determinants, but fails to examine system processes. One main concern will be to point out how Smelser's explanations of collective behavior may be applied to social processes with the addition of Myrdal's model of circular causation.

Gluckman defines two new perspectives on equilibrium. "A state of actual equilibrium—a state that we can describe as *stasis*" is defined as a fictitious condition of a system which tends to recover a stable balance after a disturbance (Gluckman, 1968:221). His equilibrium model per se is defined not in terms of states or conditions, but rather as an analytical method (Gluckman, 1968:219). To place a system into a temporal framework, he claims that the analytic unit, an institution, contains a "built-in time-scale" or a "structural duration", that period of time which an institution needs to employ all its rules and customs within its given environment (Gluckman, 1968:221). To utilize this concept, it becomes necessary to remove the institution from external factors, such as encroaching social, biological or ecological conditions. He postulates an "as if" equilibrium in order to emphasize that it is abstracted from reality" (Gluckman, 1968:221). This construct allows one to set apart an institution of a moment or instant with its temporal extrapolations, both future and past, for purposes of analysis.

While Gluckman presents an eloquent argument, it is evident that the analysis of which he speaks is a thinly veiled structural-functional analysis. Gunnar Myrdal rebuts this type of analysis in several works (1944, 1957). Myrdal presents some contemporary considerations of models of society and the change explicitly and implicitly associated with these models, borrowing heavily from physics in his explanations and examples (Moore, 1967:2-7; Myrdal, 1944:1015-1070; Myrdal, 1957:13-16). According to Myrdal, the "stable equilibrium" model is usually implicit in sociological explanations of social change. Stable equilibrium occurs in a system which has a "tendency toward automatic self-stabilization" (Myrdal, 1957:13). This model is based on an assumption that a change in the social system will

elicit a system response of change in an opposing direction. The hypothetical concepts of "maladjustment" and "adjustment" are said to draw upon this model.

Myrdal suggests that in a normal situation a change in a social system brings on supporting changes in the same direction, rather than in the opposing direction as suggested by other theories. If a system happens to be in a balanced state, he uses the concept of balanced equilibrium. Myrdal's example of this is:

In its simplest form the explanatory model can be reduced to two factors: 'white prejudice', causing discrimination against the Negroes in various respects, and the 'low plane of living' of the Negro population. These two factors are mutually inter-related: the Negroes' low plane of living is kept down by discrimination from the whites while, on the other side, the Negroes' poverty, ignorance. . . stimulate and feed the antipathy of the whites for the Negroes. White prejudice and low Negro standards thus mutually 'cause' each other. If at a point of time things tend to remain about as they are, this means that the two forces balance each other. . . . Such a static 'accommodation' is, however, entirely fortuitous and by no means a stable equilibrium position. If either of the two factors should change, this is bound to bring a change in the other factor, too, and start a cumulative process of mutual interaction in which the change in one factor would continuously be supported by the reaction of the other factor and so on in a circular way (Myrdal, 1957:16).

In this example, the balanced state of the system can easily be upset with subsequent accelerated movement away from the rest position. In this context, Myrdal also introduces "the theory of the vicious circle" or the idea of "circular causation", similar to the systems theory concept of positive feedback in which there are two or more variables having an accumulative effect as each one tends to reinforce the other(s). Myrdal favors the model of circular causation over the equilibrium models because they are not appropriate for the task of explanation of more than one instant of an on-going system or institution.

Neil Smelser, in his theories of collective behavior (Moore,

1967:7-14; Smelser, 1962), tries to account for the directions that change takes. His value-added theory of collective behavior is well known, as is the economic analogue on which it is based. The value-added concept is that each stage in a process will increment the worth or intensity of the product of that process. For example, in industry a lump of iron ore is worth relatively little, but as it is refined, shaped, assembled or otherwise processed, it gradually increases in value. In Smelser's words:

Every stage in the value-added process is a necessary condition for... addition of value in the next stage. The sufficient (minimum) condition for final production is the combination of every necessary condition, according to a definite pattern (Smelser, 1962:14).

Using Smelser's scheme, social processes can be seen to increase in intensity or specificity as they become more directed.

Smelser uses a sequence of what he refers to as value-added determinants in his explanations of collective behavior, behavior which may be considered isomorphic with social processes.² The first determinant is "structural conduciveness" which could be something on the order of an economic recession. Conduciveness is, at most, permissive of a given type of collective behavior. "Within the scope of a conducive structure, many possible kinds of behavior other than (a given type) remain" (Smelser, 1962:15). The range of possibilities is narrowed further with the addition of several more determinants identified by Smelser. This possible structural conduciveness, using an economic recession as an example, might combine with a "structural strain" (e.g., "ambiguities, deprivation, conflicts, and discrepancies" [Smelser, 1962:16]) such as a Protestant and Catholic dispute. This setting might encourage the growth of "generalized beliefs" such as "hysterical, wish fulfillment, hostile, norm-oriented, and value-oriented (beliefs)" (Smelser, 1962:16). Holding to the example, these could be hostile sentiments. Given "precipitating factors" such as an instance of sniper fire, there might be a subsequent "mobilization for action." According to Smelser, "[t]his point marks the onset of panic, the outbreak of hostility,

the beginning of agitation for reform or revolution" (Smelser, 1962:17). Possibly there will be an attempt to exert control over the action by agents of social control.

APPLICATION OF MYRDAL'S AND SMELSER'S THEORETICAL EXPLANATIONS OF SOCIAL CHANGE

These notes on the analysis of systems are presented to show that, from the perspective of some theorists, change is normal. Some special considerations and assumptions may allow us to treat a system as static, but despite possible desires for real stasis or utopian stability, change is inevitable. A synthesis of Myrdal's systems approach with Smelser's functional analysis of processes may prove quite useful in predicting and explaining various changes found in case studies of developing nations.

This section will address an analysis by Lance and McKenna (1975) of innovation successes and failures as described in the journals, a case study of a general continental region, and three more specific case studies. This analysis and these case studies will be subject to a brief secondary analysis using a scheme combining Myrdal's and Smelser's concepts. The first case study will be preceded by considerations of the general interrelationships of technology and population in order to place the case study in a clearer perspective. The last case study will include a look at a specific region of Colombia, a secondary statistical analysis, and an examination of some details of the problem of Colombia's volatile political situation. This latter examination will be made in light of some of Smelser's higher level determinants. The case studies will be shown to support Lance and McKenna's data, which suggest a general failure in most attempts at directed change. These studies will cover a spectrum from complete and partial failure to temporary and qualified success.

The first case study involves an analysis of population dynamics. Before looking at the actual case study, it will be useful to review briefly some aspects of population change. An accumulative effect associated with the interaction of technology with social institutions through the years up to the present time is an increase in population factors such as numbers, density and

land area utilized. As humans gradually learned to use tools and to make improved tools, their efficiency in hunting and food gathering increased. This produced a gain in population as well as the ability to support larger populations on the equivalent land area. Population and density increases initiated specialization of labor. This specialization accelerated technological gains, just as it continues to accelerate such gains today. These gains, as we will see, caused further increases in population and population density. One aspect of this interaction was augmentation of primary medical technology. A growth in medical knowledge gave rise to generally extended life spans, which in turn intensified population increases. The effects of these interactions are displayed in Table 1.

The considerations here are of the kind which have prompted debate in the area of "life-boat ethics." Countries with rapid population growth, such as the Asian nations involved in the Karachi Plan, need external help to prevent mass starvation. If more able nations support such a system, the question then is whether they will eventually be subsumed by the country being aided. There are some indications that an increase in technology, both technological quality and the spread of knowledge through modernization, will eventually have the effect of limiting or leveling population increase. For example, Miller and Inkeles found a statistically significant correlation between modernization and modernity of thought in the individual, and a further correlation between modernity and attitudes toward birth control and family limitations (Miller and Inkeles, 1974:167-187). There are cases, however, where this leveling effect has not occurred.

The interaction between population change and educational development has been researched by J.E. Jayasuriya of Bangkok. He found that the unfavorable results of the Karachi Plan, whose initial goal was to "provide a system of universal, compulsory and free primary education of seven years or more within a period of not more than twenty years (1960-1980)" for "every country of the Asian region," could be attributed to exceedingly rapid population growth. In the less developed countries of the Asian region in 1970, 40-45 per cent of the population was under 15 years of age, whereas this same age group comprised only 30 per

cent of the population of the more developed countries. This leads to dependency ratios of close to 90/100, as compared to 50/100 (Jayasuriya, 1974:255-264).

Another consideration in the analysis of educational change is the need for integration of education with economic needs. In UNESCO studies, it was found that within certain systems the duration of education need not be more than five years for the majority of the population in order for the needs of the economic system to be satisfied. In contrast with modern examples cited, a precedent of the 10 per cent literacy rate in the industrializing Great Britain of 1800 was given. The need for education was not a great pressure within this system. This lack of integration between the education and economic systems may help explain the failure of educational reforms in developing nations (UNESCO lecture, 1974).

Many aspects of innovation in the Asian region are also reviewed by Myrdal in his book, *Asian Drama* (1968). He suggests that medical technology is primarily responsible for the increase in population. In this region, then, there are two "vicious circles" creating opposing pressures: one toward population increase preventing further modernization, and one toward technological development.

With the introduction of primary medical technology, the structure became conducive to diffusion of technology and education and to an increase in population. Technology thus promotes population, which in turn allows the propagation of at least the primary medical technology to more people. In the other causative circle, technology promotes the expansion of the educational system, which in turn allows for an increase in the quality of technology. Without the constraint of other determinants, the system has taken a Malthusian turn for the worse.

An attempt at innovation and modernization occurred in the period of 1890 to 1920 in British Central Africa, what is now Rhodesia, Zambia, and Malawi. British colonists felt that the offer of money as wages would attract agricultural workers. The Bantu people, however, were unfamiliar with the idea of a multi-purpose money, that is, money which could be used as a means of

payment, a medium of exchange, a unit value presented and deferred, and payment of wages. They were not attracted to the idea of working for money until a head-tax payable in money was imposed.

This situation led to deteriorating interaction with a cumulative effect of the Bantu being oppressed and the colonists feeling that the Bantu were worthless. Eventually, criminal penalties were used to recruit labor. The system became so changed that it became necessary for men to leave their homes and work in company mines. This drain of men into mining camps upset the kinship structure, and later, because of the lack of recruits within the tribes, it upset the local political structure (Neale, 1972:77-88).

In this case, an attempt toward beneficial change in the economic situation of a traditional society had drastic effects because of the clash between an encroaching modernized system and a non-modernized people. The social structure of the Bantu was not conducive to change. The ensuing strain between the two cultures initiated a causative circle of deteriorating relationships which led to further system breakdown. In such a case where the structure is not conducive, directed change will fail without conflict if the prerequisite "institutions, habits, incentives, and motivation" are missing (Fickett, 1966:4).

In 1946 a country extension agent in the Rio Grande Valley of New Mexico introduced hybrid corn in an attempt to alleviate the problems of the local Spanish-American farmers who had low crop yields of poor quality. The plan for introduction of the hybrid was well conceived in that it included community leaders as the principal agents of diffusion. In fact, within two years better than 70 per cent of the 84 farmers in the area were using and growing the hybrid corn. However, the plan for technological change failed to take account of existing non-agricultural practices. The values of the farmers' families had them back to growing "Indian" corn inside of another two years. Only 3.5 per cent were left using the hybrid, as it apparently had a bad texture, flavor, and color for human use, and additionally would not hold together in the making of tortillas, a staple food in that area (Spicer, 1952:35-40).

In this case, circular causation can be seen in the adoption process, a bandwagon effect that lasted two years. The social structure was quite conducive to change, but the particular change that occurred caused a strain—the deprivation of a staple food—which in turn caused a reversion to the original pattern of growing corn. If another type of hybrid had been introduced, or if a market had been present for the sale of the corn, the innovation might well have taken hold.

The interaction between social institutions and technological development can be seen in the effects of the "Green Revolution" on the relationship of coffee growers in Colombia to their land tenure status, one case where an innovation met with relative success. Those farmers who did not adopt a newly introduced hybrid coffee bean sold or lost their land, and consequently assumed the lower status of renter or day laborer, or in a number of cases migrated out of the area (Havens and Flinn, 1974:475-476).

Some of the information from Haven and Flinn's study was condensed for use in a computer analysis for this paper (see Table 2).³ The status of owners in 1963, in terms of adoption or non-adoption of the hybrid, was related to their ownership status in 1971 and analyzed to determine the extent of correlation. A Cramer's V correlation substantiated a moderate relationship between non-adoption and change in tenure status from owner to non-owner. An additional analysis of adopter status in relationship to income corrected for inflation (see Table 3) also showed a statistical relationship at better than a .01 level of significance. This indicates that the differences found, a virtual doubling of income with adoption of the hybrid coffee, are extremely unlikely to have occurred by chance alone (Havens and Flinn, 1975:476).

In this example, the social structure of this coffee-growing region of Colombia was significantly conducive to the change inherent in the introduction of the hybrid coffee. Those growers adopting the hybrid were subsequently involved in the cumulative effects of an increase in income and the maintenance of land ownership status.

To think of the maintenance of land ownership status as an accumulative effect or positive direction of development in the

modernization process is questionable if taken out of context. One economist suggests that development is primarily composed of political and social processes that are apt to be revolutionary in nature. He notes that the land reform programs of Latin America, particularly Bolivia, Cuba, and Mexico, are all subsequent to "bloody and prolonged revolution" (Fickett, 1966:5-6). Botting (1975) also included Colombia in a similar list of countries at the "take-off" stage of economic development with outbreaks of violence possible.

The imagery of this conflict brings to mind the determinants identified by Smelser, notably that of "mobilization for action" where revolution is specifically mentioned. This violence may often be considered part of a societal restructuring necessary to provide the conduciveness which will allow for non-violent change and acceptance of modern developments.

The idea that violence is counter-productive or an obstacle to development is a common theme. Many poor countries devote upwards of 25 per cent of their GNP to internal or international conflicts. Yet one author sees violence, historically, as a successful means for advancing the "objectives of modernization." Recent revolutions in China, Cuba, and parts of Eastern Europe are seen as resulting "in the replacement of political structures" which were not conducive to modern development (Bull, 1972:107-109).

The context of development in Colombia has included a background of political unrest and violence. "Colombians la violencia" was an internal conflict that came to full force in Colombia in 1948 and which, for most practical purposes, ended in 1965. A modern historian has called it the largest war in the western hemisphere since the Mexican Revolution of 1910. It resulted in about 200,000 deaths in a population that ranged from 9.5 million to 17 million people (Ramsey, 1970). A number of structural and practical changes were seen to accompany the violence of the period.

Prior to this period, it was a common practice to displace property owners of a losing political party, whose land subsequently changed hands again with a shift in politics (Dix, 1967:364). Other changes were seen in the outlooks of the Church and the Army which both became "consciously committed to

social change" by the end of la violencia. Competence and well-articulated programs replaced political personalism and political hatred. Changes for the better were noted in the areas of rural construction and aid projects, rural education, and journalism (Ramsey, 1970:450-457). This brief review of la violencia should establish the importance of any stabilization in the land tenure system as a form of developmental progress.

CONCLUSION

In this essay, I have examined general views of social change in the form of definitions and low level abstractions. To lay the foundations for the explanation of case studies, I explored the higher level abstractions of Myrdal's and Smelser's theories. Aspects of these theories were combined for the purpose of explaining several case studies which displayed a wide range of success and failure in response to directed change attempts. At a high level of abstraction, Myrdal's theory of cumulative or circular causation might be considered as a description of process in general. Smelser, in other references to mechanisms of change and adjustments to change, has defined three ideal types associated with change processes. However, I have not intended so much to broach these topics of the processes of social change. I have rather concerned myself with showing the inevitability of social change and exploring one possible explanation of the directions that change may take. The concept of conduciveness is a loose idea, not meant to be limiting of change possibilities except in a general sense. Determinants in the hierarchy at higher positions are meant to theoretically delineate the directions of social change. A summary of the conclusions of the case studies affirms the role of conduciveness as a determinant of change direction.

In the Asian study, changes of more than one sort were taking place. Because higher level determinants did not exist, population pressures were able to outpace educational innovations. A similar pattern was seen in the New Mexican farmers. Although initially the new hybrid appeared to be acceptable, and although the system was conducive to this change, other cultural pressures caught up and outpaced the desired

change. The example of the Bantu people in Africa is an unambiguous case of structural non-conduciveness. A subjugation pattern appeared when the Bantu were unable to face up to a superior technology. The original pattern in Colombia consisted of a non-conductive structure which, through conflict, was transformed into a structure which received change well.

A scheme appears here wherein analysis can be based on three apparent levels of structural conduciveness to alteration. First, if the structure is not conducive, subjugation and/or violence may appear, depending on technology differentials and other cultural factors. Second, if the structure becomes overly conducive or not selective and constraining enough, unwanted change, such as excess population growth, may appear. Third, if the structural conduciveness is correct, modernization is apparently well received. A conservatism or sluggish response to innovation often occurs in traditional cultures which may be considered either as an inertial reaction to elements alien to the structure, or as simply a lack of need for the particular innovation.

The conclusions, thus, are: 1) change occurs, but not always in a predictable manner; 2) circular causation, a basic systems theory or feedback approach, explains more than the concept of simple, linear cause and effect; 3) systems have a structure such that elements of functional theories can be used to analyze changes in the systems approach; and 4) such analysis shows, unfortunately, that directed change will often fail.

NOTES

1. I truly appreciate the advice, concern and encouragement of two of my favorite professors. Without the help of Drs. Robert Whittenbarger and Richard Hummel, this paper would have gone the way of old term papers. Instead, it has undergone several intense rewritings, an experience that I will never forget. I also appreciate the help and comments of the MARS editorial staff, especially Alan Johnson.
2. cf. Blumer: "In its broad sense (collective behavior) refers to behavior of two or more individuals who are acting together, or collectively. . . To conceive of collective behavior in this way would be to make it embrace all group life. . ." (Blumer, 1957).

3. This condensation is necessary to satisfy statistical assumptions used in computing chi square and its related statistics, such as Cramer's V.

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TABLE 1

| Years ago | Cultural stage (Level of Technology) | Estimated density per square kilometer | Earth's total population (millions) | Estimated life span (years) |
|-----------|--------------------------------------|--|-------------------------------------|-----------------------------|
| 1,000,000 | Old Paleolithic | .00425 | .125 | 29 |
| 300,000 | Middle Paleolithic | .012 | 1 | 29 |
| 25,000 | New Paleolithic | .04 | 3.34 | 32 |
| 10,000 | Mesolithic | .04 | 5.32 | 38 |
| 6,000 | Village farming and early urban | 1.0 | 86.5 | 38 |
| 2,000 | Village farming and urban | 1.0 | 133 | 35 |
| 310 | Farming and industrial | 3.7 | 545 | 40-45 |
| 210 | Farming and industrial | 4.9 | 728 | 45-50 |
| 160 | Farming and industrial | 6.2 | 906 | 50-60 |
| 60 | Farming and industrial | 11.0 | 1,610 | 61.5 |
| 10 | Farming and industrial | 16.4 | 2,400 | 70 |
| A.D. 2000 | Farming and industrial | 46.0 | 6,270 | |

(From Deevey, 1960)

TABLE 2
ANALYSIS OF OWNERSHIP STATUS AND
ADOPTION STATUS 1971 OWNERSHIP STATUS

| 1963 OWNER | OWNER | NON-OWNER | ROW TOTAL |
|--------------|-------|-----------|----------------|
| ADOPTER | 14 | 0 | 14 |
| NON-ADOPTER | 28 | 15 | 43 |
| COLUMN TOTAL | 42 | 15 | 57 Grand Total |

Cramer's V = .341

Somer's dyx = .334 with adopter as dependent variable

Somer's dyx = .349 with ownership as dependent variable

TABLE 3
CHANGES IN REAL TOTAL FAMILY INCOME FOR ADOPTERS
AND NONADOPTERS OF NEW COFFEE VARIETIES,
TAMESIS, COLOMBIA, 1963-70

| | ADOPTERS | | NONADOPTERS | | TOTAL | |
|----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1963 (N = 17) | 1970 (N = 17) | 1963 (N = 39) | 1970 (N = 39) | 1963 (N = 56) | 1970 (N = 56) |
| 0-2,500 | 5.9% | 0.0% | 23.1% | 20.5% | 17.9% | 14.3% |
| 2,501-5,000 | 23.5 | 17.6 | 41.0 | 33.3 | 35.6 | 28.5 |
| 5,001-7,500 | 41.2 | 23.5 | 25.6 | 15.4 | 30.4 | 17.9 |
| 7,501-10,000 | 17.6 | 23.6 | 10.3 | 10.2 | 12.5 | 14.3 |
| 10,001-12,500 | 5.9 | 11.8 | 0.0 | 7.6 | 1.8 | 8.9 |
| 12,501-15,000 | 0.0 | 0.0 | 0.0 | 7.6 | 0.0 | 5.4 |
| 15,001-17,500 | 5.9 | 0.0 | 0.0 | 2.7 | 1.8 | 1.8 |
| 17,501-20,000 | 0.0 | 5.9 | 0.0 | 0.0 | 0.0 | 1.8 |
| 20,001-22,500 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22,501-25,000 | 0.0 | 17.6 | 0.0 | 2.7 | 0.0 | 7.1 |
| Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Average Income | \$6,731 | \$11,620 | \$4,509 | \$6,274 | \$5,183 | \$7,897 |

NOTE: For difference in real family income between adopters and nonadopters in 1963: $t = 2.335$, 54 df, $P > .01$; in 1971: $t = 2.479$, 54 df, $P > .01$. For changes in real family income between 1963 and 1970 for nonadopters: $t = 1.996$, 39 df, N.S.; for adopters: $t = 2.284$, 17 df, $P > .01$. For changes in amount of increase or decrease in real family income between adopters and nonadopters during 1963-70: $t = 3.884$, 54 df, $P > .01$. (From Havens and Flinn, 1975:476).