THE THEORY OF EVOLUTION AS A PARADIGM FOR THE ANALYSIS OF POLITICAL PHENOMENA

By

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ABSTRACT

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The hypothesis advanced here is that the Darwinian, or "synthetic" theory of biological evolution may profitably be employed as a paradigm for analyzing human social and political behavior. This approach is predicated upon four propositions: 1. the basic and continuing problem of all human societies is biological survival; 2. survival is a collective as well as an individual problem; 3. survival involves a many-faceted enterprise which must continuously fulfill a variety of specific biological and reproductive needs; 4. behavior as well as morphology is important for the survival of any species.

Accordingly, it is argued that social and political behavior may be analyzed functionally with reference to its consequences for the survival of human societies. The basic evolutionary criterion of reproductive efficacy is employed here with considerable refinement and qualification.

Included in the discussion is a critical analysis of the current status of political theory, a brief history of evolutionary concepts and a survey of various postulates in political theory about the nature and purpose of society and the state. There is also a detailed discussion of the modern theory of evolution and its mechanisms, a discussion of human behavior from an evolutionary and biological perspective (including a detailed discussion of aggression), and an exploration of the implications for political theory and political science research. In order to demonstrate the feasibility of this approach, a possible analytical framework is set forth, discussed and tested in a preliminary way.

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CHAPTER ONE

INTRODUCTION

In the search for a fully articulated empirical theory of political life, political scientists have in the past decade or so put forward a number of macro-theoretical paradigms.[1] Particularly notable are the systems analysis,[2] functionalist,[3] and communications[4]

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[1] "Paradigm," as used here, refers to any set of assumptions, concepts and research techniques generally accepted and employed by scholars working in a particular research area or on a particular problem. Such assumptions, concepts and research techniques are viewed as less rigorously defined and organized than a formal "model" and may or may not be accepted by or relevant for other scholars. On this point, see: Steven J. Brams and Michael O'Leary, "An Axiomatic Model of Voting Bodies," The American Political Science Review, LXIV, No. 2 (1970), 449, ftn. Also, see Thomas Kuhn, The Structure of Scientific Revolutions (Chicago: University of Chicago Press, 1962), pp. 49 ff.

[2] For a general summary of contemporary theoretical approaches, see: Stephen L. Wasby, Political Science-The Discipline and Its Dimensions: An Introduction (New York: Charles Scribner's Sons, 1970), Chaps. 4 and 5; James C. Charlesworth (ed.), Contemporary Political Analysis (New York: The Free Press, 1967); and W.J.M. MacKenzie, Politics and Social Science (Baltimore: Penguin Books, 1967).

approaches associated most prominently with David Easton, Gabriel A. Almond and Karl W. Deutsch, respectively--although a number of other political scientists have also

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Penguin Books, 1967); Morton A. Kaplan, Macropolitics: Selected Essays on the Philosophy and Science of Politics (Chicago: Aldine Publ. Co., 1969). Among the numerous discussions of systems analysis, see especially: David Easton, A Framework for Political Analysis (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965); Easton, A Systems Analysis of Political Life (New York: John Wiley and Sons, Inc., 1965); Easton, (ed.), Varieties of Political Theory (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1966); Charlesworth, op. cit., Chaps. 8 and 9; Oran R. Young, Systems of Political Science (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1968); William C. Mitchell, The American Polity (New York: The Free Press, 1962); MacKenzie, op. cit., Chap. 8; Morton A. Kaplan, System and Process in International Politics (New York: John Wiley and Sons, 1964), Chap. 1; and Kaplan, "Systems Theory and Political Science," Social Research, XXXV, No. 1 (1968), pp. 30-47.

[3]Among the extensive literature on functionalism, see in particular: Robert K. Merton, Social Theory and Social Structure (New York: The Free Press, 1957), Chap. 1, pp. 72-82; Talcott Parsons, The Social System (New York: The Free Press, 1951); Marion Levy, The Structure of Society (Princeton, N.J.: Princeton University Press, 1959); Gabriel A Almond, "A Functional Approach to Comparative Politics," in Gabriel A. Almond and James S. Coleman (eds.), The Politics of the Developing Areas (Princeton, N.J.: Princeton University Press, 1960); Almond and G. Bingham Powell, Jr., Comparative Politics: A Developmental Approach (Boston: Little, Brown and Co., 1966); Charlesworth, op. cit., Chaps. 4 and 5; and Don Martindale (ed.), Functionalism in the Social Sciences (Philadelphia: American Academy of Political and Social Science, 1965).

made important contributions.[5]

While these paradigms have generated many significant concepts, analogies and analytical approaches, none has purported to be in itself a general theory of political life. Each was deliberately conceived only as an intermediate step on the road to a general

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[4]See especially: Norbert Weiner, The Human Use of Human Beings (Garden City, N.Y.: Doubleday, Inc., 1956); Karl W. Deutsch, The Nerves of Government: Models of Political Communication and Control (New York: The Free Press, 1966); Charlesworth, op. cit., Chaps. 14 and 15; R.C.North, "Communication as an Approach to Politics," American Behavioral Scientist, X, No. 12 (1967); Gregory Bateson, "Cybernetic Explanation," American Behavioral Scientist, X, No. 12 (1967); Walter Buckley (ed.), Modern Systems Research for the Behavioral Scientist (Chicago: Aldine Publ. Co., 1968); Lucien Pye (ed.) Communication and Political Development (Princeton, N.J.: Princeton University Press, 1963); Richard R. Fagen, Politics and Communication (Boston: Little, Brown and Co., Inc., 1966).

[5]Especially noteworthy are: William C. Mitchell, The American Polity (New York: Free Press of Glencoe, 1962); Robert T. Holt, "A Proposed Structural-Functional Framework," in Charlesworth, op. cit.; Theodore Lowi, "Toward Functionalism in Political Science: The Case of Innovation in Party Systems," The American Political Science Review, LVII, No. 3 (1963), pp. 570-583; Fred Riggs, Administration in Developing Countries (Boston: Houghton-Mifflin, Co., 1964); David E. Apter, The Gold Coast in Transition (Princeton, N.J.: Princeton University Press, 1955); and Richard L. Meier, A Communication Theory of Urban Growth (Cambridge: M.I.T. Press, 1962).

theory--as a framework that might enable us only to identify and analyze significant processes and relationships and aid us in organizing empirical research.[6]

Among the many criticisms that have been levelled at such theory-building efforts,[7] three in particular stand out. The first is that, despite conscientious efforts to achieve analytical detachment, these paradigms by their very nature embody an implicit hypo-

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[6] For discussions of the authors' objectives, see: Easton, A Systems Analysis of Political Life, op. cit., Chap. 1 and 29; Almond and Powell, op. cit., Chap. 1, 2, and 11; and Deutsch, op. cit., preface.

[7] Note especially: A. James Gregor, "Political Science and the Uses of Functional Analysis," The American Political Science Review, LXII, No. 2 (1968); Martin Landau, "On the Use of Functional Analysis in American Political Science," Social Research, 35, No. 1 (1968); Carl G. Hempel "The Logic of Functional Analysis," in May Brodbeck (ed.), Readings in the Philosophy of the Social Sciences (New York: The Macmillan Co. 1968); Wasby, op. cit., p. 142; Thomas Landon Thorson, Biopolitics (New York: Holt, Rinehart and Winston, Inc., 1970) chap. 5; Charlesworth, op. cit., p. 7; Ithiel de Sola Pool (ed.), Contemporary Political Science: Toward Empirical Theory (New York: McGraw-Hill Book Co. 1967); Philip E. Converse, review of Easton, A Framework for Political Analysis in The American Political Science Review, LIX, No. 4 (1965), pp. 1001-1002; and MacKenzie, op. cit., chap. 8.

thesis (what A. James Gregor obliquely refers to as an "explanation sketch") about human social and political life, namely that it can be characterized (and analyzed) as a goal-directed, functionally interrelated, cybernetic system.[8] Because this hypothesis is buried in the architecture of these paradigms, it is not, of course, spelled out explicitly, much less supported empirically.

The second major criticism is that these frameworks are not satisfactorily explanatory or predictive.[9] Critics charge that no attempt is made to explain how political systems come into being, why they exist, the necessary conditions for their persistence, or the conditions under which they will break down (or "disaggregate"). Most charitably, these frameworks are

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[8] Easton, A Framework for Political Analysis, op. cit., pp. x-xi; Easton, A Systems Analysis of Political Life, op. cit., pp. 14-15; Almond and Powell, op. cit., pp. 13 and 16-21; Deutsch op. cit., especially chap. 11; Gregor, op. cit., pp. 432-5, 438.

[9] Gregor, op. cit., pp. 432-5; Landau, op. cit., pp. 73, 75.

construed by critics as "runic" descriptions of familiar phenomena which may, perhaps, have some heuristic utility.

Finally, even if confined to the role of description and analysis, these paradigms have so far failed the pragmatic test of usefulness. Their authors are charged with not having provided us with sufficient conceptual specificity to permit empirical tests.[10] The work of theory construction thus appears to be at a temporary impasse.

It is the burden of this dissertation, however, that one major approach to the development of a general theory of social and political life has thus far been overlooked by political scientists--that is, a paradigm based explicitly upon the Darwinian theory of biological evolution. For a variety of reasons,[11] the theory of evolution has not in the past seemed to social scientists to be a fruitful approach. Yet, contemporary under-

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[10] Pool, op. cit., Foreword, p. ix.; Gregor, op. cit., pp. 437-8.

[11] See discussion below, pp. 161-168.

standing of the workings of the evolutionary process, as well as recent developments in the life sciences, suggest that a paradigm based upon the theory of evolution might ultimately yield the general theory that has so far eluded us (as well as meeting many of the objections leveled at existing frameworks).

Such a paradigm is proposed and developed here, along with one possible approach to its operationalization.

The core hypothesis upon which this paradigm is predicated is as follows: Because of the very nature of organic life in general and human life in particular, the basic and continuing problem of every society, and of the individuals who comprise it, is biological survival.

Three crucially important propositions are related to this hypothesis. First, biological survival is not, as is often supposed, a simple matter of avoiding potential catastrophes. Rather, it must be conceived as a problem involving a spectrum of on-going biological (and instrumental psychological)<u>needs</u> which must con-

tinuously be fulfilled if survival is to be assured. Survival thus involves a many-faceted enterprise.[12]

Second, strong evidence exists in support of the proposition that behavior is as relevant to survival as is morphology.[13] Indeed, behavior and morphology evolve together in an interrelated and mutually supportive manner.[14]

The third proposition is that the basic survival unit is not, as has so often been supposed in the past, the solitary individual but rather the "gene pool" of the breeding population. Survival in most animals, including man, is essentially a collective problem,

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[12]Theodosius Dobzhansky, Mankind Evolving (New Haven: Yale University Press, 1962), p. 134; George Gaylord Simpson, The Meaning of Evolution (1st ed.) (New Haven: Yale University Press, 1949), p. 222. Also, see discussion below, pp. 183-191, 204-205.

[13]See discussion below, pp. 191-199.

[14]Sherwood L. Washburn and Judith Shirek, "Human Evolution," in Jerry Hirsch (ed.), Behavior-Genetic Analysis (New York: McGraw-Hill Book Co. 1967), p. 10. Also, see discussion below, pp. 191-193.

at least over the long run.[15]

This being the case, it is therefore argued here that human societies may indeed be conceived of cybernetically (as contemporary political theorists imply)--as goal-directed, self-regulating systems--at least with respect to the on-going problem of collective survival. Furthermore, specific ideologies, values, behaviors, institutions or total political systems, may be analyzed functionally with reference to their effect upon the survival chances of a society. This is not, however, equivalent to saying that the process is a teleological one. Men may or may not be aware of the functions of either their behaviors or of social structures. Nor may they necessarily pursue survival as a conscious goal. Regardless of the meaning it may have to the individual, all that the theory of evolution requires is that some (though not necessarily

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[15]Simpson, Biology and Man (New York: Harcourt, Brace and World, Inc., 1969) pp. 28; Dobzhansky, op. cit., p. 134. Also, see discussion below, pp. 196-200.

all) social and political phenomena have survival consequences, whether favorable or unfavorable.[16]

Accordingly, evidence is presented here in support of an evolutionary (functional) explanation of various forms of social behavior frequently manifest in political life--among them: fear, aggression, territoriality, leadership-followership hierarchies, affectional bonds, competition and cooperation.

In addition, the four macro-level functions (goal-attainment, integration, pattern maintenance and adaptation) hypothesized by Talcott Parsons,[17] and applied to political systems by William C. Mitchell,[18] and Robert T. Holt,[19] are provisionally employed here with specific reference to the collective survival

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[16]Niko Tinbergen, Social Behavior in Animals (London: Science Paperbacks and Methuen and Co. Ltd., 2nd ed., 1964), p. 2. Also see discussion below, pp. 205-215.

[17]Societies: Evolutionary and Comparative Perspectives (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), p. 7.

[18]Op. cit., supra, footnote no. 2.

[19]Op. cit., supra, footnote no. 5.

problem. It will be argued that political systems may perform any or all of these functions, or ones that are conceptually similar (including Easton's authoritative allocation of values),[20] in furtherance of the survival of a society.

Although full operationalization of an evolutionary paradigm will require a broad and sustained effort, one possible approach -- a four-step analytical framework -- is developed here and tested in a preliminary way with the object of demonstrating the feasibility of this paradigm for the analysis of political phenomena.

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[20] A Systems Analysis of Political Life, op. cit., p. 21.

CHAPTER TWO

THE CURRENT STATUS OF POLITICAL THEORY

Before proceeding to an exposition of the Darwinian theory of evolution, and thence to the problem of applying that theory to political phenomena, it would appear desirable to establish a frame of reference. Accordingly, this chapter will be devoted to a brief critical description of the current status of political theory. Several issues relevant to this dissertation will be noted and discussed: Namely, 1. The question of what constitutes a theory; 2. the controversy over the feasibility of constructing a "general theory" of political life; 3. the basis for the distinction between "normative" and "empirical" theory; and 4. major concepts contained in current theoretical paradigms. In the next chapter, we will discuss some of the criticisms that have been raised against these paradigms and will add a few more that are relevant to this dissertation. This will be followed, in the fourth chapter, by a brief survey of the intellectual history of evolutionary conceptions of social life.

Theorizing, as William T. Bluhm points out, probably goes back to the obscure beginnings of human consciousness.[1] To the layman, the term "theory" is roughly equivalent to what the scientist means by "hypothesis," and is commonly held to be any attempt to "understand" the phenomenal world. In empirical political science, however, theory-building has recently acquired a more formal status--thanks in large measure to the influence of David Easton's ground-breaking book The Political System (1953).[2]

Unfortunately, however, there still seems to be some confusion about what constitutes an "empirical" theory. Wasby, for instance, defines a theory as a "system of generalizations based on empirical findings

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[1]William T. Bluhm, Theories of the Political System: Classics of Political Thought and Modern Political Analysis (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965), p. 1.

[2](New York: Alfred A. Knopf). Assigning credit for an intellectual trend is, of course, a hazardous business, but Easton's work does stand as a landmark with respect to the recent reemergence of theory in empirical political science.

or testable empirically."[3] Or, more completely, he defines a theory as "a set of (at least two) statements, called either laws or propositions, which are related to each other and which express relationships between variables under varying states of the system."[4]

In a similar vein, Easton conceives of a theory as being "any kind of generalization or proposition that asserts that two or more things, activities, or events covary under specified conditions."[5] Both of these definitions would seem to imply that any hypothesis involving a correlation constitutes a theory.

May Brodbeck, on the other hand, defines such correlations as "laws" and reserves the title of

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[3]Wasby, op. cit., p. 62.

[4]Ibid.

[5]Easton, A Systems Analysis of Political Life, op. cit., p. 7.

"theory" for "deductively connected sets of laws".[6] By her definition, theories must be explanatory (either causal, functional, teleological, "genetic" or any combination) and must be composed of law-like generalizations. Those generalizations which do the explaining Brodbeck calls "axioms" (or explinanda) and those that are explained are "theorems" (or explicanda).[7]

Brodbeck's definition is seconded by A. James Gregor:

> For a science to most reliably discharge its two principle functions, explanation and prediction, statements embodying acquired knowledge must be systematically organized

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[6]May Brodbeck (ed.), Readings in the Philosophy of the Social Sciences (New York: The Macmillan Co. 1968), pp. 6-11. Eugene J. Meehan, however, makes a distinction between deductive and probabilistic explanations, and holds the latter to be more promising for political science research. The Theory and Method of Political Analysis (Homewood, Illinois: The Dorsey Press, 1965), pp. 105-116.

[7]Brodbeck, ibid.

> in subsumptive or deductive relations. Minimally, a set of such systematically related propositions, which include among them some lawlike generalizations, and which can be assigned specific truth values via empirical tests, is spoken of as a theory.[8]

This confusion over what constitutes a theory is not merely a problem of semantics. It probably helps to explain the confusion about whether or not current theoretical paradigms are true theories, although the confusion has sometimes been compounded by the statements (or obscurantism) of the theory-builders themselves. Easton, for example, declares at the outset of A Systems Analysis of Political Life:

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[8]A. James Gregor, "Political Science and The Uses of Functional Analysis," The American Political Science Review, LXII,No. 2 (1968), p. 425. See comparable definitions in Meehan, op. cit., pp. 128-134; Ernest Nagel, The Structure of Science: Problems in the Logic of Scientific Explanation (New York: Harcourt, Brace and World, 1961), p. 90; R.B. Braithwaite, Scientific Explanation: A Study of the Function of Theory, Probability and Law in Science (Cambridge: Cambridge University Press, 1955), p. 22; and R.S. Rudner, Philosophy of Social Science (Englewood Cliffs, New Jersey; Prentice-Hall, Inc., 1966), p. 10.

"I shall be concerned with the formulation of theory at its most inclusive level, what may be called general theory."[9] And, at the conclusion, he refers to his effort as a "general 'systems persistence' theory."[10] Even more pointedly, he declares: "Implicit in my conceptualization has been the notion of a unified theory of politics."[11]

At other times, though, Easton explicitly disavows the idea that he is himself developing a theory: "My objective will be to take one step in the direction of such a general theory."[12] And, in his peroration he modestly states: "What has been and could only be attempted here is a modest and small step, a slow inching forward toward a distant horizon..."[13]

Karl Deutsch, on the other hand, is less ambiguous. In the very first paragraph of The Nerves of Government, he states: "This book is an interim report from an enterprise of thought that is still continuing. The

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[9] Op. cit., p. 3.
[10] Ibid., p. 476.
[11] Ibid., p. 483.
[12] Ibid., p. 6.
[13] Ibid., p. 490.

enterprise is to develop eventually a theory of politics, both national and international."[14] Deutsch manages to maintain this stance, moreover, in the rest of his book.

However, the confusion abroad in political science was serious enough at one point to move A. James Gregor to devote a lengthy article in The American Political Science Review to a tortuous demonstration of why current functionalist and systems paradigms are not theories. Indeed, his belabored arguments belie his conclusion, where he reports: "There is, in fact, general agreement among social science practitioners that functionalist approaches, now and for the foreseeable future, can serve heuristic and not explanatory purposes in their enterprise."[15] (The burden of the argument here will be that Gregor is wrong.)

On one point, however, most current logicians and philosophers of science seem to agree. Both laws (or

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[14]Op. cit., p. xxv.

[15]Gregor, op. cit., p. 435.

at least law-like propositions) and explanatory theories are essential to the full fruition of any scientific enterprise. They are seen as tools of analysis which can help us to select and organize (or categorize) data, generate hypotheses for testing, define the relationships between phenomena, and, ultimately, help us build a body of empirically validated explanations of social and political life.[16]

Of course, the difficulty for the social sciences is that we do not as yet have a substantial body of laws from which to build explanatory theories. At best we have what might be considered some law-like propositions (e.g. The "Iron Law of Oligarchy."). As will be shown below, current theory-building efforts have not been based upon rigorously validated (or at least, accepted) laws and have not as yet generated many explanatory hypotheses.[17]

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[16]On this point, see Gregor, op. cit., p. 425; Deutsch, op. cit., p. xxv; Easton, A Systems Analysis of Political Life, op. cit., p. 8; Meehan, op. cit., chap. 5.

[17]Wasby, op. cit., pp. 71-2; Meehan, op. cit., p. 105.

Indeed, some political scientists despair of being able to move beyond the observance of correlations to postulate statements of causation, function, telos, or historical development. Some even reject the idea that such explanatory theory is possible with respect to social phenomena.[18]

A second aspect of contemporary theory-building activities relevant to the discussions here is the distinction Easton first made in The Political System between "singular," "narrow gauge" and"general theories."[19] Needless to say, Easton's focus along with that of Deutsch, Almond and others is general theory. Easton defines general theory as being of such scope that it is applicable to an entire field of inquiry:

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[18]Wasby, ibid, p. 71; Meehan, ibid. On the other hand, there have been some notable attempts in recent years to develop causal models of political behavior. E.g. Ted R. Gurr, "A Causal Model of Civil Strife," The American Political Science Review, LXII, No. 4 (1968). However, the hierarchy of causation, or explanation, stops with the psychological mechanisms relating to aggressive behavior.

[19]Op. cit., pp. 52-59.

> In politics, it seeks to illuminate the functioning of political systems in their entirety.... What is lacking is a broad way of formulating a theoretical question, one that will deliberately refrain from fixing on specific goals...but one that will extend its scope and address itself to the permanent and enduring problems faced by all types of political systems. Just as we may have a general theory of motion in physics or of life in biology, we require a general theory of the vital processes in politics.[20]

Morton A. Kaplan, on the other hand, argues that a general theory of political life is impossible: "There is no such thing as theory in general; there is only theory about some specific subject matter."[21] Kaplan concludes:

> A completely general theory would lack explanatory power. It would enunciate only the most elementary truisms about social and political structures or alternatively mislead by appearing to convey information

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[20]Easton, A Systems Analysis of Political Life, op. cit., pp. 8, 14.

[21]Morton A. Kaplan, "Systems Theory and Political Science," Social Research, XXXV, No. 1 (1968), p. 30.

> about specifics--for example, equalities--that in its nature it could not provide.[22]

Kaplan's assumption is that the differences between societies are far more important and fundamental than the similarities; the similarities are taken by him to be trivial. Thus, he argues, what is needed is a comparative theory, a theory which can explain the differences between political systems. We will return to this point below.

A third relevant aspect of contemporary political theory concerns the distinction between "normative" and "empirical" theory--a tradition in political science which dates from the publication of Easton's The Political System. As Easton expressed this dichotomy in his (to date) magnum opus, A Systems Analysis of Political Life:

> Political theory is in the throes of a major revolution. In the past, any mention of political theory would have been likely to rouse an image of it in the grand philosophical tradition of Plato, Aristotle, Rousseau, Mill or Dewey....Until recently, it has not at all

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[22]Kaplan, "Systems Theory," in Charlesworth, (ed.), op. cit., p. 155.

> been customary for political theorists to avow an interest in causal theory or to accept its development as one of their major responsibilities. Traditionally, political theory, interchangeable here with political philosophy, has held and propagated an image of itself as narrowly engaged in and committed to a quest for an understanding of the nature of the good life or at least an understanding of the way others have viewed it. Analysis of the moral rather than strictly empirical world has stood at the peak of theory's hierarchy of priorities. In the past decade, however...it has become transparently clear that political theory is not, need not and ought not to be a monolithic subject confined exclusively to moral and philosophical inquiry....Recent developments in the overall orientation of political science...have led to a transformation of the tasks and functions of theory....We can now say that traditional political theory has been joined by a new field of concern and instruction which may be called causal or descriptive theory.[23]

Again, a certain amount of confusion seems to have arisen over the normative-empirical distinction. Although many political scientists, including sometimes Easton himself, use "normative theory" interchangeably "philosophical speculation" or "ethical prescriptions," the term may also be used to label an empirically-

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[23]Easton, op. cit., pp. 4-6.

oriented activity. "One of the dominant approaches," Easton observes, "is to select some value as the organizing principle and to construct a body of concepts and propositions around it...Normative theory...adopts a value as its objective and evolves an empirical explanation in terms of the conditions necessary to maximize the selected value."[24]

As I hope to show here, the normative-empirical dichotomy is not so clear-cut as Easton paints it to be, either in the "Great Books" of the past, or in contemporary political theory-building activities. As Christian Bay has argued, truly causal theory about human behavior, political or otherwise, must ultimately be coextensive with what Easton labels normative theory, precisely because explanations of human behavior will ultimately have to be linked to either conscious or sub-conscious human "values"--that is, to human needs, wants, and psychological

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[24]Ibid., p. 13.

motivation states.[25] In turn, these situation-specific sources of behavior will have to be linked, according to the viewpoint to be developed here, to the theory of evolution and evolved biologically-based sources of behavior.

Furthermore, as Herbert J. Spiro notes, political systems are by nature teleological: They were "brought into being, or are being affirmed and reaffirmed, as results of more or less explicit and purposive human action, to serve certain purposes and perform certain functions."[26] Indeed, it will be argued here that, ironically enough, Easton's own paradigm contains at

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[25]"Politics and Pseudopolitics: A Critical Examination of Some Behavioral Literature," The American Political Science Review, LIX,No. 1 (1965), pp. 39-51. As if to underscore this point, Gurr, in developing his causal model of civil violence, located his explanation ultimately in psychological evidence to the effect that anger, the motivating state for aggression, is an innate and "inherently satisfying response" to perceived deprivation. (Gurr, op. cit., p. 1104.)

[26]Herbert J. Spiro, "An Evaluation of Systems Theory," in Charlesworth (ed.), op. cit., p. 166.

its core an implicit normative "principle" or explanatory hypothesis which, when exposed and brought to the surface, makes his edifice an implicitly normative, if not teleological, theory of political life. Furthermore, these same implicitly teleological premises can be discerned in other major contemporary paradigms. The argument here will be that these paradigms cannot be considered explanatory primarily because their implicit premises about social and political life have not been made explicit and posed as fully formalized and testable hypotheses. This point is fundamental to a clear understanding of just what these paradigms really imply and of how they can be related to the theory of biological evolution. Let us proceed, therefore, to a brief discussion of these paradigms.

First, let us consider Easton's systems analysis paradigm--partly because it is the most fully elaborated theoretical framework (with respect to political life), but also because it combines, or embraces, other theoretical strands that are relevant here.

As W.J.M. MacKenzie observes, Easton is caught up in a movement he did not originate. Rather, he has adapted to political science a stream of thought and a still-developing set of concepts that have been growing in influence for the past 40 years.[27] The exact genealogy of what is now generally referred to as "systems theory" is difficult to trace. Various authors differ confusingly about the sequence and relative importance of particular events.[28] However, certain landmarks may be noted.

One landmark is the work of biologist Ludwig von Bertalanffy, which began in the 1920s and culminated in the publication of his book Problems of Life in 1949.[29]

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[27]W.J.M. MacKenzie, Politics and Social Science (Baltimore: Penguin Books, 1967), p. 97.

[28]For a sampler of the confusion, see: MacKenzie, ibid.; Gregor, op. cit.; Deutsch, op. cit.; and Oran R. Young, Systems of Political Science (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968).

[29]Ludwig von Bertalanffy, Problems of Life (transl.), (New York: John Wiley and Sons, Inc., 1952).

Another was the World War Two work by a team of scientists under mathematician Norbert Weiner on fire-control systems for anti-aircraft guns. This work ultimately resulted in the emergence of the discipline of cybernetics, which is devoted to problems of communications and control in machines and men. Two major works by Weiner mark the development of this discipline: The Human Use of Human Beings (1950)[30] and Cybernetics: Or Control and Communications in the Animal and the Machine (1948).[31] Also important were W. Ross Ashby's Design for a Brain (1952)[32] and An Introduction to Cybernetics (1956).[33]

Finally, there was the founding of the Society for the Advancement of General Systems Research in 1956 and the publication in that year of two works associated with that development: Toward a Unified

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[30](Boston: Houghton Mifflin, Co.).

[31](Cambridge: M.I.T. Press).

[32](New York: John Wiley and Sons, Inc.).

[33](New York: John Wiley and Sons, Inc.).

Theory of Human Behavior, edited by Roy R. Grinker,[34] and the first annual volume of the General Systems yearbook.[35]

The literature on systems theory is by now voluminous, and the concept of a system, which is the core idea of systems theory, has been elaborated in a great profusion of different forms. At its most elementary level, though, a system is conceived to be any set of interrelated variables interacting through time.[36] These "behavioral" systems are thus dynamic--they involve, and may be defined as, a process in which discrete units or entities interact with one another. Furthermore, the nature of that interaction--the behavior or process defined by the covariance of the variables under consideration--is the focal point

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[34](New York: Basic Books, Inc.).

[35]See especially von Bertalanffy's introductory essay, "General Systems Theory," General Systems, I (1956), Introduction.

[36]The following discussion is based on W. Ross Ashby, op. cit., chapters 1 and 2; Deutsch, op. cit., chapter 5; Young, op. cit., chapter 2.

of the systems theorist's interest. He is interested in knowing what processes are going on in the system--how and why the variables interact with each other.

Now a cybernetic system, in particular, is more elaborate. It is a process in which the correlations between variables relate functionally to one or more systemic "goals" or end-states. Cybernetic systems are thus goal-directed and, as Deutsch observes, usually involve three characteristics: Organization, communication and control (or "steering," from which the term cybernetics is derived).[37] This does not necessarily imply teleological attributes. Cybernetic systems may or may not involve consciously pre-determined "purposes."[38] But by their very nature, cybernetic

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[37]Deutsch, op. cit., pp. 76-78; Also, Norbert Weiner, The Human Use of Human Beings (New York: Avon Books, 1954), pp. 23-26.

[38]See the definitive discussions of this issue in Heinz von Foerster et al. (eds.), Purposive Systems: Proceedings of the First Annual Symposium of the American Society for Cybernetics (New York: Spartan Books, 1968), in particular, Alexander S. Fraser, "The Evolution of Purposive Behavior." Deutsch also distinguishes between "goals" and teleological purposes (op. cit., p. 91).

systems can be studied and understood in terms of their origins, the nature of the processes which define them and the goals or consequences of those processes.

An important corollary of this point is that systems concepts do not in themselves make a theory. Following the definition of a theory given above, one can produce law-like propositions about a system's behavior merely by establishing correlations between its variables. However, it is only when one seeks to explain the origins or "causes" of the system and the consequences of its behavior as a system that we can talk about systems "theory." Accordingly, there can be, and are, any number of different systems theories hypothesizing various systemic functions or goal-states (teleological and non-teleological) for everything from automated production lines, to military strategy, to the neurophysiology of human behavior. Some systems may be designed merely to maintain themselves in some sort of steady state or dynamic equilibrium (homeostasis), while others may be designed to perform a

certain pre-specified task.

There is thus no one systems theory, and it may be inaccurate to accuse systems-exponents in political science of having merely borrowed analogies or metaphors from homeostatic physiology, communications theory, etc., as Gregor and others have done.[39] What in fact the systems builders have done is to borrow general concepts which were developed in other sciences and apply them to political life. What is postulated is a conceptual isomorphism. Whether or not such concepts are applicable or have been utilized in such a way as to create a formal theory of political life is, of course, another question, as is the charge that systems theorists in political science have erroneously hypothesized (either implicitly or explicitly) a direct functional analogy between organic and social processes. In other words, it is one thing to say that politics has the attributes of a cybernetic system in general, and quite another to say that it resembles a particular

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[39]Gregor, op. cit., pp. 427-432.

kind of cybernetic system--i.e., the human body.

Let us consider, then, what is implied in Easton's version of systems analysis. Because Easton did not always fully explain himself, it will be necessary to engage in some translation and interpretation as we proceed.

At the outset, Easton defines a system as any set of variables regardless of the degree of inter-relationship between them.[40] But this has the effect of throwing us off the scent, because as Easton begins to develop his structure, it soon becomes clear that he is talking about a cybernetic system in particular and not about the mere observance of correlations between variables. Easton frames his approach as follows:

> Our attention will be directed, of necessity, to the most general kind of matter that must be faced by all political systems regardless of time or place, from the most democratic to

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[40] A Systems Analysis of Political Life, op. cit., p. 21.

> the most dictatorial...The perspectives of a systems analysis of political life impel us to address ourselves to the following kind of question. How can any political system ever persist whether the world be one of stability or of change? It is comparable to asking with respect to biological life: How can human beings manage to exist? Or for that matter, what processes must be maintained if any life is to persist...[41]

In effect, Easton is saying here that political systems represent negentropy (energy and organization) and require work in order to persist. The survival of a political system requires problem-solving activities. A political system must therefore be goal-directed, at least to the extent that it must function so as to maintain itself. (Though Easton has been charged with postulating a condition of political homeostasis that is analogous to physiological homeostasis, such is not the case, and Easton expressly denies this. The hypothesized goal-state is persistence--maintenance of the process.)

This conclusion does not depend upon the above

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[41] Ibid., pp. 14-15.

statement alone, however. It is also implicit in Easton's way of characterizing the political system: Indeed, his system seems not only goal-directed but teleological as well. He tells us that political systems do not merely seek mechanistically to maintain an equilibrium but may set and seek goals other than those of reaching one or another point of equilibrium.[42]

> "At times members in a system may wish to take positive action to destroy a previous equilibrium or even to achieve some new point of continuing disequilibrium...A system need not just react to a disturbance by oscillating in the neighborhood of a prior point of equilibrium or by shifting to a new one. It may cope with the disturbance by seeking to change the environment...It may seek to insulate itself against any further influences from the environment; or the members of a system may even transform their own relationships fundamentally and modify their own goals and practices...In these and other ways a system has the capacity for creative and constructive regulation of disturbances..."[43]

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[42] Ibid., p. 20.

[43] Ibid., pp. 20-21.

In order to maintain itself (or persist), moreover, a political system must perform a systemic function. It must authoritatively allocate values for a society.[44] Indeed, that is Easton's very definition of a political system, although, somewhat confusingly, he loads more functions onto the system as he goes along. In the next breath, he tells us that a political system must also induce its members to accept its allocations of values as binding.[45] Later on, he tells us that a political system requires continuing energy in order to "put the decisions into effect and supervise their implementation."[46]

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[44] Ibid., p. 21.

[45] Ibid., pp. 22-23.

[46] Ibid., p. 205. In a recent critique of functionalist approaches to politics, Martin Landau inexplicably set Easton's work aside as not relevant to his discussion, because,he said, it was not really functionalist in nature but was based on an"information-transfer" model--as distinct from an "energy-transfer model" or a combined "information-energy-transfer model" (op. cit., pp. 57-58). If this were the case, Easton's system

Furthermore, the function of authoritatively allocating values is related to another necessary function of political systems--the processing of demands.[47] "Central to the analysis," Easton tells

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could not be a cybernetic system at all; it would merely be a communications net. But a close reading shows that Easton was quite explicit: Political systems control as well as making decisions. Indeed, later on in A Systems Analysis of Political Life, Easton attributes two additional functions to political systems that were not mentioned previously. He tells us that political systems function to maintain the unity of the people and maintain the rules and structures of authority (ibid., p. 158). These functions look very much like Talcott Parsons' "integration" and "boundary maintenance" functions (which puts Easton squarely in the functionalist tradition). But unfortunately, Easton never integrates these functions into his theoretical structure, so that, according to Easton's definition of a political system (the process of authoritatively allocating values), it could engage in unifying and rule-maintaining activities without actually existing (that is, in a situation where it was no longer allocating values).

[47]Indeed, Easton is somewhat unclear about the precise relationship between the function of authoritatively allocating values and the processing of demands. Sometimes he implies that the two processes are coextensive, which sounds very "democratic" in orientation. Leadership does not set goals for a society, it merely reacts to demands from below, demands which in turn are based on specific, conscious and expressly articulated "wants". It would appear to be basically a mechanism which responds to stimuli. We will return to this point below.

us, "will be the idea that a political system gets something done; it processes demands."[48] And, if a political system should ever prove unable to process demands it would break down, so we are told.

In short, the image of a goal-directed and even intelligently purposive system is suffused throughout Easton's writings on systems analysis. A few quotes should suffice to underscore this point:

> A political system is not just a set of structures and activities that react supinely to stimuli. It is rather a set of interactions through which positive and constructive efforts may be taken to cope with situations that threaten to destroy its integrity as a system.[49]

> A far more useful imagery conceives the system as a goal-oriented pattern of relationships through which the members are capable of adapting to their environment, using it as a source of resources, physical, financial or human, and, if necessary, transforming the system as well... It is an open, self-regulating and self-transforming system...[50]

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[48] Ibid., p. 69.

[49] Ibid.

[50] Ibid., p. 345.

> The first order problem concerns the way in which the fundamental functions necessary for systems persistence and which are expressed through specific types of processes and structures, are safeguarded in a society. Given the various kinds of stress that might have made it unlikely for any political system to endure, we need to become interested in the way in which the members of political systems have managed to handle these stresses so that, at a minimum, some kind of authoritative processes for allocating values could be assured.[51]

We thus seem to be confronted with a very curious situation. At the beginning of A Systems Analysis of Political Life, Easton criticizes normative theory for fixing on some value as a theoretical organizing principle. Instead he calls for "a broad way of formating a theoretical question, one that will deliberately refrain from fixing on specific goals..."[52] Easton states emphatically that his framework is not a theory (although we have noted some ambiguity in his writings). He does not, it is true, formulate any explanatory hypotheses as such. Yet, Easton does fulfill two out

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[51] A Framework for Political Analysis, op. cit., p. 86.

[52] A Systems Analysis of Political Life, op. cit., p. 14.

of three of Gregor's prerequisites for a functional or teleological explanation. He does specify a preferred goal-state for his system, and he does specify the conditions and traits which are necessary for the attainment and/or maintenance of that goal-state (minimizing stress by processing demands and maintaining support). What Easton has not done (and this bears on the discussion to be presented below) is specify the range of values or variation of the variables outside of which the goal-state (persistence) cannot be maintained. As Gregor correctly notes, this effectively insulates Easton's paradigm from empirical test.[53]

Although it has obviously not been subjected to empirical test, Easton's work does seem to constitute a major, if implicit, hypothesis about political life. (Its adequacy as such is another matter, of course.) Despite Easton's disavowals, he seems to be asserting that political systems are oriented to a dominant value,

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[53]Gregor, op. cit., p. 433.

or goal-state. The implicit premise, which Easton puts forward as a self-evident axiom, is that the persistence of any political system involves negentropy (organization and the utilization of energy). Persistence is thus a continuing problem. Deductively, if persistence is a problem, and if a society wishes (or requires) the persistence of its political system, then it must actively work, in a goal-directed manner, to maintain the system. Political processes may therefore be analyzed and explained functionally in terms of the persistence problem. Furthermore, any failure of a system to persist should be explainable as a failure to meet the functional requisites for persistence.[54]

In short, Easton seems to have done what he expressly sought to avoid doing and claimed he was not doing. Systems analysis would appear to be a theory in disguise.

However, it is only a theory in the older tradition of political thought--an explanation derived deductively

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[54] Ibid., pp. 24-25, 33.

either from supposedly self-evident or superficially documented premises. It is not, therefore, essentially different from the theory-building activities of an Aristotle, Machiavelli or Hobbes, despite its contemporary jargon and concepts. (Of course, it does avoid the pitfall of deducing ethical prescriptions from its premises.) It is clearly not a scientific theory in the sense of having been derived from rigorously verified, law-like premises. Also, it would appear to be a "normative theory," in that it is oriented around a dominant value--the persistence of the political system. We will deal with the question of the conceptual adequacy of Easton's quasi-theory in the next chapter. But first, several other macro-level paradigms should be discussed briefly.

Functionalism, or sometimes structural-functionalism, is at least as old as political science, as Martin Landau has shown.[55] In recent years, however, functionalism has acquired a formal status and method-

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[55] Op. cit., pp. 56-73.

ological self-consciousness and precision not previously in evidence. Again, the genealogy of this development is not entirely clear, but many social scientists, particularly in anthropology and sociology, have contributed to this analytical genre. In anthropology the names Bronislaw Malinowski and A.R. Radcliffe-Brown figure prominently, and in sociology Talcott Parsons, Marion J. Levy Jr., and Robert K. Merton have been influential.[56]

Macro-functionalism in political science (what Flanigan and Fogelman call "structural-functionalism"),[57] is distinguished by certain basic characteristics. One is a focus on politics as a single, integrated system

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[56]See in particular: Malinowski, A Scientific Theory of Culture and Other Essays (Chapel Hill: University of North Carolina Press, 1944); Radcliffe-Brown, Structure and Function in Primitive Society (London: Cohen and West, 1956); Parsons, The Social System (New York: The Free Press, 1951); Parsons and Edward Shils (ed.), Toward a General Theory of Action (Cambridge: Harvard University Press, 1951); Levy, The Structure of Society (Princeton: Princeton University Press, 1951); Merton, Social Theory and Social Structure (New York: The Free Press, 1957).

[57]William Flanigan and Edwin Fogelman, "Functional Analysis," in Charlesworth (ed.), op. cit., p. 75.

of behaviors and processes. The total system is the unit of analysis and is assumed to have distinct properties of its own. Another is a process, rather than structural, orientation. A third is the hypothesis of functional interdependence between diverse structures and processes. Fourth, it is assumed that the system has certain functional requisites. And finally, it is assumed that processes (and the structures with which they are associated) may be analyzed functionally--that is, with reference to their consequences for the system. Again, the hypothesis of goal-directedness is not always explicit. In some cases, it is even better hidden than in Easton's work, but it is there nonetheless. Indeed, it is implicit in the very notion that a system has functional requisites without which it will not persist.[58]

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[58] Ibid., p. 76; also, Almond and Powell, op. cit., pp. 10-41; Landau, op. cit., pp. 55-58; and Holt op. cit., pp. 88-90. In the past, there have been serious logical and methodological problems raised against the functionalist-approach, but, as Holt shows, these are surmountable.

The most elaborate, if not systematic, of the functionalists is, of course, Talcott Parsons. And, while Parsons' focus is the social system as a totality, he includes within his theoretical structure a conceptualization of politics which has served as a starting point for many functionally-oriented political scientists (notably Almond, Holt and Mitchell).

Parsons' most recent formulation of his constantly evolving thought-structure is contained in Societies: Evolutionary and Comparative Perspectives (1966).[59] His focus is the "action system," an analytical construct encompassing human behavior in all of its dimensions, and he makes it clear at the outset that his action system is purposeful, being as it is the product of human actions:

> Action consists of the structures and processes by which human beings form meaningful intentions and, more or less successfully, implement them in concrete situations...Intentions and implementation

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[59] (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966).

> taken together imply a disposition of the action system--individual or collective--to modify its relation to its situation or environment in an intended direction.[60]

Although we are apparently dealing here with a goal-directed system, (indeed the book is laced with cybernetic imagery), it appears to be one of a very special kind. As MacKenzie points out, Parsons seems to exclude all but consciously formulated goals.[61] Also, he seems to rule out goal-directed activities that might come under the heading of maintenance, rather than the deliberate change of a status quo. Nonetheless, goal-directedness is a definite part of Parsons' schema.

Furthermore, Parsons postulates four functions as requisite to the persistence of any action system": 1. pattern maintenance, that is, "maintenance of the highest 'governing' or controlling patterns;" 2. internal integration; 3. "orientation to the attainment

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[60] Ibid., p. 5.

[61] Op. cit., p. 90.

of goals," in relation to its environment; and 4. an "adaptation to the broad conditions of the physical environment."[62]

One of these four requisite functions, it will be noted, is goal-attainment--which would seem to make his conceptualization clearly cybernetic in character. But what is particularly striking is that Parsons allocates his four functions to specific social structures in such a way that the goal-attainment function is considered primarily the province of the "polity" or political system:[63]

> The goal-attainment subsystem is the polity, consisting of collectivities, governmental and private, which contribute organizational capacities to the achievement of the goals of the society and its subsystems.[64]

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[62] Parsons, Societies: Evolutionary and Comparative Perspectives, op. cit., p.7.

[63] Parsons, "The Political Aspect of Social Structure and Process," in Easton (ed.) Varieties of Political Theory, op. cit., p. 106. The other three functions (pattern maintenance, integration and adaptation) are linked by Parsons respectively to religious groups and the family, the "Law" or legal system, and the economy.

[64] Ibid.

> Political structures are concerned with organizing collective action for the attainment of collectively significant goals, whether on a society-wide basis or on a more narrow basis, either territorially or functionally defined.[65]

In other words, Parsons would seem to be willing to go a step further than Easton. Instead of being primarily a processor of demands, Parsons' political system is specifically assigned the task of collective-goal attainment for society as a whole. This would appear to represent an important hypothesis about the nature of political life, and we will return to it below.

In adapting Parsons' approach to political science, political theorists have borrowed eclectically For example, in Almond's early formulation of his functionalist approach, in The Politics of Developing Areas, he merely catalogued five "political" and three "governmental" functions which he said are recurrent in all political systems.[66] However, Almond did not

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[65]Societies: Evolutionary and Comparative Perspectives, op. cit., p. 13.

[66]Gabriel A. Almond, "A Functional Approach to Comparative Politics," in Gabriel A. Almond and

at that point provide a theoretical structure for his functions. Their interrelationships were not made clear, and the observance of their recurrence in different societies was not linked to any hypothesis to the effect that these functions were either necessary or sufficient for the persistence of the system.[67]

Six years later, in Comparative Politics: A Developmental Approach (co-authored with G. Bingham Powell, Jr.), these ambiguities were resolved. Significantly, they were resolved by effecting a merger between Easton's conceptualization of the political system and Almond's own, reformulated, catalog

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James S. Coleman (eds.), The Politics of Developing Areas (Princeton: Princeton University Press, 1960). The five political functions are: political socialization, political recruitment, interest articulation, interest aggregation, and political communication. The three governmental functions (which are obviously analogous to the traditional legislative, executive and judicial functions) are rule-making, rule-application and rule-adjudication.

[67]Flanigan and Fogelman, op. cit., p. 77.

of specific functions.[68] Here, Almond is more explicit: "We have to deal with those processes which maintain or change political systems over time."[69] In explaining his approach, Almond states:

> The system of interaction which ensues may be anything but harmonic and stable, but it will be interdependent. And it is the task of political science research to ascertain how change in any one of the parts of a political system affects other parts and the whole.... The ability to explain and predict in the social sciences is enhanced when we think of social structures and institutions as performing functions in systems.[70]

Thus, like Easton, Almond formulates no explicit hypothesis about the nature of politics, but a cybernetic conception of political life forms the implicit premise upon which Almond's functionalism is based.

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[68] Op. cit., chapter 2. Actually, Almond now has three analytical categories. One is a category of systemic capabilities: regulative, extractive, distributive, and responsive. A second is a set of functions related to the "conversion process" which goes on at the heart of the system. These include: interest articulation, interest aggregation, rule making, rule application, rule adjudication and communication. Finally there are what Almond calls "system maintenance and adaptation" functions: socialization and recruitment.

[69] Ibid., p. 22.

[70] Ibid., pp. 13, 28.

Like Easton, Almond also conceives the political system as performing essential functions for the larger society. His conversion process is similar to Easton's,and his rule making, rule application and rule adjudication functions correspond to Easton's authoritative allocation of values. Likewise, Almond follows Easton in defining his political system functionally--in terms of the functions it performs. On the other hand, Almond focuses his attention far less on the problem of how the political system maintains itself and far more on the relationship between a political system and its environment. He is concerned ultimately with developing systematic comparisons between societies,and with the conditions and causes of political development.[71]

Somewhat closer to Parsons is William C. Mitchell, whose conceptualization is derived from Parsons' suggestion that the political system should be viewed as the principal instrumentality of the goal-attainment

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[71]Ibid., pp. 30-41.

function for society.[72] Whereas Easton limits his inputs to demands and supports, Mitchell adds expectations (what the citizenry may desire, perhaps even unconsciously), and the resources necessary for the system to pursue goal-attainment activities. And, where Easton does not make any sharp functional distinction between his "outputs," Mitchell divides his into: a. system goals; b. values and costs; and c. controls. Mitchell thus accords the political system a conceptually broader role, more in keeping with the Parsonian paradigm.

Robert T. Holt, on the other hand,has been developing a conceptually innovative application of Parsons' four functional requisites which departs radically from the original. First, he argues that systems-relevant functions must be related to concrete structures and processes to be analysed meaningfully. Social structures are viewed by Holt as independent variables, the processes (and mechanisms) associated

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[72] Op. cit., chap. 1.

with those structures are viewed as intervening variables, and the functions they perform are treated as the dependent variables. Second, he argues that a variety of structures or processes may fulfill the same functional requisites in different situations. His third, and most important, proposition is that the state of a political system at any given time t_1 is "determined" by its state at some other time t_o and by the events which have occurred on the system's boundary between t_o and t_1. "Changes in the system occur as responses to changes in the environment on the boundary of a system, but the state of the system places limits upon the kind of responses which can be made."[73]

With these propositions as a foundation, Holt then proceeds to construct the following hypotheses: Social systems (including their political systems) may be categorized in accordance with the structural alternatives by which the four Parsonian functions are performed. Furthermore, the resulting taxonomies will

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[73] Ibid., p. 92.

reflect the characteristics of the environments in which they are located. The specific structures, processes, and, consequently, functional contributions of any political system will thus be the result of a process of "developmental accommodation" between the system and its environment.[74] The problems involved in hypothesizing such "external" determinism will be discussed below. But for now, suffice it to say that Holt's conceptualization, like thoseof Easton, Parsons and Mitchell, is one of a goal-directed system. As Holt puts it: "For any social system there is a set of functional requisites--operational conditions that must be satisfied if the system is to continue to exist."[75]

The final category of paradigms to be considered here are what have incorrectly been labelled "communications models" of the political system. In fact, they are not communications paradigms; they are cybernetic paradigms. Karl Deutsch, the chief proponent and expounder of this approach probably bears part of the

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[74] Ibid., pp. 95-98. [75] Ibid., p. 89.

blame for being mislabelled a communications theorist, for in his presentations of cybernetics concepts (from which his own paradigm is frankly drawn), he emphasizes the communications rather than the "steering" or "control" aspect of cybernetic systems. He will say, for example:

> The viewpoint of cybernetics suggests that all organizations are alike in certain fundamental characteristics and that every organization is held together by communication...It is communication, that is, the ability to transmit messages and to react to them, that make organizations.[76]

Only at the end of his discussion will Deutsch observe: "Finally, cybernetics suggests that steering or governing is one of the most interesting and significant processes in the world."[77]

It is not only interesting; it is the very heart of the cyberneticists' kind of system. Communications is certainly vital to such a system, and if one cares to, he may analyze communications processes as a distinctive set of phenomena. But what distinguishes a cybernetic system from a telephone network is that a

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[76]Deutsch, op. cit., p. 77. [77]Ibid., p. 89.

cybernetic system is "purposive," or goal-oriented (and often self-regulating). Communications facilitate control processes in highly organized, goal-directed systems, but they are not the most significant aspect of such systems.

Deutsch certainly understands this point. In laying the groundwork for his paradigm, he provides us with a masterful discussion of cybernetics concepts--including the cyberneticists' interpretation of such thorny concepts as "purpose," "will," "autonomy" and "mind."[78]

Furthermore, Deutsch fully endorses Parsons' catalog of requisite functions, including Parsons' linkage of politics to goal-attainment.[79] At one point Deutsch defines the "essence" of politics as: "The dependable coordination of human efforts and expectations for the attainment of the goals of the society."[80]

Finally, in elaborating his paradigm, Deutsch

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[78] Ibid., chaps. 5-8. [79] Ibid., pp. 116-117.

[80] Ibid., p. 124.

devotes a chapter to discussing government as a process of "steering". He deals specifically with "goals" and "purposes," as well as discussing the role of feedback in the process of governing.[81]

Yet it is also true that Deutsch lays heavy emphasis on communications processes and their functions and devotes proportionately less attention to goals, goal-setting and processes of political control. Perhaps it is for this reason (and perhaps also because his paradigm is architecturally less well developed), that Deutsch is erroneously treated as being in a conceptually different, not to mention less important, category from Easton, Parsons and Almond. No less perceptive a scholar than MacKenzie, in his highly regarded overview of political science Politics and Social Science, gives Deutsch one page under "partial theories."[82] Likewise, Wasby dismisses Deutsch's "communications theory" [sic] with the following: "The cybernetics model loosely adapted by Deutsch for analyzing

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[81] Ibid., chap. 11.

[82] Op. cit., pp. 117-118.

the stability and instability of political systems as coupled communications systems is not rich enough to do all that he intends to do with it."[83]

One can only conclude that, whatever contribution Deutsch may have made to the misunderstanding of his work, some of his critics do not fully understand cybernetics concepts.

In point of fact, Deutsch fully shares with the systems theorists and the functionalists the fundamental, if often implicit,premise that human social and political life fits the definition of a cybernetic system, and that the persistence of the system is a basic problem (if not necessarily the principal focus of the system's goal-directedness).

Despite differences of emphasis, despite some conceptual disagreements about the relationship between the political system and its environment, and despite many terminological differences, the central premise in each of these paradigms would seem to be identical. We

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[83] Op. cit., p. 144.

appear to be dealing with a common point of view and a more orderly theoretical frame of reference than all of the superficial differences would seem to imply.

In the course of his generally caustic critique of such paradigms, Gregor seems to sense (although he does not really pursue) the theoretical substance underlying all the disclaimers, the jargon and the runic abstractions. "What passes for functional accounts in political science," Gregor tells us at one point, "are generally explanation sketches of a singularly elliptical sort."[84] Elsewhere, Gregor refers to such approaches as "promissory notes on such explanations,"[85] and as "'working hypotheses' which can best be construed as exhortations to treat society, political systems and personality as self-regulating systems."[86]

The problems, then, are threefold. First, we must see what evidence exists to support or disconfirm this

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[84] Op. cit., p. 433. [85] Ibid., p. 434.

[86] Ibid.

common hypothesis. Second, we must see what the evidence tells us about some of the major criticisms that have been made of these paradigms. (These criticisms will be discussed in the next chapter.) And, third, we must see what the evidence has to say about some of the more significant conceptual differences between these paradigms.

CHAPTER THREE

SOME CRITICISMS OF CURRENT PARADIGMS

The critical literature relating to current theoretical paradigms is already so extensive and forbiddingly complex that it is becoming increasingly difficult to gain control of it. One source of confusion is the fact that some still-current criticisms relate to positions that were long ago abandoned by the exponents of one or another of the various approaches. For example, it is doubtful that any functionalist today would espouse the position argued by Malinowski in 1926 that: "In every type of civilization, every custom, material object, idea and belief fulfills some vital function...represents some indispensable part within a working whole."[1] Landau points to this line of reasoning as if it were typical of contemporary functionalists,[2] when in fact many

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[1]Malinowski, "Anthropology," Encyclopedia Britannica (1926),Suppl. Vol. I., p. 132.

[2]Landau, op. cit., p. 65.

of them today recognize not only dysfunctional phenomena but non-functional "survivals" as well.[3]

Adding to the confusion is the fact that some of the criticisms to be found in the literature refer to apparent misinterpretations of current paradigms, rather than to what those paradigms actually do or imply; their architects are sometimes accused of doing things they have not in fact done.

One of the most persistent canards in this respect is the charge that the paradigm-makers have a conservative bias, and that their frameworks tend to justify the status quo; these paradigms are said to imply that whatever is is "good" (i.e., functional).[4] (Of course, to

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[3]Young, op. cit., p. 35. The concept of a survival relates to structures or processes that once performed some function but no longer do so. For a systematic discussion of this concept, see: Abram Kardiner, The Psychological Frontiers of Society (New York: Columbia University Press, 1945).

[4]Young, op. cit., p. 36; also W.G. Runciman, "Functionalism as a Method in Political Thought," in James A. Gould and Vincent V. Thursby (eds.), Contemporary Political Thought: Issues in Scope, Value, and Direction (New York: Holt, Rinehart and Winston, Inc., 1969), pp. 189, 195-196.

describe the function of a particular behavior within a system is not equivalent to an endorsement of the system.) But, perhaps this accusation was applicable to early Parsonian thinking, which was in fact based upon a rather crude and mechanistic notion of an inherent equilibrium in society.[5] In more recent writings, though, Parsons has developed a (social) evolutionary and historical focus. Early in Societies: Evolutionary and Comparative Perspectives (1966), Parsons declares: "The special type of process with which this book is concerned...is change. Though all processes change something, it is useful for our purposes to distinguish from others the processes which change social structures."[6] Parsons then proceeds to develop a "Paradigm of Evolutionary Change."[7]

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[5]See Max Black, "Some Questions About Parsons' Theories," in Max Black (ed.), The Social Theories of Talcott Parsons (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961).

[6]Parsons, op. cit., p. 21.

[7]Ibid.

Likewise, Flanigan and Fogelman have pointed out that many, if not most, of the political scientists who have employed a functional approach have been concerned particularly with using it to illuminate the processes of political development.[8] As Almond puts it at the conclusion of his "overview" chapter in Comparative Politics: A Developmental Approach: "Political change is one of the most pervasive and fundamental concerns of our analysis."[9]

Finally, David Easton takes pains to emphasize that his analytical system focuses upon essential processes, and not upon the particular structures by which such processes take place. Pointedly abjuring the idea that his theoretical system is predicated upon some conception of a static equilibrium, Easton tells us:

> For any social system, including the political, adaptation represents more than simple adjustments to the events of its life. It is made up of efforts, limited only by the variety of human

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[8]Flanigan and Fogelman, op. cit., p. 79.

[9]Almond and Powell, op. cit., p. 41.

> skills, resources, and ingenuity, to control, modify or fundamentally change either the environment or the system itself, or both together.[10]

There are, however, a number of substantial and well-founded criticisms of contemporary paradigms which are as yet unanswered. Because some of these also relate to the paradigm to be developed here, they are relevant to this discussion. Accordingly, a brief summary of the more important criticisms is in order. Some of these criticisms apply generally to all the current theoretical approaches, while others apply to particular paradigms, or to a particular variation on a paradigmatic theme. In addition, some criticisms not previously raised but relevant here will be included.

Perhaps the most serious criticism--levelled primarily at functionalist and systems paradigms but applicable to Deutsch's framework as well--is that the questions to which they are addressed, at least explicitly, are not sufficiently interesting or important. Enumeration of the requisite functions or processes

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[10]Easton, A Systems Analysis of Political Life, op. cit., p. 21.

essential to the persistence of a system tells us nothing about how such systems come into being, why they exist or why the specified functions are in fact required, as hypothesized, for systemic persistence.[11] A question such as: "What are the functional requisites for the persistence of a political system?" is certainly significant; but the answer, assuming it could be answered empirically, would represent a law with relatively little explanatory power in and of itself. Meehan describes this as "a weak form of theory."[12]

Gregor seems to concur, despite the intimations noted earlier that he also recognizes the more important, if obscured, hypothesis of systemic goal-directedness which is implicit in these paradigms. Gregor concludes: "...functionalist analyses are not explanatory at all--they are analytic and heuristic--and consequently

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[11]Young, op. cit., p. 47; Runciman, op. cit., pp. 188-189; Flanigan and Fogelman, op. cit., p. 83.

[12]Meehan, op. cit., p. 153.

singularly incapable, in themselves, of providing predictive or explanatory [sic] leverage."[13]

Indeed, of the four major types of explanation listed by Meehan--causal, functional, teleological and "genetic" (that is, an explanation based on historical antecedents)--only one, functional explanation, is explicitly embraced and developed by current theoretical paradigms.[14]

A second major criticism concerns the issue, mentioned above, of the applicability of various functionalist, systems and "communications" paradigms to political phenomena. Gregor, quoting freely from Ernst Haas, James Miller, A.R. Radcliffe-Brown, Chalmer Johnson and Carl G. Hempel in support of his argument, accuses the macro-theoreticians of having uncritically borrowed metaphors from homeostatic physiology and servo-mechanical systems.[15] Gregor writes:

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[13]Gregor, op. cit., pp. 431, 432, 438.

[14]Meehan, op. cit., pp. 98, 116-125.

[15]Gregor, op. cit., pp. 427-428.

> Functional analysis employs the techniques characteristic of biological explanation... The explanatory power ascribed to macro- and micro-functionalist analyses derive, in significant measure, from organismic analogies.... Frequently a system, like the human organism, having specific and specified system requisites is seen as analogous to a society...But it has not been established that society shares syntactical or nomic isomorphism with any non-societal empirical system.[16]

However, as suggested above, the accusation of making false analogies is essentially an attack on a straw man. Contemporary theorists are not so naive as to claim a formal analogy between social processes and homeostatic processes in the human body. Indeed, a close reading of Easton's work shows that he expressly denies this.[17] The critical isomorphism hypothesized by these theorists is between cybernetic systems and societies--as pointed out above.

In other words, the challenge to contemporary macro-theoretical frameworks cannot be couched in terms of false analogies. The challenge must instead be

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[16]Ibid., pp. 427, 431.

[17]Easton, A Systems Analysis of Political Life, op. cit., pp. 19-21.

addressed to the implicit hypothesis that societies (or political systems) may be characterized as self-regulating, goal-directed systems. The proper question should be whether or not social or political systems do in fact exhibit the characteristics of a cybernetic system. As noted above, this hypothesis is built into the very architecture of contemporary paradigms; utilization of the various concepts and analytical categories proposed in these frameworks is contingent upon at least tacit acceptance of this hypothesis. But, the hypothesis of goal-directedness has not generally been formulated explicitly, much less subjected to empirical verification.

Among the political scientists who have taken note of this situation, there has been a spectrum of responses. Herbert J. Spiro, who takes a sanguine view, is at one end of the spectrum. Because political systems are empirical systems rather than analytical constructs, Spiro argues, and because they are more or less consciously purposive and goal-directed systems: "Teleological systems analysis is more warranted for

political systems than for the others," he concludes.[18]

At the other end of the spectrum is Gregor, who takes a hard line:

> ...Explanatory and predictive power can only be the consequence of verification studies conducted on the primary object of study itself....Essential to such explanations is the establishment of appropriate hypotheses of self-regulation and goal directedness in an objectively testable form.[19]

Oran Young takes a middle-ground position, however. Conceding that the issue cannot be fully resolved on an abstract, or deductive basis, he nonetheless observes:

> It is relatively clear that a number of isomorphic relationships do exist and that the conceptual notion of isomorphism is not entirely empty empirically. The important question, however, concerns criteria of significance with which to judge isomorphic relationships.[20]

Young's observation points to a third major criticism--or set of criticisms--of contemporary paradigms, which might be classified together under the

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[18]Spiro, op. cit., p. 166.

[19]Gregor, op. cit., pp. 432-434.

[20]Young, op. cit., p. 24.

heading of "operationalization problems."[21] Underlying a large number of specific criticisms of one or another of these paradigms is the basic argument that key concepts, processes, functions or relationships have been defined so vaguely, with so little precision and empirical content, that they cannot be operationalized. Many of the concepts have not, in fact, been derived inductively -- from a rigorous analysis of the empirical world -- but have been deduced. (Most charitably, one might describe their genesis as a kind of gestalt analysis.) This criticism is particularly true of cybernetic paradigms, whose concepts were borrowed ready-made and merely adapted for use with political phenomena. The result, as Flanigan and Fogelman point out, is that "the analyst can define his 'requisite functions' as he pleases, and he can be equally imaginative in locating which structures perform

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[21]The following discussion will be based on critiques in Gregor, op. cit., pp. 431, 434; Young, op. cit., pp. 24-25, 26, 31-37, 44-48 and 59-62; Flanigan and Fogelman, op. cit., pp. 81-84; and Runciman, op. cit., pp. 189-192. All of these writers are in essential agreement about the shortcomings of current paradigms as directives for empirical research.

what functions."[22]

Among the specific criticisms to be found in the literature are the following:

1. Because various lists of functions (and associated structural arrangements) have been derived deductively, no empirical criteria are provided for choosing between these lists.

2. Thus far, no empirical support has been generated for the basic hypothesis of functional requisites. It is therefore impossible to formalize "if-then" propositions around this hypothesis. (Indeed, Flanigan and Fogelman charge that there is a striking paucity of explicit hypotheses to be found in these paradigms,[23] although Young asserts that a close reading of the literature reveals a number of somewhat buried or implicit hypotheses.[24])

3. Insufficient empirical content has been provided for quantification of key variables in a

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[22]Flanigan and Fogelman, op. cit., p. 80.

[23]Ibid., p. 82.

[24]Young, op. cit., p. 25.

number of frameworks. How does one go about measuring degrees of pattern maintenance, for instance?

4. Likewise, the linkages between theoretical concepts and specific, empirical processes and structures are generally weakly established, if at all.

5. In most instances, system boundaries are not delineated with sufficient precision to enable an analyst to make a meaningful selection among potentially relevant phenomena.

6. Ordinarily, no specification is made, beyond the vaguest generalities, of the permissible range of variation of key variables before the system "breaks down."

7. No criteria are provided by theorists who have borrowed concepts from cybernetics for evaluating the degree of isomorphism between an empirical political system and a cybernetic system.

8. The models developed by many of these analysts become procrustean beds, into which must be forced a variety of phenomena that may or may not fit. Easton and Deutsch in particular have been criticized for

overformalizing in their models processes that are less rational, less orderly and less susceptible to the imputation of clearcut cause-effect (or stimulus-response) relationships than the models would lead one to believe. Many qualitative factors (psychological nuances, personality influences, emotions, ideologies etc.) which are recognized as important facets of political life are seen as having been given short shrift in these models.

9. A general overemphasis on process has led to a neglect of outcomes--except in terms of their relationship to the maintenance of the process (i.e. the system). As Young puts it, with reference to functionalism in particular: "This type of analysis provides relatively little scope for the discussion of goals and objectives. Its emphasis on maintenance and survival (though these are systemic goals in themselves) tends to circumscribe the extent to which it can deal with other types of normative demands and interests."[25] By the same token,

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[25] Ibid., p. 34. As will become clear below,

a focus on process and function tends to downgrade interest in specific behaviors.[26]

10. Finally, there is the charge that analytical paradigms such as Easton's have no predictive capability because the definition of a political system is a tautology. A system defined as a process exists when the process exists; it exists when it exists.

Flanigan and Fogelman's conclusions with respect to structural-functionalism in particular probably express well the prevailing sentiment toward all of the major current paradigms:

> Structural-functionalists have not taken the enormously difficult step of refining, operationalizing, and testing hypotheses....we raise the question whether the emphasis upon

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Young's remark is a reflection of an underlying conceptual confusion in the discipline of political science. First, political scientists have tended to focus their attention upon the persistence of the political system, rather than upon the persistence of the larger system in which the political system is embedded. And second, political scientists do not ordinarily define the term "survival" in a broad enough manner to encompass the full scope of the problem.

[26] Ibid., pp. 59-60.

> "functions" as the focus of analysis is likely to prove fruitful. The contention that an emphasis upon functions may prove abortive as the focus for analysis at the level of the political system as a whole is based on the difficulties encountered first in defining functional requisites operationally, and second in specifying the indefinite range of activities which fulfill these functions.... The difficulties...suggest that this type of analysis is unlikely to achieve its objectives.[27]

In addition to these general criticisms relating to the problem of operationalization, a number of conceptual criticisms of specific paradigms have also been put forward. Only a few of the most important will be mentioned here, in order to lay the ground-work for a later discussion of these paradigms in relation to the theory of evolution. Two of this writer's criticisms of Easton will also be discussed.

First, a number of critics have charged that structural-functionalism, because of its focus on the functions which maintain systems, is essentially a static framework, despite disclaimers by its practitioners. Indeed, as Young points out, structural-functionalism

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[27]Flanigan and Fogelman, op. cit., pp. 82-84.

is ill-equipped conceptually for explaining change, except in the direction of better performance of its requisite functions.[28]

Deutsch's framework is better able to describe the processes of change--through goal-changing feedback and learning processes, for example--but as Young notes, Deutsch's focus is on the process of goal-attainment and not upon the criteria or specific processes by which goals are set and values allocated (that is, upon Lasswell's question: "Who Gets What, When, How?").[29]

There is also the accusation that Deutsch's model is simply too mechanistic, too formal and logical and too focused on process--the quantitative flows of information through communications networks--to be able to deal adequately with the disorderly, highly qualitative and value-laden processes of politics. In other words, Deutsch's model is charged with having the

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[28]Young, op. cit., p. 36.

[29]Ibid., pp. 58-59.

defects of its virtues.[30]

If most of the other functionalists are unable to deal adequately with change,Holt's explanation, which focuses expressly upon the mechanisms of change, is at once too vague about the linkage between environmental changes and changes within the political system.At the same time, it is too deterministic in its approach. Holt characterizes systemic changes as being the result of a kind of crude stimulus-response model, leaving nothing to human goal-setting and goal-seeking capabilities. Nor is he able to give any specificity to the kinds of environmental changes that are politically relevant,and why.

Finally, we come to Easton's edifice, which is at once the most completely elaborated and most conceptually flawed of all the contemporary paradigms. In the first place, because of Easton's emphasis upon analytically defined processes rather than empirical processes and structures, a great many existential political phenomena (wars, revolutions, famines, depressions) would go un-

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[30]Ibid., pp. 59-62.

noticed by an analyst working with such a paradigm, unless it had some effect upon the analytic process. As Thomas Thorson notes: "How costly is an abstraction, allegedly relevant to politics, that leads us to conclude that the French Revolution, the coming of the New Deal, the Labour victory in 1945, Hitler's taking power, and indeed, I suppose, the German conquest of Poland are all instances of persistence."[31]

This leads to a very curious paradox, the result, one suspects, of a failure to distinguish adequately between the analytical and empirical systems. Easton asserts that the political system (defined by him as the process of authoritatively allocating values) will persist as long as the process persists. He also asserts that every organized society requires such authoritative allocations of values. In other words, the persistence of the political system (or the authoritative value allocation process) is virtually coextensive with

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[31]Thomas Landon Thorson, Biopolitics (New York: Holt, Rinehart and Winston, Inc., 1970), p. 66.

the physical survival of a society. Presumably only during brief periods of anarchy or civil war could the political system "break down" without the society itself being destroyed as a viable entity. One wonders, then, why Easton gives so much attention to problems of "stress" on the political system and to maintenance of "support". Loss of support for a particular regime, even to the point where a revolution occurs, does not represent a significant change in terms of the viability of Easton's political system as process. As Philip E. Converse notes, the survival of Easton's system seems to hinge on variables which are exogenous to almost any study of empirical political processes.[32]

An even more serious conceptual problem, it would appear, relates to the role of "persistence" in Easton's paradigm. He argues:

> How do any and all political systems manage to persist in a world of both stability and change? Ultimately the search for an answer will reveal what I have called the life process of political

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[32]Converse, review of David Easton, A Framework For Political Analysis, The American Political Science Review, LIX, No. 4. (1965), pp. 1001-1002.

> systems...The analysis of these processes, and of the nature and conditions of the responses, I posit as the central problem of political theory.... Persistence and change of systems, or rather, persistence through change has seemed to be the most inclusive kind of question that one might ask about a political system.[33]

By his own admission, the focus of Easton's framework is how a political system maintains itself. In his analysis, the basic goal-state toward which the input-output conversion process is oriented is the preservation of the political system. At one point Easton describes the system as follows: "The political system looks like a vast and perpetual conversion process. It takes in demands and support as they are shaped in the environment and produces something out of them called outputs."[34]

> ...our analysis will rest on the idea of a system imbedded in an environment and subject to possible influences from it that threaten to drive the essential variables of the system beyond their critical range. To persist, the system must be capable of responding with measures that are

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[33]Easton, A Systems Analysis of Political Life, op. cit., pp. 17, 475.

[34]Ibid., p. 29.

successful in alleviating the stress so created.[35]

This leaves us with the clear implication that the system only processes demands in order to maintain itself. Easton is conceptually vague about goal-attainment beyond the problem of system maintenance. One may well question, however, whether or not the persistence of the political system is in fact the most inclusive problem one might treat with respect to political life.

Easton is not unaware, of course, of the interrelationship between the political system and the larger system in which it is embedded. As he himself puts it, his system is conceived to be an "open system" which is functionally related to the larger society. Now, it may be self-evident that a political system defined as a process embedded in a larger system cannot persist unless the larger system also persists. And Easton alludes in his discussion to the fact that some of the phenomena that produce "stresses" on the system

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[35] Ibid., p. 33.

are things which relate to the persistence of the larger system--wars, famines, depressions and the allocation of scarce resources (resources required for survival). But this point is not made a structural element of his formal paradigm. In contrast with Parsons' paradigm (which Deutsch, Holt and Mitchell also seem to support), Easton's political system has no explicit goal-attainment function for the larger society--except for whatever goal-attainment the individual interpreter may wish to read into Easton's reference to the authoritative allocation of values for a society.

This conceptual problem in Easton's paradigm is linked to a third problem--one that leads Easton to an apparent contradiction.

As suggested above, Easton characterizes the value allocation process as essentially one in which demands and supports are converted into outputs, which gives his paradigm a democratic cast. Demands, Easton says, are central to his conception; without them there

would be no occasion for allocating values.[36]

Yet, at the same time, Easton does not want to be accused of hypothesizing a crudely mechanistic process. He is careful to explain that the proccessing of demands within the "black box,"or decision center, is not merely a matter of responding "supinely" to stimuli.[37] Demands are processed in a very purposive way, although Easton does not specify the criteria by which such decisions are made.

Later on, moreover, under his discussion of outputs, Easton introduces the idea that the outputs may not be deterministically linked to demands at all, and that autonomous leadership may play an important role in politics. Easton tells us:

> Outputs are not the product of the passive summation of demands, as though the role of the authorities were to add up the pros and cons in a controversy, compare one demand with another, cancel one in favor of another and so forth, until, using the rules of the game in the system, they arrive at some decision or output and reconcile conflicts among relevant members...On the contrary,

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[36] Ibid., p. 48.

[37] Ibid., p. 69.

> the authorities...are able to intervene positively in the course of events. They have the capacity to work constructively on the demands or issues, to recombine, reassess, assimilate or reject them. The authorities may be able to sponsor entirely new demands, unthought of by other members in the system...They may also on their own initiative establish objectives and evaluate needs in the light of present circumstances and anticipations of future resources and consequences. [Italics added.][38]

This extraordinary passage begs numerous questions. At very least, Easton will have to resolve the apparent conflict between his explicit characterization of the system as a process which converts demands into outputs and his later suggestion that the decision-makers of a society may act purposively (and with considerable autonomy) on the basis of decision-making criteria other than those derived directly from demands. Though Easton never says it in so many words, one is left to infer that the decision-making criteria employed by political authorities are the maintenance needs of the political system (an arguable proposition, if this is indeed what Easton meant to imply).

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[38] Ibid., p. 346.

To summarize, then, it appears that the critics are, for the most part, extremely dubious about the immediate prospects for any of the current paradigms. Gregor was quoted above to this effect,[39] and Landau[40] and Meehan seem to concur.[41] Runciman concludes: "This chapter has suggested grounds for skepticism about the capacity of functionalism to provide full explanations of political or other social behavior."[42] And Flanigan and Fogelman are unequivocal:

> We raise the question whether the emphasis upon 'functions' as the focus of analysis is likely to prove fruitful....The difficulties encountered in applying structural-functionalism to the analysis of political systems...suggest that this type of analysis is unlikely to achieve its objectives.[43]

Empirical, or explanatory, theory-building efforts would thus appear to be at an impasse. Indeed, political

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[39] Supra, note number 15 , Chapter Two, p. 18.

[40] Landau, op. cit., p. 75.

[41] Meehan, op. cit., p. 109.

[42] Runciman, op. cit., p. 196.

[43] Flanigan and Fogelman, op. cit., pp. 83-84.

events of the past few years external to the discipline of political science have tended to eclipse activities related to furthering the science of politics. Instead, there has been a revitalization of interest in normative theory and political problem-solving activities, and a diminution of interest in empirical theory.

However, one major avenue for developing both empirical and normative political theory has not as yet been explored by political scientists. The burden of the argument here will be that the "modern," "synthetic" theory of biological evolution (also referred to as the "Darwinian theory of evolution" in order to distinguish it from other evolutionary theories), would seem to contain within it the basis for a unified explanatory theory of all life, including human social and political life. This line of argument will be developed in detail in subsequent chapters. Before proceeding, though, certain methodological clarifications should be made with respect to the criticisms discussed above.

First, there is Young's argument that most of the

shortcomings involved in functional analyses are not inherent in this form of analysis but attributable to its practitioners. Young points to three common fallacies to be found in functional analyses: 1. the "fallacy of functional teleology" (or the tendency to assume that any recurrent pattern of activity is a functional requisite); 2. the fallacy of "universal functionalism" (or the tendency to attribute functionality to every kind of social phenomenon); and 3. the "fallacy of deductive functionalism" (or the tendency to develop lists of functions deductively and then to go looking for patterns of behavior to which to attribute these functions).[44] It will be argued here that a paradigm based on the theory of evolution can avoid these pitfalls.

A second point relates to Meehan's argument that truly explanatory theory is not possible at the present stage of development in the social sciences because of a conspicuous lack of explanatory "laws" upon which to base such a theory.[45] It will be argued here that such

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[44]Young, op. cit., p. 35-36.

[45]Meehan, op. cit., p. 109.

laws do exist in the life sciences, and that they can be transferred to human social and political behavior without prejudice to provide the necessary explinanda. In other words, it will be contended here that a system of explanatory hypotheses about human political life can be derived from the Darwinian theory of evolution and from existing knowledge about the workings of the evolutionary process.

Finally, there is the challenge that Gregor laid down for those who would aspire to develop a satisfactory functionalist theory of political life:

> ...Any effort to characterize the conditions for survival of a society, a culture, or personality is extremely difficult, but functional explanations can hardly be conceived adequate unless such initial determinations are forthcoming....What is initially required, should such affirmations aspire to the status of theoretical propositions, would be a specification of biological, personality and general 'system' needs..."[46]

The chapters to follow will be addressed to precisely this challenge.

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[46]Gregor, op. cit., pp. 434, 438.

CHAPTER FOUR

EVOLUTIONARY CONCEPTS IN THE HISTORY OF SOCIAL AND POLITICAL THEORY

Most contemporary social and political theorists are evolutionists in the sense that they recognize the ubiquity of social change and assume it is at least a structured, if not directional, process. As pointed out above, even functionalist and systems paradigms are conceived dynamically. Nor, as we shall see, are modern thinkers unique in their outlook. Ideas of change, growth and development have contested with both metaphysical and naturalistic conceptions of an underlying order and immutability ever since the beginnings of Western philosophy.[1] Indeed, it may not be too far-fetched to argue, with sociologist Robert A. Nisbet, that most of the social theories from Plato to the latter-day Parsons may be studied as variations on a single theme:

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[1]W. Windelband, A History of Philosophy (trans.), (New York: The Macmillan Co. 1954), chap. 1.

The idea of growth or development.[2]

Accordingly, the major distinctions between Darwinian and non-Darwinian theories of social life lie not in the postulate of change but in the manner in which various theorists characterize the process -- as well as in the kind of supporting evidence brought to bear. A necessary prerequisite, therefore, to an exposition of the modern, synthetic theory of biological evolution is a brief critical resume of the place of evolutionary concepts in the history of social and political theory. Not only should such a resume provide us with an intellectual framework within which to describe the Darwinian theory of evolution, but it should sharpen our awareness of the distinction between the modern theory of evolution and various non-Darwinian, quasi-Darwinian (and Social Darwinist) theories and paradigms.

Also included will be a brief discussion of the manner in which various theorists have posited the basic function or purpose of social and/or political life--

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[2]Robert A. Nisbet, Social Change and History (New York: Oxford University Press, 1969), pp. 7-11.

again as a way of setting the stage for the viewpoint that is implicit in the modern theory of biological evolution.

If the beginnings of Western philosophy can be traced to the search by Thales, Anaximander, Anaximenes and others of the so-called Milesian School (in the Sixth Century B.C.) for an underlying, immutable order or "original ground of things,"[3] the beginnings of evolutionary theory may be attributed to the spirited attacks on such an enterprise by Heraclitus of Epheseus (about 536-470 B.C.), who asserted that the only reality was the ever-changing phenomenal world. Using fire as his metaphor, Heraclitus reduced nature to the law of change. "One never steps twice into the same river," as he put it.[4] Significantly, Heraclitus also held that the processes of change were law-like and orderly (he postulated a kind of crude dialectic), involving a definite succession of events. Furthermore, he eschewed teleological speculations; he did not conceive

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[3]Windelband, op. cit., p. 27.

[4]Ibid., pp. 36, 49-50. Henry F. Osborn, From The Greeks To Darwin (New York: Macmillan Co., 1908), pp. 37-41.

of the processes of nature as goal-directed but merely ordered.[5] In short, the cast of mind and weltanschauung of this austere pre-Christian philosopher was fully compatible with that of modern Darwinian evolutionists.

Even more striking perhaps, were the writings of the physician-statesman Empedocles of Agrigentum (about 490-430 B.C.), which have been passed on to us second-hand by Aristotle. Empedocles taught that all the animals, including man, had arisen at various times and places without reference to any pre-ordained plan, and that in the course of time, only those most fitted for life were able to maintain themselves.[6] So far as we know, then, the originator of the concept of natural selection, which was later re-discovered by Darwin (and which plays such a central role in the modern theory of biological evolution), was in fact Empedocles. Moreover, Empedocles' formulation of the origins and development of life were fully endorsed by Plato and Aristotle a century later,

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[5] Ibid., p. 36.

[6] Aristotle, Physics II. 8, 198b 29. Cited in Windelband, op. cit., p. 53.

when Greek philosophical thought reached its apogee.

However, an equally powerful strand of Greek thought involved the postulate of recurrent cycles of growth and decay within an essentially static natural order. Such conceptualizations were undoubtedly drawn from analogies with the seasons, the biological life-cycle, the frequent rise and fall of human societies (of which the Greeks were well aware) and a short-term ecological situation that may have resembled homeostasis.

Accordingly, Plato's attempts to classify states, culminating in his famous six-fold taxonomy in the Statesman and the Laws (three law-abiding and three lawless corruptions),[7] reflected not only his appreciation of the differences between states but also his thesis that one form of government may evolve (or devolve) into another. Although nature itself was characterized by an

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[7]The three law-abiding were monarchy, aristocracy and mixed democracy, and the lawless corruptions were tyranny, oligarchy and extreme democracy. The following discussion is taken from George H. Sabine, A History of Political Theory (New York: Henry Holt and Co., 1954), chaps. 2 and 3; also, Windelband, op. cit., pp.116-131. Original sources will be cited where used.

underlying order and harmony, according to Plato, a cyclical process of development and decline was the rule with political systems. Thus the ideal state sketched out in the Republic represented Plato's attempt to erect a political order which, because of its internal architecture and the wisdom of its rulers, would be able to emulate the harmony Plato perceived in nature.[8] Although he later reluctantly modified his position, in the Republic Plato entertained the possibility of radical social and political transformation in order to achieve social and political homeostasis. This idea of redemption through revolution was to become a major theme of subsequent political thought, but it is an idea that is ultimately inimical to evolutionary thinking--in which the future must be derived from, if not necessarily determined by, the present.[9] (By the same

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[8]Of course, in his later years, Plato conceded the impracticability of his ideal state and fixed upon "the golden cord of law" as a surrogate for the wisdom of philosopher kings. Laws, 644d-645a.

[9]We must be careful here to distinguish between existential political revolutions, which are essentially evolutionary steps in an historical continuum, and the radical goals envisioned in revolutionary ideology.

token, the evidence of evolution does not support the hypothesis of an underlying harmony or equilibrium in nature, at least over the long run.)

With reference to our subsequent discussion, it is particularly important to note here that for Plato, the city-state represented the full flowering of human development, and his object was merely to correct its defects and perfect it as an instrument capable of fully satisfying both man's physical needs and his social, cultural and moral aspirations. Plato's goal was thus at once radical and profoundly conservative. He entertained none of the peculiarly modern notions of continued growth and material progress in the future, as well as in the past.

Aristotle's teleology embodies a similarly truncated perspective.[10] To Aristotle, the true "nature" of anything is what he called in the Metaphysics its "final cause"--that is, what a thing is capable of becoming in its final

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[10]The following discussion is derived from Windelband, op. cit., pp. 132-154; Sabine, op. cit., chaps. 5-6; and Ernest Barker (ed.), The Politics of Aristotle (New York: Oxford University Press, 1962).

form (either structurally or in terms of its functions). As Sabine explains: "Nature is at bottom a system of capacities or forces of growth directed by their inherent nature toward characteristic ends."[11] Thus, the "nature" of an acorn is the potential end-product of its development--an oak tree--just as the true nature of man is to be found in what he is capable of becoming, socially and ethically, in a "self-sufficing" community, or "polis" (which, to Aristotle, was the Greek city state at its best). Such a community was thus seen as the vehicle for man's realization of his essential nature. According to Aristotle, there is an "immanent impulse" in man toward such an association.[12] As with Plato, therefore, Aristotle's concern was with the improvement of the existing social and political forms, and with arresting the recurrent tendency of states to decay. But in contrast with Plato, Aristotle's approach to political development was evolutionary in character. Instead of looking upon mixed states and

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[11]Sabine, op. cit., p. 121.

[12]Politics, Book I, Chap. II, No. 15.

legal institutions as second-best, Aristotle considered such arrangements as the ideal. The Law, in particular, embodied for Aristotle the accumulated experience and wisdom of a state (a notion that is not dissimilar to the modern evolutionists' conception of the role of culture in human evolution).

Also noteworthy for this discussion is Aristotle's use of an organismic metaphor to describe human social development. Not only did Aristotle portray social life as analogous to organic processes (in sharp contrast with such mechanistic conceptions as Thomas Hobbes' leviathan), but he equated such processes with the essential characteristics of all of nature. As a physician's son, Aristotle was more drawn to a biological view of nature than to such metaphysical notions as that of an unchanging substance underlying the empirical world.

By contrast, the Stoic view of social evolution was pantheistic and anticipated to a striking extent the metaphysical evolutionism of Hegel.[13] Founded in

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[13]The following discussion is taken from Windelband,

Athens, just before 300 B.C. by Zeno of Citium (about 340-265 B.C.), the Stoic School taught that the entire universe is a living, connected whole, and that all matter and living forms are particular states of a divine power. This divine-natural world being, or vital principle, is purposeful and unfolds in a determinate and rational way. Moreover, the universe is seen as anthropocentric, in that it is particularly tailored to man.

In opposition to both Stoic and Aristotelian explanations of the evolution of social life, Epicurus (341-270 B.C.) developed an individualist and materialist view of society that is strongly echoed in modern-day liberalism.[14] Nature, to Epicurus (whose school was founded in Athens in 306 B.C.), means the pursuit of

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op. cit., pp. 178-197; also Sabine op. cit., pp. 145-151.

[14]The following discussion is derived from Sabine, op. cit., pp. 132-136; also Windelband, op. cit., pp. 178-197.

self-interest, and there is no standard of good beyond what each individual finds personally pleasurable or painful. Since all men are selfish and seek only their own good, states are not "natural" and do not exist primarily to serve ethical purposes. They are artificial contrivances invented purely to serve human expedience. They are contractual in nature, and are justified only to the extent that they serve private goods, among which the principle good is security from the depredations of other men.

A summary of the Epicurean version of human history has been provided for us by Sabine:

> The social philosophy of the Epicureans was backed up by a really impressive theory of the origin and development of human institutions upon purely materialist principles... All forms of social life, its political and social institutions, the arts and sciences, in short, all human culture, have come about without the intervention of any intelligence other than man's. Living beings themselves are the result of purely physical causes, and Epicurus borrowed from Empedocles a theory that rather crudely suggests the modern hypothesis of natural selection. Man has no instinctive leaning toward society and no impulsion other than the restless pursuit of his individual happiness. In the beginning he lived a roving and solitary life, seeking shelter in caves, and struggling to maintain himself against wild beasts. The first step toward civilization was the accidental discovery

> of fire...Experience and the more or less intelligent adaptation of action to the conditions of nature in time produced the various useful arts, as well as the institutions and laws of organized society. Civilization is wholly the creation of natural human powers acting within the conditions set by the physical environment...[15]

Except for a gross distortion of human motivation (and thus an incorrect conclusion about the naturalness of society), this pre-Christian conception of the evolution of society is not fundamentally in conflict with the modern synthesis of human evolutionary history (although the details differ considerably, of course).

In sum, what is so striking about the corpus of Greek thought is that most of the subsequent formulations of human evolution (empirical and otherwise) represent only incremental additions to (or independent rediscoveries of) the major alternatives hypothesized in Athens well before the birth of Christ.

Roman thought, by contrast, was singularly devoid of original contributions to the dialogue about human evolution, at least during the Republican era. On the

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[15]Sabine, op. cit., pp. 135-6.

other hand, the Roman Empire produced two important intellectual innovators from our point of view--Seneca and St. Augustine. Acutely aware of the growing decadence and corruption about him, Seneca (4-65 A.D.) expanded upon a hint in Plato's Laws and developed the notion that man's origins were innocent and that the institution of private property had corrupted him. Presaging Rousseau several centuries later, Seneca pictured man's origins as a Golden Age--an idyllic state of nature.[16] Government was therefore a makeshift remedy for human wickedness, and human fulfillment lay not in present or in the future, but in the past.

To this concept of man's fall from virtue, based on a revised Stoic cosmology, St. Augustine (354-430) later added (in the City of God) the idea that man's fall and ultimate redemption were subject to an iron necessity (the doctrine of predestination), and that conflict (between good and evil) was the instrument of historical

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[16]The following discussion is based on Sabine, op. cit., pp. 175-180.

change.[17] Instead of recurrent cycles of growth and decay, St. Augustine posited a single cycle, beginning with the creation of Adam and ending with the triumph of the "City of God" over the earthly city (which St. Augustine used both metaphorically, to stand for the spiritual and "appetitive" sides of man, and literally). A secularized version of this cosmic historical cycle would turn up 1400 years later in the writings of Karl Marx.[18]

One of the talismen which is traditionally used to distinguish the modern era from the Middle Ages and antiquity is the idea of progress--progress here in this world. For one of the fundamental characteristics of social and political theorists from the Enlightenment onward was that, with a few notable exceptions, they abandoned the ancient adherence to the idea of recurrent

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[17]This discussion is based on Windelband, op. cit., pp. 276-287; also Sabine op. cit., pp. 187-192.

[18]Interestingly enough, Marx also paralleled St. Augustine in positing an historical determinism and in giving conflict a central role, although the war between good and evil was transformed by Marx into the class struggle (see below, pp. 128-132).

historical cycles, or an underlying cosmic homeostasis, in favor of the idea that man, through his own efforts and the use of his rational faculties,[19] might be able to bring about more or less continuous progress.

Bernard de Fontenelle was perhaps the first major Enlightenment thinker to draw such conclusions, and he did so by employing both an analogy and a sharp disanalogy between organic development and human social evolution. On the other hand, he perceived that cultural evolution seemed to be a cumulative process comparable to the intellectual development of a single individual. At the same time, he noted the important difference that instead of declining after reaching some developmental peak, as is the case with old age, culture was able to continue its ascent beyond the lifetime of a

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[19]The post-Medieval resurgence of faith in the ultimate predominance of "reason" is taken by some writers to be of even greater significance than the notion of progress. St. Thomas Aquinas' (about 1225-1274) dual reconciliation of reason and revelation on the one hand and worldly and spiritual ends on the other is often cited as an important intellectual bridge to the Enlightenment. (Windelband, op. cit., pp. 318-337; Sabine, op. cit., pp. 247-253.)

single individual.[20]

Although John Locke (1632-1704) is not ordinarily considered an evolutionary theorist, a rationally-based developmental paradigm was contained in his explanation of the origins of the social contract. In order to lay the ground-work for his theory of indefeasible natural rights and the limited, contractual nature of civil government, Locke hypothesized in the "Second Treatise" a state of nature in which men existed as free, sociable, rational and "property" owning (in the sense of one's person and one's labor) individuals.[21] The state of nature was by definition a rational affair. But some men, irrationally seeking absolute power over other men, threatened to destroy this essentially harmonious state of nature. Thus, to preserve the rights

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[20]Nisbet, op. cit., pp. 104-105.

[21]John Locke, An Essay Concerning the True Original, Extent and End of Civil Government ("Second Treatise on Civil Government") (1690), chaps. II, III, V. This discussion is also based on the introduction in Sir Ernest Barker (ed.), Social Contract (New York: Oxford University Press, 1962), pp. viii-xliv; and, John Plamenatz, Man and Society (London: Longmans, Green and Co., Ltd., 1963), chap. 6.

they already enjoyed in the state of nature, men invented political society (the social contract) as a utilitarian device, or a perfecting mechanism. One must not make too much of Locke's evolutionism, of course. But the idea of organized society as a human invention designed for purely utilitarian rather than ethical purposes (to perfect the state of nature) has a definitely modern cast to it.

This point also applies to Thomas Hobbes (1588-1679). It is true that Hobbes proceeded from different assumptions about human nature and the state of nature.[22] Instead of perceiving man as motivated by the rational pursuit of his well-being, as Locke did, Hobbes (like the Epicureans) saw man's behavior as dominated by a crude and essentially non-rational egoism. A simple pain-pleasure model based on the desire for power and

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[22]The following discussion is taken from Plamenatz, op. cit., chap. 4; also, the introduction to Michael Oakeshott (ed.), Leviathan (Oxford: Basil Blackwell, 1960); Sabine, op. cit., chap. 23; and Thomas Hobbes, Leviathan, Chaps. 11, 13, 14, 15, 17, 21.

the fear of death was seen by Hobbes as the source of human behavior. "I put for a general inclination of all mankind," Hobbes asserted, "a perpetual and restless desire for power after power, that ceaseth only in death."[23] As a result, the state of nature was pictured by Hobbes as a "state of war." But since the instinct of self-preservation was stronger (indeed, Hobbes makes it the basis both for man's lust for power and his fear of death), Hobbes somewhat inconsistently introduced a weak form of reason to enable men to construct a social contract and a political authority capable of imposing mutual restraint (in the interest of self-preservation). Men are not capable of the sustained use of reason, Hobbes implied, but only of the single act of submitting to an absolute sovereign.

Thus, to Hobbes the state is an artificial mechanism erected against human nature. However, Hobbes, like Locke, conceived of political society as a rationally-based, human contrivance designed to improve upon man's pre-

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[23]Leviathan, chap. 11.

historic condition. It was seen by him as a survival-serving cultural artifact.

On the other hand, neither Hobbes nor Locke had any vision of the future, any sense of human progress beyond their own times. Indeed, both generalized from their own experience and observation to human nature at all times and in all places. Thus their conceptions involved the same kind of limited time-frame which marked the Platonic and Aristotelian views of the polis.

By the 18th Century, however, explicit theories of cultural evolution based on a variety of more or less precisely defined notions of progress and generally linked to (if not determined by) man's use of his reasoning powers became a common, though not universally accepted, theme.[24] As Sabine observes:

> Throughout [Enlightenment] literature from Helvetius to Holbach runs the idea of human progress. It was implicit in the idea of a natural social order and in the vision of a general science of human nature, in the belief that social well-being is a product of knowledge, and most emphatically in Locke's conception that knowledge results from the accumulation of experience. The idea of progress

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[24] Nisbet, op. cit., chap. 3.

> had never been wholly absent from philosophical empiricism, from the time when Bacon, comparing ancient and modern learning, had asserted that the modern age is"a more advanced age of the world, and stored and stocked with infinite experiments and observations,"or when Pascal had suggested that the history of the race, like that of an individual, may be conceived as a continuous process of learning. Voltaire in his histories, by emphasizing the idea that the evolution of the arts and sciences is the key to social development, contributed to the same point of view.[25]

Two of the most striking examples of Enlightenment progressivism are Turgot and Condorcet (1743-1794). In the Discours sur les progrès successifs de l'esprit humain (1750), Turgot proceeded from the view that there is an essential difference between those sciences that seek laws for recurrent phenomena and human history, which represents an ever-growing accumulation of experience.[26] Rather than seeking social laws, Turgot argued, savants should search for a developmental pattern in human history--which he then proceeded to do. Discerning three past stages--hunting, pastoralism and farming--

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[25]Sabine, op. cit., p. 571.

[26]This seemingly innocuous point is one which Thomas Landon Thorson quite recently felt compelled to reiterate after 30-odd years of behavioralist "positivism" in political science (Biopolitics, op. cit.).

Turgot postulated that the processes that had been responsible for past development could be expected to yield further progress in the future. The key, of course, was the progressive increase in human knowledge. The law of history, then, was the law of cultural progress (in the largest sense)--a theme that would recur in innumerable permutations in 19th and 20th Century social theory.

Condorcet, likewise, divided history into developmental stages (three pre-historic and six in European history).[27] Even more explicitly than Turgot, Condorcet envisioned a coming utopian era which would arise from the growth and diffusion of knowledge and from the power man would gain through knowledge to overcome the obstacles to human happiness. He even went so far as to postulate the progressive realization of equality between nations, the elimination of class lines and the general mental and moral improvement of the species,

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[27]Condorcet, Esquisse d'un tableau historique des progrès de l'esprit humain (1794). This discussion is derived from Sabine, op. cit., pp. 571-572 and Windelband, op. cit., p. 527.

all to be realized within the context of political democracy. It is all very suggestive of Marx, a half century later.

An interesting variant on the general theme of progress was the work of Charles de Secondat Montesquieu (1689-1755). Montesquieu's Spirit of the Laws is justly renowned for its conception of the separation of powers. Less well-known, however, is the fact that Montesquieu was also the progenitor of a cultural-ecological explanation for the development of states and, more important, for the variations to be found between them. Though crudely formulated by today's standards, Montesquieu's hypothesis was that societies came into existence as conscious inventions to satisfy certain basic human needs which he called the "laws of nature" (e.g. peace, or security, food,the desire for social interaction, etc.),[28] and that political differences between societies can be attributed to a number of "variable factors" (such as climate, soil, geographical location, size, occupations

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[28]Spirit of the Laws (Esprit des lois), chap. II.

of the people, religion, wealth, commerce and manners and customs).[29] Montesquieu also identified three stages in the development of societies (savagery, barbarism and civilization), though, significantly, he did not attempt to project this developmental process into the future. In contrast with such optimistic theorists as Turgot, Condorcet and Immanuel Kant, Montesquieu represented a more pessimistic strain in Enlightenment thought, in that he was not confident that past progress could be projected into the future by means of some law of progress.

An even sharper contrast can be found in the work of Jean Jacques Rousseau (1712-1778). Rousseau was profoundly alienated by the decadence of his society and totally lacked the faith in reason or the sense of progress shared by many of his contemporaries.[30] At the

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[29] Ibid., chap III. It should be noted, however, that Sabine (op. cit., pp. 554-555) contends that Montesquieu probably developed this line of thinking from an explicit discussion of the same hypothesis in Aristotle's Politics (Books IV-VI).

[30] The following discussion is taken from the introduction to Barker (ed.) Social Contract, op. cit.;

same time, he espoused an idealistic vision similar to Plato's of society as potentially an organic and morally uplifting community (the state would also serve as a church, as in the Republic). Indeed, with Rousseau the organic metaphor began to get metaphysical. In The Social Contract (1762), Rousseau postulated that the community as social organism could be said to have a will of its own, the "General Will," which has as its object the general welfare.[31] The General Will (volonté générale) was not necessarily either the will of the majority or even of all the citizenry; it might be embodied in the will of one man, the "Legislator,"

Plamenatz, op. cit., chap. 10; Sabine, op. cit., chap. 28; and Rousseau The Social Contract, Books I and II.

[31]Metaphysics, organicism and moral sentiments aside, Rousseau did seem to grasp a fundamental point about society as viewed from an evolutionary perspective. In Book II (chap. iv) of The Social Contract, Rousseau says: "If the state is a moral person whose life is in the union of its members, and if the most important of its cares is the care for its own preservation, it must have a universal and compelling force, in order to move and dispose each part as may be most advantageous to the whole."

"Law Giver" or "Leader" who figures so prominently in political thought from Plato to Machiavelli to Adolph Hitler.

As a result, Rousseau was of two minds about human social evolution. On the one hand, society had "turned a stupid and limited animal into an intelligent being and a Man."[32] Far from idealizing man's origins, as Augustine had done, Rousseau pictured man in the state of nature as being morally innocent but, at the same time, isolated, lacking language and the arts and all the desirable features of civilized life. On the other hand, Rousseau was acutely aware of the debased condition of the mass of pre-revolutionary Frenchmen ("man is born free and everywhere he is in chains").[33] Anticipating the revolutionary writers of the next two centuries, Rousseau charged that this condition too was attributable to society and its institutions (particularly private property). On balance, therefore, Rousseau (like the

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[32] Ibid., Book I, chap. viii.

[33] Ibid., Book I, chap. i.

early Plato) looked upon human history as a process of moral devolution which could only be reversed by radical social and political change.

In reaction to Rousseau, as well as to David Hume's attack on Natural Law and, even more important, to the upheaval of the French Revolution, the latter part of the 18th and early 19th Centuries witnessed a new reverence for tradition and an idealization of history. In its more extreme forms, human cultural development came to be looked upon as the manifestation of the purpose of a divine mind (or cosmic spirit) realizing itself gradually in history.[34] As Sabine put it, the cults of immutable laws of nature and of indefeasible individual rights were replaced by the cult of tradition, the organic community and the preordained purposes of history.[35]

Edmund Burke (1730-1797) was the first major theorist of this genre--as well as being the least

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[34]On this as well as more materialistic reifications of history, see Karl Popper, The Poverty of Historicism (New York: Basic Books, 1960).

[35]Sabine, op. cit., p. 607.

metaphysical among them. Although Burke was at one with Rousseau in viewing society organically (and in his skepticism about the reliability of unaided reason), he differed profoundly in his basic attitude toward the society of his time. Rather than viewing it as oppressive, Burke saw the accumulated traditions, norms and institutions of his society as being the repository of the collective intelligence of the species.[36] "The individual is foolish... but the species is wise, and, when time is given to it, as a species it always acts right."[37] Or again, "We are afraid to put men to live...on his own private stock of reason; because we suspect that this stock in each man is small, and that the individuals would do better to avail themselves of the general bank and capital of

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[36]In this respect, Burke's argument with Rousseau parallels Aristotle's disagreement with the Plato of the Republic over the relative wisdom of The Law as against that of a Law Giver (or guardian). This discussion is based on Plamenatz, op. cit., chap. 9; also Sabine, op. cit., pp. 609-617.

[37]Burke, Reform of Representation in the House of Commons (1782), quoted in Sabine, op. cit., p. 609.

nations and of ages."[38]

Burke was also the quintessential organismic theorist. Institutions, he said, are not invented. They are alive and grow in accordance with "a divine tactic". The social contract is not a limited, legal entity but an organic partnership, "not only between those who are living, but between those who are living, those who are dead, and those who are to be born. Each contract of each particular state is but a clause in the great primeval contract of eternal society..."[39]

Though not differing fundamentally from Burke, Hegel (1770-1831) was more extreme in several respects.[40] First, Hegelian history was positively mystical. Instead of being merely the reflection of a divine purpose, history was portrayed by Hegel as the progressive actualization

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[38]Burke, Reflections on the Revolution in France (1789), quoted in Sabine, op. cit., p. 613.

[39]Burke, Reflections on the Revolution in France, William B. Todd (ed.), (New York: Holt, Rinehart and Winston, 1959), p. 117.

[40]The following discussion is based on Plamenatz, op. cit., II, chaps. 3 and 4; Windelband, op. cit., pp. 611-615; and Sabine, op. cit., chap. 30.

of a World Spirit in time, or as he put it, "the march of God in the world."[41] History was thus reified into a global process of moral and spiritual development.

It was, moreover, a deterministic process. Like some of the Enlightenment philosophers, Hegel believed in the inevitability of progress, although he meant moral and spiritual more than material or intellectual progress. Indeed, human reason had nothing to do with Hegelian history. Rather, history consisted of impersonal forces working themselves out independently of human will, creativity or consciousness. The Hegelian version of the law of evolution thus referred to the inevitable pattern and necessary stages by which the general plan of history unfolded. Of course, the pattern Hegel had in mind was his famous "dialectic"--a succession of syntheses between continually emerging contradictions, or moral opposites, with the outcomes being directional. The dialectic was at once a causal law of development, a descriptive tool able to highlight what were seen to

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[41]Quoted in Sabine, op. cit., p. 666.

be the essential processes of history and a moral standard for judging events. But it was also a closed system in which biological needs, ecological processes and human intellectual activities were irrelevant.

It is probably not unfair to say that Hegel was more at odds with the modern theory of biological evolution than any other single theorist of major stature. In contrast with evolutionary theorists, he was at once unilinear, deterministic and indifferent to the material, biological world. Furthermore, he was totally at loggerheads with contemporary evolutionists with regard to the basic determinants of change. Evolutionists cannot accept the idea that adaptive responses to environmental challenges generate their own antitheses, and that the resulting conflict leads ultimately to a synthesis. Nor do evolutionists discern moral progress at the core of either biological or social evolution.

Beginning with Auguste Comte (1798-1857), social and political theory began to show signs of disciplinary specialization, a consequence in part of Comte's own

proselyting for an empirical, positivist social science.[42] (Later on, of course, we will note several of the theoretical branches that eventually appeared in the social sciences, from anthropological to economic, sociological and political theories.)

Though empirically grounded (he argued for an inductive approach to sociology based on observable phenomena), Comte was ultimately interested in the interaction between mental activity and social life. Proceeding from Rousseau's (and Hegel's) conceptualization of society as an organism (indeed he was a thoroughgoing macro-functionalist),[43] Comte's Positive Philosophy differed in that it put human intelligence back into the picture. Returning to the viewpoint of the Age of Reason, Comte posited a three-stage evolution of human intelligence (theological, metaphysical and positive) and held that this process was integral with the

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[42]The following discussion is derived from Plamenatz, op. cit., II, chap. 7; Windelband, op. cit., pp. 649-655;and Comte, A General View of Positivism (1857).

[43]F.W. Coker, Organismic Theories of the State, Studies in History, Economics and Public Law, XXXVIII, No. 2 (New York: Columbia University Press, 1910), p. 123.

more general development of society. Like the Philosophes, Comte also had an explicit theory of progress, and he made it his business to seek out the "laws" of social development. He hypothesized that the process of development was linear, and that it paralleled the evolution of human mental capacities. "Each of the successive social states," he wrote, "is the necessary result of the preceding state and indispensable condition (moteur) of the following state."[44] Furthermore, anticipating Durkheim, Eisenstadt and others, Comte saw progress as linked to an increasing specialization of function.[45]

Aside from the crudity of his conceptualization, Comte's emphasis on the role of human mentation in social development seems quite contemporary. It is common to many of his successors in the social sciences, although the idea has been re-worked in a great variety of ways--from the unconscious thought structures of Claude Lévi Strauss to Leslie White's technological determinism to Karl Marx's

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[44] Ibid., p. 119.

[45] Ibid., p. 124.

mentalistic-materialistic dialectic (see below). Indeed, the degree to which Comte anticipated the functionalists of recent years is striking. Coker gives us the following brief summary of Comte's functionalism:

> For Comte society has the essentially organic attribute of 'consensus universel.' This means a natural and spontaneous harmony of structure and functions, all parts of a complex system working toward a common end, through the action and reaction of these parts upon one another, and their cooperative activity upon the environment... Cooperation is the dominating principle of society, though sympathy also--the sentiment of unity--is an active and necessary element; and this principle of cooperation and sympathy, based on the organic nature of society, has a political consequence. For cooperation demands government. The function of government is to maintain the solidarity of society, to keep active the spirit of the whole, the sentiments of unity. The activity of government is thus of a spiritual and moral, as well as material nature.[46]

Unlike many of his successors in the social sciences, however, Comte never lost sight of the interrelationship between social artifacts and the biological and inorganic environments within which such artifacts occur. Sociology, he argued, must be related to biology and founded upon the laws governing natural phenomena.[47]

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[46] Ibid., p. 123.

[47] Ibid., p. 116.

In this respect, Comte was more in tune with the modern theory of evolution than with the many attempts in recent decades to create autonomous sociological, anthropological or political theories.

Of all the 19th Century theorists, though, the one whose perspective was most nearly in accord with modern evolutionary theory was Herbert Spencer (1820-1903).[48] Indeed, Spencer was a major contributor to the system of concepts that have popularly been attributed to Darwin, and he played an important role as prophet and expounder of evolutionary theory.[49] He was also

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[48]The following discussion is based on J.W. Burrow Evolution and Society (Cambridge, England: Cambridge University Press, 1970), chap. 6; Richard Hofstadter, Social Darwinism in American Thought (Boston: Beacon Press, 1955), chaps. 1 and 2; Robert L. Carneiro (ed.), The Evolution of Society: Selections from Herbert Spencer's "Principles of Sociology" (Chicago: University of Chicago Press, 1967), Editor's Introduction; Coker, op. cit., pp. 124-139; Windelband, op. cit., pp. 667-669; and Sabine, op. cit., pp. 721-725.

[49]Carneiro (ed.), op. cit., p. x. In fact, Darwin's contribution was limited to the mechanism of natural selection, whereas Spencer had conceived of evolution as a cosmic process embracing all of nature, including human social life, well before Darwin published. Spencer also coined such terms as "evolution" and "the survival of the fittest," and he was the first to challenge publicly the then prevailing doctrine of special creation.

one of the architects of sociology and anthropology (though his role has not been appreciated by subsequent generations),[50] as well as the highly controversial progenitor of a school of political theorists (the Social Darwinists) whose reactionary politics contaminated and ultimately discredited a fundamentally sound theoretical approach. (On this point, see the discussion below, pp. 148-152.) After more than half a century in eclipse, that approach is only now being reinjected into the main stream of the social sciences.

Though Spencer has been a bête noire to most 20th Century social theorists, such was not always the case. In his own lifetime, Spencer was a dominant figure in social thought. He was hailed by such giants as Darwin and Alfred Russel Wallace (co-discoverer of natural selection) as perhaps the greatest thinker of his age. He was also a profound scholar whose ideas were solidly grounded in the natural science of his day. His "Synthetic Philosophy" was in fact the last great effort to encompass in one

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[50] In what must constitute a major revision of the history of science, Carneiro traces to Spencer the functionalist approaches in both anthropology and sociology. (Ibid., pp. xlix-li.)

system of thought the total range of social and natural sciences, and he was as much at home with mathematics as with metaphysics.

Because Spencer's work was so encompassing, it is not easily summarized. However, certain key facets may be noted. First, like many of his predecessors, Spencer freely employed an analogy between society and an organism (indeed, he coined the term "super-organic" with reference to social life), but the analogy was merely his way of illustrating what was essentially a functionalist conception of society. Against critics who accused him of making mindless analogies, Spencer rendered the following, surprisingly contemporary, rebuttal:

> Here let it once more be distinctly asserted that there exist no analogies between the body politic and a living body, save those necessitated by that mutual dependence of parts which they display in common...Comparisons have been made only because structures and functions in the human body furnish familiar illustrations of structures and functions in general."[51]

A second important aspect of Spencer's work is

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[51]Spencer, Principles of Sociology (New York: D. Appleton and Co., 1899), I., p. 592.

that he firmly linked his functionalism to an evolutionary conception of nature (and society), a linkage that is only now being re-established after a hiatus of more than 50 years. To Spencer, functional interdependence in any organic or social structure had to be related to the basic problem of survival. But one of the consequences of the reaction to Social Darwinism was that, before being passed on to subsequent generations of social scientists, Spencer's functionalism was separated from the theory of evolution.[52]

Spencer's particular brand of evolutionism also has a very contemporary ring about it. The first theorist to distinguish clearly between mere growth and development, Spencer postulated that evolution was characterized not merely by increasing bulk, but more importantly by an ever-increasing complexity of structure. He posited as a cosmic trend a progression from energy to life, to mind, to society and ultimately to more differentiated and integrated civilizations (a point of

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[52]Carneiro, op. cit., p. li.

view that is echoed in Eisenstadt, Parsons and some sociologically-oriented political scientists). This was not seen as a unilinear process but as one involving many branches. Furthermore, he recognized the possibility of retrogressions along the road.

Spencer also had a pluralist conception of the causes of social evolution. He recognized the importance of geography and of economic factors, and he appreciated that the harnessing of energy was basic to social evolution (thus presaging Leslie White and other contemporary evolutionists). He also grasped the idea of an interplay between cultural and environmental factors. And yet, when all is said and done, his emphasis was upon the role of warfare (at least in human social evolution). His account of the origins of the state, for example, was based purely on the need for defense against external aggression.[53]

Even so,had Spencer limited himself to such grandiose generalizations, his thinking would not have

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[53]Coker, op. cit., p. 136.

seemed so repugnant to subsequent generations. What ultimately got Spencer into trouble were his efforts to reconcile evolutionism with his liberal heritage. The result was not only a disaster from the standpoint of his relationship to the political currents of his time, but it forced Spencer into a set of political prescriptions that were profoundly inconsistent with his basic conception of the workings of evolution. Had he been more consistent, he might have come out in a position closer to such liberal revisionists as T.H. Green and the Oxford School, who put man back into society as a social being and gave society a value independent of the individual.[54] (See below, pp. 148-152.)

One approaches Marxism, the last great system of social and political theory, with considerable trepidation, not just because of its subtlety and complexity, but because of the enormous body of amplifying and interpretive literature

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[54]Indeed, once revisionist liberals began to treat society as a collectivity with a general good that was perhaps distinct from the sum of individual "goods," evolutionary conceptions of social development also began to creep into liberal thought. See for example: Leonard Hobhouse, Mind in Evolution (1901).

associated with Karl Marx (1818-1883). What follows, therefore, can only be the most cursory summary.[55]

In the first place, for anyone who is familiar with the tradition of discourse many of Marx's ideas have a déjà vu quality about them. The notion of man actualizing himself as a social being, through time and in relation to the evolution of society, is distinctly Aristotelian. The Marxian view of society as an entity directed to the meeting of both material and social needs is also a familiar theme. Marx's conception of man's origins in innocence, and of the corrupting and degrading influence of social institutions (particularly private property), are to be found in Rousseau. The Marxian vision of history as a deterministic process is reminiscent of St. Augustine, Hegel and others, while

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[55]The following discussion is derived from G.D.H. Cole, The Meaning of Marxism (Ann Arbor: The University of Michigan Press, 1964); Erich Fromm, Marx's Concept of Man (New York: Frederick Ungar Publ. Co., 1965); Plamenatz, op. cit., II, chaps. 5 and 6; and Marx, Critique of Political Economy and The Communist Manifesto.

Marx's faith that the processes of history were directed toward a utopian outcome reminds us of Condorcet and other Enlightenment thinkers. Even the idea of social conflict as a key mechanism of change is traceable at least to St. Augustine, and it was acknowledged by Marx himself that he had borrowed his dialectic from Hegel.

Yet, when all is said and done, Marx integrated these and other strands of social thought in a new and compelling way. For our purposes, however, it is important to note only certain aspects of Marxian thought.

A fundamental, though often misunderstood, point about Marxism is that Marx conceived the process of social evolution as being one which involved an interaction between changes in the mode of production on the one hand, and mental development(that is the growth of human consciousness) on the other. The interaction between these two evolutionary processes was seen by Marx as being dialectical, with the outcomes representing progress toward a pre-determined goal-state--a communist society.

A crucially important concomitant of this vision

was the idea that man could ultimately be freed from the burdens associated with providing for his material needs, and from the deprivations associated with not being able to provide adequately for these needs. In other words, the basic problem of survival could ultimately be solved. Furthermore, the division of labor was seen by Marx, not as an indispensable instrument for meeting survival needs, but as a social invention which enabled capitalists to exploit workers. Thus, for Marx an historical determinism based on a self-propelled, materialistic-mentalistic interaction would lead ultimately to personal freedom. For Marx, as for Spencer, evolution was equated with progress, and human history was seen as directional, pre-determined by its own inner dynamics and goal-directed.

From the intellectual tradition traced above come most of the major themes that have characterized Twentieth Century thought. In broad outline, the public philosophy of our era has consisted of a conception of human history as a single, unique temporal sequence in which the past, present and future are causally connected with one another. Equally characteristic has been an unquestioning faith in progress. The trend of history is assumed to be toward

improvement -- moral, material, social, or all three. (Oswald Spengler, Arnold Toynbee and other "rise and fall" theorists are notable exceptions, of course.) Finally, there is the common assumption that man is the principal creator of progress, through his own mental activities and efforts.

Within this general weltanschauung, a great profusion of more or less formal theories of social and political life have been put forward. In fact, there are too many theories to be detailed here without making arbitrary exclusions or severely truncating the discussion. However, it is possible to categorize these theories in several dimensions. Following Service, I will discuss major contemporary theories in terms of their hypotheses or conceptualizations relating to 1. the structure of social life; 2. hypothesized goals, if any; 3. mechanisms of social change; 4. the issue of determinism; and 5. the nature and purpose of society and the state:[56]

1. Structure: Does social life have

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[56]The following discussion is based on: Elman R. Service, "The Prime Movers of Cultural Evolution," Southwestern Journal of Anthropology, 24, No. 4 (1968), pp. 396-409; Service, "Cultural Evolution," International Encyclopedia of the Social Sciences (New York: The Macmillan Co., 1965), V, pp. 221-228; Donald T. Campbell, "Variation and Selective Retention in Socio-Cultural Evolution," in Herbert R. Barringer et al., Social Change in Developing

directionality? Do historical processes conform to a fixed sequence or set of stages? Lewis H. Morgan[57] and Edward B. Tylor,[58] two pioneers in anthropology, were unilinear evolutionists. Tylor was the first to postulate the autonomy of cultural evolution and developed a typology of cultural stages which were comparable to Morgan's ethnical periods. Spencer, on the other hand, was multi-linear in outlook (viewing cultural development as analogous to biological speciation) and was not rigidly linear at that. He recognized the likelihood of major retrogressions as well as "progress".[59] More recently, Julian H. Steward put forward a multi-linear and non-deterministic theory of cultural evolution based on the interaction between a population (particularly its techno-economic behavior) and geographical variables.[60] Leslie A. White, by contrast,

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Areas: A Reinterpretation of Evolutionary Theory (Cambridge, Massachusetts: Schenkman Publishing Co., 1965); and the works cited below.

[57]Morgan, Ancient Society (1877) (Cambridge, Massachusetts: Harvard University Press, 1964).

[58]Tylor, Primitive Culture (London: John Murray, 1871).

[59]Carneiro, op. cit., p. xlii.

[60]Steward, Theory of Culture Change: The Methodology of Multi-Linear Evolution (Urbana: University of Illinois Press, 1955).

views cultural evolution as merely a reflection of technological development, which is seen by him as a unilinear and self-contained process.[61] This is comparable to the approach of economist Walt Rostow, who hypothesizes five necessary stages in the economic development of a society (traditional, pre-conditions for take-off, take-off, drive to maturity and, finally, high mass consumption).[62] Needless to say, this is but a formalized description of the process of industrialization, and Rostow equates human social development with this economically delimited process. To him, industrialization represents the most significant feature of human "progress".

A frequent, though not necessary, corollary of the postulate of directionality is the identification of one or more historical trends in evolution. Émile Durkheim discerned a trend toward an increasing

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[61]White, The Evolution of Culture (New York: McGraw-Hill Book Co., Inc., 1959).

[62]Rostow, The Stages of Economic Growth (Cambridge, England: Cambridge University Press, 1960).

division of labor.[63] Spencer posited increasing heterogeneity, complexity and self-regulation as a cosmic trend which included human social development.[64] A.J. Lotka (and many others subsequently, including Leslie White) perceived an evolutionary trend toward increased energy capture (or "biomass"),[65] while G.K. Zipf asserted a trend toward efficiency (or the minimizing of effort).[66] Alfred E. Emerson (after Cannon) on the other hand, argues that increasing homeostasis is the only consistent trend.[67]

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[63]Durkheim, The Division of Labor in Society (1893) (Glencoe, Illinois: The Free Press, 1960).

[64]Carneiro, op. cit., pp. xvii-xviii.

[65]Lotka, "Evolution and Thermodynamics," Science and Society, 8 (1944), pp. 161-171; and "The Law of Evolution as a Maximal Principle," Human Biology, 17 (1945), pp. 167-194.

[66]Zipf, Human Behavior and the Principle of Least Effort: An Introduction to Human Ecology (Cambridge, Massachusetts: Addison-Wesley Press, 1949).

[67]Emerson, "Dynamic Homeostasis: A Unifying Principle in Organic, Social and Ethical Evolution," Scientific Monthly, 78 (1954), pp. 67-85.

Borrowing a leaf (without credit) from Spencer, sociologists Talcott Parsons and Shmuel N. Eisenstadt both link social evolution to increasing differentiation and, as a necessary concomitant, increasing integration,[68] which Parsons equates with an "enhancement of adaptive capacity."[69] Finally, there are a variety of postulates of ethical or spiritual progress, such as those of Herbert Spencer and Pierre Teilhard de Chardin.[70]

2. Goal-directed or not: Many who seek to identify and describe past evolutionary trends also project these trends into the future, and though it may be fallacious to assume that a trend is a law, the temptation to do so seems to be very great. Perhaps the most notable examples of the modern era are Spencer, who projected a fully

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[68]Parsons, Societies: Evolutionary and Comparative Perspectives, op. cit.; Eisenstadt, Modernization: Protest and Change (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966); and "Social Evolution," in Encylcopedia of the Social Sciences, op. cit., V, pp. 228-234.

[69]Parsons, ibid., p. 21.

[70]Joseph V. Kopp, Teilhard de Chardin: A New Synthesis of Evolution (Glenrock, New Jersey: Paulist Press, 1964).

self-regulating society, Marx, who envisioned the realization of communism, and de Chardin, who foresaw the ultimate realization of an ethical goal--the actualization of a collective consciousness and social harmony.

3. Mechanism, or mechanisms of evolution: Is there a prime mover of some sort? What is the locus of social change? Materialistically oriented theorists tend to single out technological, or economic, factors, and while it is true that these factors can ultimately be traced back to human mentation, often nonetheless they become reified and take on a life and dynamism of their own. Morgan, for example, located the engine of social evolution in "inventions and discoveries." For Leslie White the key is the progress of "technology," which he defines as the ability to harness energy for the meeting of needs and wants. For Marx, of course, it was changes in the "mode of production" of man's material needs, while Eisenstadt links change to "free-floating resources" exploited by "entrepreneurs" (a conception which is reminiscent of the formulation of

Joseph Schumpeter, twenty years earlier).[71]

By contrast, many social theorists, including the Social Darwinists, postulate social conflict (or at least competition) as the key to progress. Spencer, Walter Bagehot, Ludwig Gumplowicz, Charles Sumner and others all emphasized external conflict (with nature or between groups), although peaceful competition internally was also deemed important by some, such as Spencer and Sumner. Conflict in the form of the class-struggle was important for Marx, but he did not really consider it to have been a prime mover. Rather, conflict was viewed as the consequence of a more basic process.

There are also a number of theorists who locate the source of change in human mental processes. Although mind is implicated in many, if not most, social theories, some treat mental activities as a sort of constant, rather than a variable. However, some theorists fix on mental activities as being prior in the chain of social causation. M.F. Ashley-Montagu focuses on cultural

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[71]Schumpeter, Capitalism, Socialism and Democracy (New York: Harper & Brothers, 1942).

development as a total process,[72] while V. Gordon Childe singled out the development of tools (which in turn yielded surplus energy),[73] and Claude Lévi-Strauss hypothesizes unconscious "thought structures" as the determinant of human evolution.[74]

4. Deterministic or not: Any theorist who projects an evolutionary trend into the future, or who postulates that the process is goal-directed, must of necessity assume that the course of evolution is determined by whatever causes are identified as fundamental. There is, however, a certain amount of confusion on this subject. Sometimes only semantics separates those who attribute social evolution to "free will" and those who are mentalistic determinists. By the same token, some writers use the term "determinism" merely as a way of walling out (or in) a particular category of possible causal variables.

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[72]Montagu, Man: His First Million Years (New York: New American Library,1962); and Man in Process (New York: New American Library, 1961).

[73]Childe, Man Makes Himself (New York: New American Library of World Literature, Inc., 1951).

[74]Lévi-Strauss, Structural Anthropology (New York: Basic Books, 1963).

Marvin Harris, for instance, describes himself as a probabilistic determinist [sic],[75] which must surely mean that among the three sets of variables included in his causal model (technology, economy and the environment), he does not assign decisive influence in any specific case to any particular variable. Conversely, Harris must mean to exclude any variables which do not fall into one of his three catagories. One may question, though, whether or not multi-variate, probabilistic models of social change can rightly be labelled "determinism" without being seriously misleading, especially considering the historic connotations of the word determinism. At any rate, most contemporary theorists are not monistic and do not presume to be able to predict with much confidence. And some of those who are monistic determinists hedge their bets by making the locus of causality a very large bag into which may be put all manner of specific variables. Leslie White's definition of technology, for example, embraces all of the "life-

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[75]Harris, "Monistic Determinism: Anti-Service," Southwestern Journal of Anthropology, 25 (1969), No.2, p. 202.

sustaining, life-perpetuating processes" of a society.[76]

5. The nature and purpose of society and/or the state: Most of the major systems of social and political theory have proceeded from certain basic assumptions, or premises, about the nature of human nature (what are often referred to today as "psychological premises"). These in turn have provided the premises for a theorist's assumptions about the nature and purpose of the state. Obviously, this is an exceedingly complex subject, one which could occupy entire volumes. However, a brief discussion; even if inadequate, of some major themes found in the tradition of discourse is a necessary pre-requisite to what will follow in subsequent chapters.

In the Republic,[77] Plato states clearly that society is founded upon human needs, and that a division of labor with respect to these needs lies at its root. Furthermore, the good life is defined by Plato as every man doing what he is best suited to do with respect

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[76]White, op. cit., p. 19.

[77]The following is derived from Plato, The Republic (B. Jowett, ed.), (New York: Random House, "The Modern Library," 1941), Books II and IV.

to these needs. Plato's vision of the ideal society is often interpreted to be essentially ethical in nature, but it can also be given a more strictly functionalist interpretation. The Platonic notion of social harmony (or homeostasis) may well be analogous to the evolutionist's notion of maximizing the adaptiveness of a deme (see below), even though Plato's functional categories seem extremely crude by contemporary standards.

To Aristotle also,[78] the origins of society were to be found in the necessities of life--reproduction, self-preservation and personal survival needs. Once in existence, however, society continues for the sake of the "good life," by which Aristotle meant the realization of man's innate potential for social and ethical development. A truly "self-sufficing" community (or "polis") is therefore one which provides not only the basic necessities of life but, more important, serves as an instrumentality for perfecting the human

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[78]The following is a paraphrase of the Politics, chap. 2.

animal. Aristotle was above all a realist. He certainly did not mean to discount the survival functions of society. But, in emphasizing the ethical potentialities of social life, he did tend to take the "necessities" for granted, as though this problem could somehow be considered solved, or could be assumed as a given once a society had become a going concern. As a result, Aristotle's conception of the functions of society is turned inward; he overlooked foreign affairs and the continuing need for self-defense, for example. The emphasis in Aristotle's conception of a "self-sufficing" community, in other words, was on social and ethical considerations rather than on continuing necessities.

On the other hand, both Plato and Aristotle had a very strong sense of politics as being concerned with the common problems and the general welfare of a society. Political systems, then, were understood to be functionally related to the collective needs of a society.

Machiavelli, on the other hand, had no ethical ambitions for society. Indeed, he saw ethics as a

means to an end--not, as is so often supposed, the end of "power" for princes but rather of "survival" for a society. A close reading of both The Prince and The Discourses reveals an overriding preoccupation on Machiavelli's part with the security of a society.[79] Power was the means by which, in particular, Italy's liberation might be achieved. One could say that Machiavelli had the virtue of Aristotle's weaknesses. For Machiavelli, the problem of survival was largely a problem of defense against the depredations of foreign enemies. However, he also tended to take other survival requisites for granted, as Aristotle before him had done.

Machiavelli's views on politics are not easily summarized, but there can be no doubt that he considered politics and political systems to be vitally related to the survival and well-being of a society. In general he seemed to favor tailoring government to the needs of a society. In crisis situations, he favored strong, centralized leadership, whereas in times of relative

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[79]See especially, The Prince, chap. 26 and The Discourses, chap. 1.

social stability and external peace, he favored a mixed democracy.

Hobbes, by contrast, grounded his political theory not in the requisites of life, but in crudely drawn premises about the nature of man and of the motivations underlying human behavior. These were a desire for power and a fear of death.[80] Since in the state of nature this would lead to a universal war of each against each, the only answer for it was the establishment of an authority able to keep the peace. For Hobbes, in other words, the problem of survival was reduced primarily to one of maintaining internal order, although external defense was also assigned to Hobbes' "Sovereign."

An explicit, and very important, facet of Hobbes' model was that he did not give any weight to the welfare of society as a collectivity. The justification for the power Hobbes would grant the Sovereign was not the survival of society as a whole but was rooted in each individual's

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[80] Hobbes, Leviathan, chaps. 13 and 21.

motive of self-preservation. For this reason, Hobbes would not permit his Sovereign to sacrifice the lives of his subjects in defense of the Commonwealth. Nor could he justify any man's making that sacrifice by means of his psychological premises.

By returning to the organic conception of society found in Plato and Aristotle, Rousseau[81] recovered the notion of a general good, which he called the volonté générale. But while he recognized the origins of social life in the basic necessities (the state of nature was precarious for man, in Rousseau's view), he did not link the General Will with those necessities. Like Aristotle, he seems to have taken survival for granted once society was in operation and to have considered the main problem to be one of how to end the internal exploitation between the members of society. Of course, it could also be argued that the very notion of the general welfare implies on-going common problems and needs which must be dealt with.

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[81]Derived from Rousseau, The Social Contract, Book I, chap. 2; Book II, chap. 3; and Barker (ed.), Social Contract, op. cit., introduction.

And, for Rousseau, government is only legitimate, or sovereign, when it is acting in accordance with the General Will.

David Hume's conception of society is not far removed from that of Rousseau, even though Hume is often lumped with Hobbes and others who purveyed a crude hedonism as the basis of society.[82] Hume argued that, in addition to self-interest and habit, a sense of common interest in the meeting of human needs also served as a basis for society. Hume's positivism involved simply the question of how best to serve those needs, and he asserted that this question could be the only rational basis for ethics. Bentham, in turn, took this fairly broad, though utilitarian, conception of society and the state and reduced it again to an Hobbesian caricature by wedding it to an overly simplistic pain-pleasure model of human motivation. In short, the mainstream of early liberalism explained society in terms of a crudely distorted conception of human nature.

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[82]The following discussion is taken from Sabine, op. cit., pp. 601-606.

Unfortunately, Herbert Spencer's political thought was couched in this tradition, and his brilliant contributions to evolutionary theory were polluted by his unsuccessful attempt to meld evolutionism and liberalism.[83] Indeed, the contradictions that resulted seem almost perverse, for some of his political conclusions were quite inconsistent with his premises.

On the one hand, Spencer pictured society as an organism which was evolving in the direction of increased complexity, differentiation and functional interdependence. This was part of the general trend of evolution as a cosmic process. Consistent with this image, Spencer at one stage characterized the state as one of three major "organs," or subsystems in the social organism--what he called the "regulative" system (the others being the "sustaining" system, or industry, and the "distributive" system, or commerce). The origins of the state, accordingly, were cooperation for mutual defense, for the greater satisfaction of wants and for

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[83] Supra footnote No. 48.

the prevention of injuries. Spencer posited that natural selection worked not only on individuals but on groups, and that warfare had thus been a major selection pressure in human evolution.

Yet, despite all of this, Spencer refused to concede the idea that there could be a general welfare, as distinct from individual welfares, to which the individual might have to be subordinated. In other words, the goal-directedness of society as a collectivity was circumscribed by Spencer to conform with the social contract liberalism of Hobbes, Locke et al. Indeed, Spencer accepted the psychological premises of liberalism--that man's motives can be explained in terms of the "hedonistic calculus" of pain and pleasure. Furthermore, while the evolution of society as a whole was an organic process, the state was pictured as an artificial and temporary mechanism. The evolution (i.e. progress) of society would ultimately do away with wars and lead to social homeostasis (a notion paralleling the "hidden hand" posited in Laissez Faire economic theory). Accordingly, societies would ultimately be able to do

away with the machinery of the state (a vision not too different from that of Karl Marx).

Spencer even opposed ameliorative social reforms, on the ground that state interference with the "natural" evolution of society would thwart progress. (Spencer linked evolutionary progress to a tooth-and-claw notion of natural selection, epitomized by his phrase, the "survival of the fittest".) Not only was the survival of the fittest the key to progress, but it should be the standard for social ethics. Anything which impeded natural selection (e.g. social welfare legislation) stood in the way of progress. Spencer did not, of course, go so far as to endorse unlimited, unscrupulous exploitation. The actions of any individual were to be constrained, Spencer said, by the equal freedom of all other men. Such a vague, global standard is impossible to actualize, of course. But more important, the Spencerian social ethic lent itself exceedingly well to the self-justifications of exploitive industrialists.

Exactly how increased cooperation, integration,

interdependence and social harmony were to emerge out of social processes in which individualism and self-assertion were maximized, Spencer was never able to explain. But more to the point, Spencer never made a convincing case for the disanalogy he asserted between the state and the brain and nervous system of an organism. In arguing the case for such a disanalogy, Spencer ultimately stood against the empirical evidence. Historically, the role of leadership has become increasingly important as societies have become larger, more complexly organized and more interdependent.[84] Furthermore, the increasing complexity and interdependence of society has been accompanied by the progressively greater subordination of the individual (for better or worse) to social processes and institutions beyond his control.

In sum, the ideological stance of idealist liberals such as T.H. Green and the European and British socialists would have been more consistent with

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[84]On this point, see S.N. Eisenstadt, Modernization: Protest and Change, op. cit., chap. 1.

Spencer's own organismic hypotheses about the nature of society and the trend of history.

Karl Marx's conclusions are equally paradoxical.[85] Like so many of the other great theorists, Marx appreciated that the origins of society were to be found in human needs, and that productive forces were mainly concerned with providing these requisites. Far from wanting to abolish the industrial system, Marx envisioned its ultimate evolution to the point where the survival problem would be solved, thus permitting man's "liberation from the chains of economic determination."[86] But like Spencer, Marx never came to grips with how an increasing division of labor, specialization, complexity and interdependence--the hallmarks of industrial evolution--could ultimately lead to freedom, voluntarism and lack of specialization. As Seymour Martin Lipset has observed, Marxists had no response to Robert Michels'

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[85]The following discussion is derived from Cole, op. cit., chaps. 2, 3 and 7; Plamenatz, op. cit., II, chaps. 5 and 6; Fromm, op. cit., pp. 1-80 and Marx, German Ideology.

[86]Ibid., p. 3ff.

dictum: "Who says organization, says oligarchy."[87]

Marx argued that man is by nature a "species being" (by which Marx meant a social animal whose social needs are more basic than hedonistic calculations of pain and pleasure). This social nature unfolds itself gradually in history (an idea reminiscent of Aristotle), while in each particular epoch human personality and motivations are shaped by the conditions of material life. Thus the motives of power-seeking and personal gain are not inherent in human nature, but are instead a reflection of the socio-economic system in which the individual is embedded.

Furthermore, "the mode of production of material life conditions the social, political and intellectual life process in general."[88] The state is not seen by Marx as a necessary part of society, or as a bulwark

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[87]Robert Michels, Political Parties, with introduction by Seymour Martin Lipset (New York: The Crowell-Collier Publishing Co., 1962), pp. 25-27, 365.

[88]Marx, Preface to a Contribution to the Critique of Political Economy, reprinted in Fromm, op. cit., p. 217.

against the potential destructiveness inherent in human egoism. The state is an epiphenomenon of the Capitalist system--an instrument of the dominant class, a weapon for oppressing the working class and (for Lenin) the handmaiden of international imperialism. Therefore, the state has no necessary function for society. It is neither required by the inherent characteristics of human nature nor by the problems involved in meeting human needs. Indeed, Marx hypothesized that the state would no longer be necessary once socialism had been achieved.

On the other hand, Marx was frustratingly vague about what the classless, property-less and economically liberated society would be like. Since the practical details were never spelled out, Marx never had to face the question of how to reconcile radical freedom with the unavoidable problem of providing for the continuing human needs.

For reasons that will be discussed at length below, in recent decades social scientists have generally avoided questions about the nature and purpose of society, or the state -- at least explicitly (Leslie White

is an exception in this regard.)

On the other hand, this has not prevented a great many implicit assumptions from creeping in. In Chapters Two and Three above, the various implicit hypotheses of functionalists, systems analysts and "communications" theorists were discussed. Another good example is the voluminous literature that has appeared in recent years on economic and political development.

In the first place, development is generally defined in materialistic terms--in terms of the ability to provide goods and services. Or, to be precise, the problem of development is defined in terms of what is required for a "developing nation" to achieve a socio-economic system and level of living comparable to that of the industrialized countries. Thus, development is not conceived in terms of any fundamental life-or-death problems, but in terms of how to increase the standard of living toward that of the undustrialized nations. In other words, development is defined, not as the distance from A to Z, but from, say, G to K. Furthermore,

there is the assumption that it is a good thing to go from G to K and not the reverse; development, defined as an increase in the standard of living and--perhaps --political democratization, is assumed to be a desirable goal.[89]

A notable exception to this all too common point of view is Fred von der Mehden, who resisted the temptation to use the characteristics of industrialized nations as his value premises. Instead he urged political scientists to reduce the concept of political development to its "lowest common denominator"--the ability of a state to provide security and the necessities of life for its people.[90]

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[89]For a sampling of the literature on development, see especially: Almond and Coleman, op. cit.; Almond and Powell, op. cit.; David Apter, The Politics of Modernization (Chicago: University of Chicago Press, 1965); C.E. Black, The Dynamics of Modernization (New York: Harper and Row Publishers, 1966); Kalman H. Silvert (ed.), Expectant Peoples: Nationalism and Development (New York: Random House, 1963); Jason L. Finkle and Richard W. Gable, Political Development and Social Change (New York: John Wiley and Sons, 1966).

[90]Von der Mehden, Politics of the Developing Nations (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1964).

Although there is considerable confusion of cause and effect among developmental theorists, in general they seem to agree that political leadership (parties, charismatic leaders, the bureaucracy, or even the army) must play a major role in the developmental process. Most would accept Talcott Parsons' conception of the political system as the locus of the goal-attainment function for a society; political development is seen as a necessary concomitant, if not prerequisite, to the more generalized process of "modernization."

From this brief survey of the corpus of social theory, certain general conclusions may be drawn. First there has been a frequent lumping together, especially in recent decades, of such notions as progress, change, evolution and techno-economic development. In fact, these concepts have often been treated as synonymous.

Second, there has been an increasingly pronounced tendency in recent decades to treat social processes as autonomous, or as governed by their own internal dynamics.

A third general tendency has been for theorists to project past trends into the future--to assume that

the patterns of change discernable in the past are in fact laws.

Fourth, there have been frequent lapses into reductionism; social evolution is often characterized in terms of some monolithic force, or process.

Determinism is also commonly a facet of social and political theory, although in some cases the locus is circumscribed so broadly as to become almost tautalogical; that is, social evolution is determined by whatever determines social evolution.

There also seems to have been a relatively frequent, though by no means universal, recognition among major theorists of the past that social life and the state originated in the problem of meeting human needs. Even some of the most individualistically oriented theorists seemed to appreciate that society provides some benefits to the individuals who comprise them.

Most contemporary theorists probably also accept an evolutionary explanation of the origins of society, though few feel obliged to state this assumption explicitly. On the other hand, many theorists today seem

to imply that the basic needs are no longer a problem. Evolution, in the Darwinian sense of an on-going struggle for survival, is often seen as something that happened in the past. Further evolution, or future history, can be projected in terms of various hypotheses of progress. Easton's conclusion that the persistence of the political system is the most inclusive problem for political theory typifies this point of view. A commonplace assumption in recent years has been that, save for such man-made catastrophes as nuclear war, our survival problems have been "solved"; the unfinished business on the agenda now is how to achieve the"good life."

Indeed, only if one assumes that contemporary social and political life are unrelated to the Darwinian problem of survival is the divorce of functionalism from evolutionary theory feasible. Yet an entire generation of social scientists was able to make this separation without giving it a second thought.[91] Furthermore, any

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[91]For discussions of this point, see Barringer et al., op. cit., and S.A. Barnett (ed.), A Century of Darwin (Cambridge, Massachusetts: Harvard University Press, 1958), especially Donald G. MacRae, "Darwinism in the Social Sciences."

theory which posits the autonomy of social processes must of necessity assume that the basic biological needs of the species are assured, or are not relevant. By the same token, any theorist who postulates a deterministic process or projects an ultimate goal-state (other than the apocalypse) for human society must necessarily exclude from his premises the possibility of the non-survival of a society,or of the species.

As we shall see in the chapters that follow, the modern, synthetic (or Darwinian) theory of biological evolution proceeds from a radically different set of assumptions about human life.

CHAPTER FIVE

THE MODERN, SYNTHETIC THEORY OF BIOLOGICAL EVOLUTION

In what must surely rate as one of the strangest episodes in the entire history of science, two generations of our immediate forebears in the social sciences managed to all but ignore the "Darwinian" theory of biological evolution and to exclude from their purview any consideration of the role of biological factors in the shaping of human behavior.[1] Our immediate heritage has thus been one of environmental (that is, socio-economic and cultural) determinism.[2] The result has often been

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[1]For discussions of this situation, and of the causes for it, see: Richard L. Means, "Sociology, Biology, and the Analysis of Social Problems," Social Problems, XV (1967), No. 2, pp. 200-212; Mark H. Haller, "Social Science and Genetics: A Historical Perspective," in David C. Glass (ed.), Genetics (New York: The Rockefeller University and the Russell Sage Foundation, 1968); Marvin Bressler, "Sociology, Biology and Ideology," in Glass (ibid.); and Campbell, op. cit.

[2]Perhaps the epitome of this attitude is a statement by Leslie White: "Nor would we be aided in the slightest degree by taking the human organism into consideration. Here as before the biological factor is irrelevant, and consequently it should be disregarded." (Op. cit., p. 14.)

a one-dimensional and curiously disembodied perspective.

There are, of course, many reasons for this state of affairs. One important factor is the legacy of Social Darwinism. The political exploitation of the theory of evolution, often far beyond the limits of the evidence, did incalculable harm.[3] Not only was the theory of evolution misused in furtherance of a conservative political ideology, but far too much was claimed by early biologists for the role of heredity--on the basis of grossly inadequate evidence.[4] In addition, the extreme hereditarian view of man lent encouragement to a strong current of racism, nativism and biological elitism in 19th and early 20th Century America.[5] One

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[3]As Theodosius Dobzhansky has observed: "The 'gladiatorial theory' of the struggle for existence is, indeed, no longer a part of our understanding of how natural selection operates in evolution. Social Darwinism really never had sound biological roots..." Mankind Evolving (New Haven: Yale University Press, 1962), p. 341. For a detailed discussion of the role of Social Darwinism in American intellectual history, and of the consequences for the social sciences, see also: Richard Hofstadter, Social Darwinism in American Thought (Boston: Beacon Press, 1967).

[4]Bressler, op. cit., pp. 179-180.

[5]Haller, op. cit., pp. 116-118; Hofstadter, op. cit., chap. 9; Campbell, op. cit., p. 23.

manifestation of this was the way in which the eugenics movement, founded in 1883 by Sir Francis Galton with the most humane of purposes in mind, was captured by a virulent brand of apologists for war, for class privilege, and for imperialism. In the United States eugenics advocates played a key role during the 1920s in the enactment of restrictive immigration laws and of laws in over half the states authorizing the sexual sterilization of criminals, the insane and the feebleminded.[6]

The reaction against such social doctrines took many forms. On the philosophical level, the Spencerian interpretation of natural selection was disputed by writers who emphasized the social and cooperative side of man. Perhaps the most notable writer of this genre was the Russian naturalist-anarchist, Prince Petr Kropotkin, who concluded that cooperation and not conflict was the key factor in evolution.[7] (Kropotkin's

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[6]Haller, op. cit., p. 217; Hofstadter, op. cit., pp. 161-169; and Dobzhansky, op. cit., pp. 13-15.

[7]Kropotkin, Mutual Aid: A Factor of Evolution (1902), (reprinted, Boston: Extending Horizon Books, 1955).

work was little-known outside of Russia during his own lifetime, however, and the burden of the argument was borne by sociologists such as Durkheim and Lester Ward, by philosophers such as John Dewey and by the socialist political writers.)

Another major factor was the accumulation of evidence during the 1920s and 1930s that environmental factors were demonstrably important determinants of behavior. This was coupled with telling attacks on the adequacy of earlier hereditarian studies, and by a swing of the ideological pendulum during the Great Depression era.[8] As historian Mark H. Haller put it: "The intellectual foundations for a hereditarian interpretation of human behavior crumbled at the same time that the hereditarian interpretation came under ideological attack."[9]

Of equal importance was the emergence of behaviorist psychology, which asserted a radically environmentalist model of behavior. Associated with John B. Watson (and

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[8] Haller, op. cit., pp. 219-222.

[9] Ibid., p. 222; Dobzhansky, op. cit., pp. 10-11.

later B.F. Skinner), Behaviorism postulated a simple "stimulus-response" conditioning model of human behavioral development which, in its earliest incarnations, excluded the organism as a relevant factor in explaining behavior. As John B. Watson, the founding father of Behaviorism, explained it: "The behaviorist has learned by his study that most of the things we see the adult doing are really learned. We used to think a lot of them were instinctive, that is, 'unlearned.' ....Actual observation thus makes it impossible for us any longer to entertain the concept of instinct."[10]

Although Behaviorism made important contributions,

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[10]Watson, Behaviorism (1924) (reprinted, Chicago: University of Chicago Press, 1962), pp. 17, 136; B.F. Skinner, Science and Human Behavior (New York: The Macmillan Co., 1953). For a general discussion of Behaviorist psychology, see especially: Seymour M. Berger and William W. Lambert, "Stimulus-Response Theory in Contemporary Social Psychology," in Gardner Lindzey and Elliot Aronson (eds.), Handbook of Social Psychology (Reading, Mass.: Addison-Wesley Publishing Co., 1968), I, Chap. 2; also, Charles Taylor, "Psychological Behaviorism," in The Encyclopedia of Philosophy (New York: Macmillan Co., and The Free Press, 1967), VI, pp. 516-520; Arnold S. Kaufman, "Behaviorism," loc. cit., I, pp. 268-273; and Dobzhansky, op. cit., pp. 73-75.

a perhaps too ready acceptance by many social scientists of the extreme environmentalist model had the effect of foreclosing consideration of biological factors in many quarters of the social sciences. In other words, the pendulum was allowed to swing from one unsubstantiated extreme to the other.

A similar situation obtained in anthropology, where a reaction led by Franz Boas and his disciples against the racist and imperialist currents abroad in his profession took the form of cultural relativism and radical environmentalism.[11] In its most extreme formulations, the concept of culture came to be reified into a closed system. Once again, Leslie White probably epitomizes this attitude: "Cultural phenomena as such must be studied and interpreted in terms of culture."[12] (But, as Dobzhansky notes: "To exclude in advance any consideration of the genetic basis from the study of

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[11]Haller, op. cit., p. 218; Dobzhansky, op. cit., pp. 9, 73-75;

[12]White, op. cit., p. 28; see also White, "Culturology," Encyclopedia of the Social Sciences, op. cit., III, pp. 547-551.

culture is contrary to elementary rules of scientific procedure.")[13]

By the same token, for the past few decades biological factors have been "a missing variable," as Means puts it,[14] in standard sociology texts. Ignoring the admonition of the Founding Father of modern sociology, Auguste Comte, that explanations of social life must be grounded in the "biological laws,"[15] sociologists became chained to Emile Durkheim's dictum that sociology must be autonomous. Social facts must be explained in terms of other social facts: "The determining cause of a social fact should be sought among the social facts preceding it and not among the states of individual consciousness."[16] Indeed, Durkheim was one of the chief

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[13]Dobzhansky, op. cit., p. 75.

[14]Means, op. cit., p. 202. As an example, see: Robert Bierstedt, The Social Order (New York: McGraw-Hill Book Co., 1957).

[15]Quoted in Bressler, op. cit., p. 179.

[16]Durkheim, "Social Facts," in May Brodbeck (ed.), op. cit., pp. 245-254.

opponents of Spencer and of "biologism" in the social sciences.[17]

Perhaps the coup de grace for the evolutionary and biological perspective in the social sciences came with the rise of Naziism in Germany and the Nazi's espousal of the most virulent kind of racist doctrines.[18] But whatever the cause, there can be no doubt that the Darwinian (or more recently "synthetic") theory of evolution and social biology have been terra incognita for most of the current generation of social scientists.[19]

Of course, this situation has been changing rapidly in the past few years.[20] Again, many factors have con-

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[17]Robert A. Nisbet, Emile Durkheim (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965), p. 15.

[18]Both Dobzhansky (op. cit., p. 12) and Haller (op. cit., p. 219) attribute major influence to anti-Nazi sentiments in the latter 1930s. See also Sabine, op. cit., chap. 35.

[19]For extensive documentation of this point, see: Leslie White, The Evolution of Culture, op. cit., preface; M.J.Herskovits, Man and His Works (New York: Alfred A. Knopf, 1948); and Supra note No. 1.

[20]Among the many signposts of the change are the appearance ofa number of new, interdisciplinary sub-specialties (such as psychobiology and behavior genetics), the establishment by the Social Science Research Council of a Committee on the Biological Bases of Behavior, several interdisciplinary conferences and,

tributed to the current revival of interest, but the most important by far is our rapidly growing body of solidly-grounded, scientific knowledge about the actual workings of evolution and about the role of genetic and bio-chemical factors in behavior. In fact, this data is derived from numerous disciplines, or sub-disciplines (see below).

Among the many social scientists who have recently been attempting to help re-build the bridges between the biological and social sciences, a number of political scientists have made significant contributions, including Albert Somit, James C. Davies, Arthur Kalleberg, Charles R. Adrian, David Schwartz, Robert B. Stauffer, Thomas L. Thorson and Ralph P. Hummel.[21] This writer's own approach

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of course, a number of popularizations of varying degrees of competence: E.g., Konrad Lorenz, On Aggression (New York: Harcourt, Brace and World, 1966); Robert Ardrey, The Territorial Imperative (New York: Atheneum Publishers, 1966); Desmond Morris, The Naked Ape (New York: Dell Publishing Co., 1967).

[21]Somit, "Toward a More Biologically-Oriented Political Science: Ethology and Psychopharmacology,"

differs only in that it seeks first to fabricate a theoretical paradigm derived from the Darwinian, or synthetic theory of evolution. Only then, it is maintained, can we proceed systematically to the analysis of specific political phenomena; neuro-physiological or bio-chemical explanations of behavior will be incomplete explanations as long as we are unable to explain behavior functionally with reference to its survival consequences. At any rate, that is the point of view upon which this chapter and the chapters that follow have been structured.

Midwest Journal of Political Science, XII (1968), pp. 550-567; Davies, "The Psychobiology of Political Behavior: Some Provocative Developments," (unpublished, 1969); and "Violence and Aggression: Innate or Not?" (unpublished, 1970); Kalleberg, "Concept Formation in Normative and Empirical Studies: Toward Reconciliation in Political Theory," American Political Science Review, LXIII (1969), No. 1, pp. 26-39; Adrian, "Implications for Political Science and Public Policy of Recent Ethological Research" (unpublished, 1969); Schwartz, "Perceptions of Personal Energy and the Adoption of Basic Behavioral Orientations to Politics" (unpublished, 1970); Stauffer, "The Role of Drugs in Political Change" (unpublished, 1970); Thorson, Biopolitics (New York: Holt, Rinehart and Winston, Inc., 1970); Hummel, "A Case For a Bio-Social Model of Charisma" (unpublished, 1970).

The modern understanding of the history of life on earth has been termed the "synthetic" theory of evolution because, as biologist George Gaylord Simpson explains: "It is a new synthesis from all fields of biology as well as related work in other fields and not the offspring exclusively of one of the numerous preceding theories."[22]

Although theories of evolution have a long history, the modern theory of biological evolution traditionally dates from the publication of Charles Darwin's On the Origin of Species (1859). Impressed by Malthus's observation in his An Essay on the Principle of Population (1798) that the number of individuals born tends to multiply

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[22]Simpson, "The Study of Evolution: Methods and Present Status of Theory," in Anne Roe and George Gaylord Simpson, Behavior and Evolution (New Haven: Yale University Press, 1958) p. 13; also G. Ledyard Stebbins, Processes of Organic Evolution (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), p. ix. Some biologists, though, advocate the term "post-Darwinian" for contemporary evolutionary biology -- to indicate that biology is now entering a phase in which serious attempts are being made to predict particular biological events in evolutionary and ecological time. On this point, see E.O. Wilson (review of Richard C. Lewontin (ed.), Population Biology and Evolution) in Science, CLXIII (1969), pp. 1184-1185.

faster than the means of subsistence,[23] Darwin put forward the concept of natural selection to account for the presumed fact that only a part of each generation was able to survive -- the part consisting of those individuals most "fit". The qualities of the fittest individuals, then, would be passed on to their progeny (by mechanisms unknown to Darwin), and the progeny in turn would be subject to selection. Gradually, through successive generations, this process of biological evolution would lead to the improved adaptation of the survivors to their environments. By this process, moreover, all living forms could be seen to have been descended with modification from preexisting forms.[24]

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[23]Actually, the Malthusian hypothesis is disputed today. Many species exhibit the ability to regulate their numbers, in some cases by a process analogous to social conventions, so as to maintain a homeostatic fit with their environments. See V.C. Wynne-Edwards, Animal Dispersion in Relation to Social Behavior (Edinburgh: Oliver and Boyd, 1962).

[24]Stebbins, op. cit., pp. 2-11; George Gaylord Simpson, This View of Life (New York: Harcourt, Brace and World, Inc., 1964), chap. 1; I. Michael Lerner, Heredity, Evolution and Society (San Francisco: W.H. Freeman and Co., 1968), chap. 3.

Darwin himself amassed an impressive amount of evidence from observation of the geographical divergence and specialization of organisms, from comparative anatomy, comparative embryology, paleontology (the fossil record) and what was then known of artificial selection.[25] His evidence convinced most biologists that evolution had indeed occurred, although the subsequent public debate was heated.[26]

The actual mechanisms of heredity, and the source of the variations which provide the raw material upon which selection works, were unknown for several decades following the publication of Darwin's evidence. Darwin himself spoke of "variations which seem to us in our ignorance to arise spontaneously."[27] However, this weakness in the theory was finally removed when the Mendelian principles of inheritance were re-discovered and -- in the 1920s and 1930s -- correctly applied to

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[25]Lerner, op. cit., pp. 32-39.

[26]Stebbins, op. cit., p. 17.

[27]Quoted by Simpson, in The Meaning of Evolution, op. cit., p. 268.

populations,[28] and with the discovery of the occurrence of spontaneous genetic mutations. The variability upon which natural selection acts was thus found to have its source ultimately in 1. mutation and 2. genetic recombination.[29]

Furthermore, in the century since On the Origin of Species appeared, the case has gotten ever-stronger. In the past several decades, evolutionists in all branches of biology -- especially taxonomy (classification) and systematics (the study of diversity and relationships of organisms), several branches of genetics, cytology (or cell biology), comparative morphology and physiology, embryology, ecology and paleontology -- have provided additional supporting evidence and are today in general agreement.[30] More recently, the new discipline of ethology (the study of animal behavior in its natural

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[28]Stebbins, op. cit., p. 19.

[29]Ibid.

[30]Ibid., p. ix and chap. 1; Lerner, op. cit., chaps. 3, 4 and 5; Ernst Mayr, Principles of Systematic Zoology (New York: McGraw-Hill, Inc., 1969), pp. 2, 8-9; Wilson, op. cit., pp. 1184-5; and Simpson, The Meaning of Evolution, op. cit., chap. 16.

environment) has also provided reinforcement and demonstrated linkages between behavior, morphology and evolution.[31] In addition, significant contributions have been made in recent years by anthropologists,[32] and psychologists (particularly those working in behavior genetics,[33] psychobiology[34] and child development,[35] or

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[31]Mayr, op. cit., pp. 135-138.

[32]See for example, Alexander Alland, Jr., Evolution and Human Behavior (Garden City, New York: The Natural History Press, 1967); Alland, Adaptation in Cultural Evolution: An Approach to Medical Anthropology (New York: Columbia University Press, 1970); Andrew Vayda (ed.), Environment and Cultural Behavior: Ecological Studies in Cultural Anthropology (Garden City, New York: The Natural History Press, 1969); and A.J. Kelso, Physical Anthropology, (Philadelphia: J.B. Lippincott Co., 1970).

[33]See for example, Gerald E. McClearn, "The Inheritance of Behavior," in Leo Postman (ed.), Psychology in the Making (New York: Alfred A. Knopf, 1962); Jerry Hirsch, Behavior-Genetic Analysis, (New York: McGraw-Hill, Inc., 1967); Steven G. Vandenberg (ed.), Methods and Goals in Human Behavior Genetics (New York: Academic Press, 1965).

[34]See for example, James L. McGaugh, Norman Weinberger and Richard E. Whalen (eds.), Psychobiology (San Francisco: W.H. Freeman and Co., 1966).

[35]See for example, Jerome S. Bruner, Processes of Growth in Infancy (Worcester, Massachusetts: Clark University Press and Barre Publishers, 1968); Gordon W. Bronson, "The Development of Fear in Man and Other Animals," Child Development, XXXIX (1968), No. 2, pp. 409-431.

the "growth sciences").

An excellent summary of the present status of the theory of evolution has been provided for us by the geneticist I. Michael Lerner:

> Now all biologists agree that organic evolution is a reality and that the currently dominant species on this planet (man) and all other existing kinds of life were not always the way they are now.... The evolutionary outlooks...is based on the evidence that the earth as we know it today and all its kinds of inhabitants were not the result of Special Creation, but were produced by a complex, tortuous, and enormously long historical sequence of events. Knowledge of the past and of the processes that have led from the beginnings of life on earth has not yet been apprehended in full detail...But the evidence that the [evolutionary] process has occurred is overwhelming. In part it is based on the historical record deducible by observation; in part it stems from actual experiments. And evolution is also, given the basic facts of genetics, a logical necessity....Because evolution is the only consistent explanation of our accumulated observations on current and extinct life on earth, it may be said that evolution has been demonstrated beyond all reasonable doubt -- although dissipation of unreasonable doubt, such as expressed by Gosse [who suggested that God "planted" the evidence of evolution to test our faith] or the Mississippi Fundamentalists, has by no means been accomplished.[36]

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[36]Lerner, op. cit., pp. 2,46.

Accordingly, Simpson was able to conclude:

> We seem at last to have a unified theory -- although a complex one inevitably, as evolution itself is a complex interaction of different processes -- which is capable of facing all the classic problems of the history of life and of providing a causalistic solution of each.[37]

A comprehensive description of the synthetic theory of evolution is beyond the scope of this dissertation, although such discussions can be found in several authoritative works, including: George Gaylord Simpson, The Meaning of Evolution and This View of Life; Theodosius Dobzhansky, Genetics and the Origin of the Species, Mankind Evolving and Heredity and the Nature of Man; Ernst Mayr, Principles of Systematic Zoology; Julian Huzley, Evolution: The Modern Synthesis, and Evolution in Action; I. Michael Lerner, Heredity, Evolution and Society; and G. Ledyard Stebbins, Processes of Organic Evolution.[38] Some of the principles

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[37]Simpson, The Meaning of Evolution, op. cit., p. 279.

[38]Simpson, The Meaning of Evolution, ibid., This View of Life, op. cit.; Dobzhansky, Genetics and The Origin of Species (New York: Columbia University Press, 1951), Mankind Evolving, op. cit., Heredity and

and mechanisms of particular relevance to political theory and empirical political research will be summarized here, however.

To begin with, we should explain what is understood by "natural selection."[39] Briefly, evolution is a process through which a population of organisms enhances its survival and reproductive potential by successive genetic changes, or adaptations. Random mutations, genetic recombination (or reshuffling), and behavioral variation provide the raw material for adaptation. This raw material is then tested in the environment for its survival value, or relative fitness, and the "editing" process is called natural selection. Of course, natural selection is not a purposive agent,

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the Nature of Man (New York: Harcourt, Brace and World, Inc., 1964); Mayr, op. cit.; Huxley, Evolution: The Modern Synthesis (New York: Harper and Bros. 1943), Evolution in Action (New York: Harper and Row, 1966); Lerner, op. cit.; Stebbins, op. cit.

[39]The following discussion is based upon Stebbins, op. cit., chap. 1; Simpson, The Meaning of Evolution, op. cit., pp. 219-229; and Lerner, op. cit., pp. 32-33.

but neither is it a constant. Its effects are specific to a particular environmental configuration and shift in accordance with changes in the relationship between organisms and the environment. Indeed, three basic types of changes are encompassed by natural selection: exogenous changes in the environment, changes in a population of organisms which affect its fit with its environment and changes in the environment as a consequence of population-environment interactions. Three kinds of selection result: 1. stabilizing selection; 2. directional selection; and 3. disruptive selection.[40]

As a process, then, evolution involves two distinct kinds of phenomena. One kind consists of the variations upon which natural selection acts, and the other consists of mechanisms making for continuity (which permit the accumulation of "adaptive" variations).[41]

Evolution is thus not a random process. Far from it. As Simpson explains:

> In the first place, the immanent characteristics of the universe certainly must limit the possibilities of organic evolution quite stringently.

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[40]Stebbins, op. cit., pp. 80-82.

[41]Alland, op. cit., p. 2; Campbell, op. cit., p. 27.

> Their influence extends to every level of organic activity. At the ultimate biochemical level, for instance, the...highly specific and invariant... properties of the carbon atom make life possible as it is and keep it from being anything else... At the higher, organismic level the restrictions ...are equally pervasive..[E.g.], physically maximal and...optimal sizes of land organisms are governed by the mechanical arrangements of skeletal and muscular systems, the strengths of their materials, the force of gravity [etc.]....Configural limitations are also...inherent in the fact that evolution is an historical, continuous process... What could ever later evolve here on earth has always been strictly limited at every moment through the past 2 billion years or more by what had already evolved...The possibilities are minutely few in comparison with the impossibilities.[42]

Conversely, evolution is not deterministic or teleological. Though it is historical in nature, it is a process, not a goal. As geneticist Julian Huxley has written:

> Natural selection converts randomness into direction, and blind chance into apparent purpose. It operates with the aid of time to produce improvements in the machinery of living, and in the process generates results of a more astronomical improbability, which could have been achieved in no other way. But it has its limitations. It is opportunist and it is relative: at any one time it can only produce results which are of immediate biological advantage to their possessors, in relation to the particular

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[42]Simpson, This View of Life, op. cit., pp. 239-240. By the same token, the number of possible mutations of any one gene are also strictly limited. (Ibid.)

> situation of the moment. So it can never plan ahead or work to complete a design. Furthermore, it often leads life into blind alleys, from which there is no evolutionary escape.[43]

A second point is that the basic criterion of Darwinian "fitness," or "adaptiveness," is reproductive efficacy. Lerner puts it as follows: "Natural selection is... essentially the differential reproduction of the different genotypes."[44] Modern biologists appear to be unanimous on this point.[45] What this means, as biologist Robert Rosen has noted, is that "all types of competitive advantage, regardless of their initial nature, are ultimately translated into differences in fecundity, which ultimately result in the predominance of the advantageous forms..."[46] That

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[43]Huxley, Evolution in Action, op. cit., p. 48. We will have more to say on this point below.

[44]Lerner, op. cit., p. 33.

[45]Viz. Dobzhansky, Mankind Evolving, op. cit., pp. 129, 159; Simpson, The Meaning of Evolution, op. cit., p. 76; Bruce Wallace and Adrian Srb, Adaptation (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), p. 12; Lawrence E. Mettler and Thomas G. Gregg, Population Genetics and Evolution (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.1969), pp. 90-91.

is to say, "the features conferring greater adaptedness will, if inherited, accumulate over generations, and the hereditary constitution of the population will gradually become altered. The ensuing change is phyletic evolution...and the force responsible is natural selection."[47]

Darwin himself stressed the survival of offspring. He also stressed the stage of mating in higher animals and made a distinction between "sexual" selection and "natural" selection. But since both differential mortality and differential fertility can lead to differential reproductive success, today both kinds of selection are looked upon as special cases of a broadened concept of natural selection.[48]

This point is fundamental to an understanding of the modern theory of evolution. For, if the focus of natural selection is the offspring (and the offspring's

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[46]Robert Rosen, Optimality Principles in Biology (London: Butterworths, 1967), p. 6.

[47]Mettler and Gregg, op. cit., p. 90.

[48]Simpson, This View of Life, op. cit., p. 77.

offspring), any factor which influences reproductive efficacy -- genetic, ecological, cultural or political -- becomes a selection pressure, whether favorable or unfavorable. (We will have more to say on this matter below).

Of equal importance to an understanding of the synthetic theory of evolution is the fact that, in the modern view, the basic survival unit is not the isolated individual, as is commonly supposed, but rather the collectivity. The collective nature of the survival enterprise begins at the level of the genes (the basic unit of heredity). As biologist Ernst W. Caspari has observed:

> The modern theory of evolution is based on our knowledge of the behavior of genes in populations. The basic conceptual advance in this field was the recognition that a sexually reproducing population, a 'Mendelian' population, can be regarded as a collection of genes, a gene pool: in which the genes are reshuffled every generation. It is therefore possible to abstract from the individuals that are, so to speak, attached to the genes and to describe the population in terms of gene frequencies in the gene pool.[49]

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[49] "Introduction to Part I and Remarks on Evolutionary Aspects of Behavior," in Jerry Hirsch (ed.), Behavior-Genetic Analysis, op. cit., pp. 3-4.

The survival (or long-run reproductive success) of a gene pool is, then, dependent upon its collective fitness. Zoologist William Etkin expressed it as follows:

> According to our present understanding of the genetics of animal populations, the gene pool of a population is a balanced system wonderfully sensitive to selection pressures. The double set of genes in each individual (diploid condition) which includes an 'unexpressed' set of recessive genes allows the accumulation of gene mutations in the population. These furnish the raw material upon which natural selection acts. Sexual reproduction permits rapid diffusion of genetic change throughout a population....As a consequence...natural selection operating upon the genetic system of higher organisms can effect rapid and delicate adaptation of these organisms to the changing demands of the environment.[50]

Thus Stebbins was able to conclude:

> As geneticists have demonstrated with increasing clarity that the gene pool in natural populations is a highly integrated system, evolutionists have shifted their attention from the individual to the population as the unit of natural selection and evolutionary change.[51]

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[50] Etkin, Social Behavior From Fish to Man (Chicago: University of Chicago Press "Phoenix," 1967), p. 3.

[51] Stebbins, op. cit., p. 53. In actuality, natural selection operates at various levels, wherever reproduction takes place -- genes, gene complexes, chromosomes, cells, individual organisms and populations -- and there is a feedback process at work between these levels. (Mettler and Gregg, op. cit., p. 91). It nonetheless remains true that the gene pool is the basis for survival over the long run.

In other words, the collective nature of the survival enterprise also applies at the macro level in most species -- certainly in all those that are sexually reproducing. Simpson notes:

> Adaptation...is favorable to a population, or species of populations, and only incidentally to an individual organism...Lamarck [an 18th Century French naturalist] and the Neo-Lamarckians...thought that the relevant system was the individual organism. Darwin agreed as to that relevance, but he observed that in respect to adaptation much the most important system is the reproducing population. It was probably the most original and essential of Darwin's discoveries, although not always recognized as such. We now know that the population system is not only the most important; it is literally all-important. In fact, the system involved in natural selection and adaptation is an open one including both a reproducing population and its whole environment. However...it is the organic population, not its environment, that becomes adapted, maintains adaptation, changes adaptation or -- and historically this has been the usual case -- finally becomes extinct.[52]

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[52] Simpson, Biology and Man, op. cit., p. 28. Darwin's appreciation of the importance of the group in evolution was most strongly stated in The Descent of Man (1873). (See especially pp. 477-478 and 496-501 in the Modern Library edition.) Darwin's thinking in this regard seems to have been greatly influenced by the writing of the co-discoverer of natural selection, Alfred Russel Wallace. See: "The Origin of Human Races and the Antiquity of Man Deduced from the theory of 'Natural Selection,' in The Anthropological Review, II (1864), pp. clviii-clxx. As noted above, Petr Kropotkin provided the most extensive "ethological" support for this hypothesis among 19th Century writers in his Mutual Aid: A Factor of Evolution (1888).

The geneticists' concept of population is explained by Mettler and Gregg:

> The term population, when broadly defined, refers to any set of items, but it is used by biologists to describe specifically such aggregates of similarly adapted individuals. Population geneticists limit the term even more to describe groups of sexual forms that associate for reproduction as well as for ecological reasons. Genetically defined, a population (or more correctly, a genetic population) is a spatial-temporal group of conspecific interbreeding individuals. The genetic population maintains a continuity over time because of reproductive interconnections between generations, and is endowed with spatial unity owing to interbreeding among its members. A population may grow in size or become reduced through migration of individuals in or out, or by alterations in birth and death rates. It may fuse with other populations and it may become extinct, either by the total elimination or by the complete emigration of its members.[53]

Ultimately, as noted above, the "success" of a population is reflected in its reproductive efficacy. And biologists from Darwin's day forward have traditionally considered reproductive success to be largely a matter of sheer numbers (the population with the greatest numbers being the most "successful"). In recent years, however, this assumption has increasingly been called

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[53]Mettler and Gregg, op. cit., p. 30.

into question. As ethologist V.C. Wynne-Edwards has observed:

> We are now in the anomalous position of being committed to Darwin's concept that organisms are always striving to increase their numbers, and all that follows from this, and at the same time of finding in actual fact that many animals have efficient adaptations for holding their populations down....[54]

Accordingly, a great deal of re-thinking is currently going on about this subject.[55] In theory, there are at least five different measures which might be utilized to determine the reproductive efficacy of a population. One involves straightforward increases or decreases in population size over time. A second measure involves a statistic reflecting the relative reproductive

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[54]Wynne-Edwards, "Population Control and Social Selection in Animals," in Glass (ed.), op. cit., p. 148.

[55]The following discussion represents a synthesis by the writer based on discussions in William Petersen Population (New York: The Macmillan, Co., 1961), pp. 526-535; Eugene P. Odum, Ecology (New York: Holt, Rinehart and Winston, Inc., 1963), chap. 5; Clifford B. Knight, Basic Concepts of Ecology (New York: The Macmillan Co., 1965), pp. 16-21, and chap. 8; Edward J. Kormondy, Concepts of Ecology (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969), pp. 91ff.; and Paul R. Ehrlich and Anne H. Ehrlich, Population, Resources, Environment: Issues in Human Ecology (San Francisco: W.H. Freeman and Co. 1970).

success of two or more populations. It is obviously a limited, comparative measure. Third, there is the computation for the maximum number of individuals which any given environment is able to support. This is an ecological measure and involves the concept of "carrying capacity." Traditionally used in range management to define the number of grazing animals which could be supported by a given amount of grassland, carrying capacity is now being utilized by ecologists in relation to the panoply of resources required by human populations for their support. Thus, the carrying capacity of any environment is limited by what is referred to as "Liebig's Law," or the "law of the minimum" (after Justus Von Liebig, a 19th Century pioneer in the study of chemical fertilizers). That is, whichever requisite of life is in shortest supply in a particular environment, like the weakest link of a chain, determines the maximum population which can be supported in that environment.

A fourth possible measure involves a calculation (or rather estimation) of the minimum number below which a gene pool greatly diminishes its viability and is

liable quickly to become extinct.[56] (Obviously this is a very poor measure since, by definition, it represents marginal viability.)

For reasons which are complex and not really relevant to the discussion here, biologists find objections to each of the four measures listed above (changes through time within a single population, relative reproductive efficacy between two or more populations, maximum number, or minimum number), when taken in isolation. It is not that these measures do not tell us something meaningful about the reproductive efficacy of a population, but current thinking seems to be that a fifth measure -- the "optimum number" -- is to be preferred, since it combines the best features of the other four. The optimum number does not refer to any fixed size, but is instead a variable based on the density of each local population in relation to the resources (and hazards) of its particular ecological niche. This ratio will be

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[56]Simpson, The Meaning of Evolution, op. cit., pp. 208-209; 228-229; and Knight, op. cit., pp. 216-219.

different for different species and may require a deme (or breeding population) to anticipate its seasonal and future needs or adjust to gradual changes in the local ecology. The most impressive evidence to date in support of this concept is the fact that many animal populations in the wild seem to be able to maintain what appears to be an optimum number; their potential fecundity is often far greater than is normally utilized, the excess being regulated often by "social conventions" of various kinds -- such as restrictions on the number of males who are permitted to breed, limits on the number of eggs which are allowed to hatch, or, even, in some insect species, the creation of castes of sterile individuals.[57] Wynne-Edwards reports:

> Modern studies have confirmed that the factor which ultimately limits the density of animal populations is in most cases food [and water] supply....It seems certain that this common need to hold back on the consumption of food is the reason so many animals have become adapted through natural selection to limit their numbers by self-imposed means.[58]

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[57]See Wynne-Edwards, Animal Dispersion in Relation to Social Behavior (Edinburgh: Oliver and Boyd, 1962); also, "Population Control and Social Selection in Animals," in Glass (ed.), op. cit., pp. 143-163.

If reproductive efficacy is the basic criterion of evolutionary success, and if the gene pool of the deme is the basic survival unit, it is clear that the problem of survival is not a limited and individualistic affair, essentially, but rather an on-going and many-faceted enterprise -- both individual and inter-personal. Geneticist Alexander Kessler has observed:

> Population fitness involves much more than demographic adaptation to underutilization of levels of food resources. It requires a wide array of adaptabilities -- adaptabilities to select and use new foods as well as to conserve their quantities; to adjust to other populations and to other species; to explore and to investigate new environments; to exploit opportunities as they arise; to acquire knowledge; to anticipate dangers; to develop new skills. All of these serve to extend the species' range and mastery of environments.[59]

Implicit in this conceptualization of the survival problem is the idea that behavior, as well as morphology is relevant to the meeting of any species' survival needs. In introducing the proceedings of a

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[58]Wynne-Edwards, "Population Control and Social Selection in Animals," ibid., p. 148.

[59]Kessler, "Social Behavior and Population Dynamics: Evolutionary Relationships," in Glass (ed.), op. cit., p. 176.

landmark sympsium on this subject back in 1958, Anne Roe and George Gaylord Simpson wrote:

> The most widely held modern theory of evolution ....reinstates [after Darwin] behavior not merely as something to which evolution has happened but as something that is itself one of the essential determinants of evolution....Morphology, physiology and behavior are so inextricably united in functioning and in evolution that it is only to be expected that most of the concepts and principles of evolution in general apply to all three aspects.[60]

A fourth point, therefore, is that in the current view, behavioral traits evolve in much the same way as does morphology. As the English zoologist Robert A. Hinde expressed it: "Behavior produces consequences which may or may not be of significance for the survival of reproduction of the individual. Consequences which are of such significance provide material for natural selection..."[61]

This point was elaborated upon by anthropologists Sherwood L. Washburn and Judith Shirek in a recent dis-

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[60]Roe and Simpson, op. cit., pp. 9, 534. See also pp. 519-535.

[61]Hinde, Animal Behavior: A Synthesis of Ethology and Comparative Psychology (New York: McGraw-Hill Book Co., 1966), p. 446.

cussion of human evolution:

> Behaviors leading to reproductive success are favored by natural selection, and the genetic bases of these successful behaviors are incorporated into the gene pool of the population. There is a feedback between behavior and its biological base, so that behavior is both the cause of changing gene frequencies and a consequence of changing biology.[62]

In other words, behavior and morphology evolve together in an integrated and mutually supportive manner. Even where behavior is not genetically based but learned, it is subject to the so-called "Baldwin effect." That is, if an animal society adopts a new adaptive behavior, any genetic character compatible with that acquired behavior will tend to become fixed in subsequent generations, or at least will not be selected out.[63]

By the same token, the total behavioral repertoire of any species forms a distinctive and interrelated system. The social organization of any group-living species involves multiple interadjustments to the demands

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[62]Washburn and Shirek, "Human Evolution," in Hirsch (ed.), op. cit., p. 10.

[63]John A. King, "Behavioral Modification of the Gene Pool," in Hirsch, ibid., p. 42. The Baldwin effect should not be confused with Lysenkoism, however. Acquired traits do not cause genetic changes in the individual.

of nature. Furthermore, as Etkin points out:

> The behavior system of an organism must not only be efficient but must correlate with the entire life of the organism. Survival value depends upon the over-all balance of many factors. The integration of behaviors is as significant as the usefulness of the behavior considered in isolation. It must not be thought, however, that integration implies that all the forms of behavior are necessarily harmonious. They may, in fact, clash and, by opposing keep each other in chack....[64]

Not only that, but as Hinde notes:

> The characters of a species must be regarded as an adaptive complex suiting it to the particular ecological niche which it inhabits. If the areas inhabited by two populations differ ecologically, each will tend to become adapted to local conditions; the changes involved may have ramifying consequences through the adaptive complex....[65]

One example is the "cultural" variation between chimpanzees living in open woodlands and those inhabiting rain forest areas. Woodlands chimps sometimes kill and eat meat and make primitive tools from twigs, while rain forest chimps have never been observed doing so.[66] Another

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[64]Etkin, op. cit., p. 113.

[65]Hinde, op. cit., p. 444.

[66]George B. Schaller, "Behavioral Comparisons of the Apes," in Irven DeVore (ed.), Primate Behavior (New York: Holt, Rinehart and Winston, Inc., 1965), p. 480.

example is the striking behavioral differences between ground-nesting and cliff-dwelling kittiwakes. Because the cliff-dwellers are well protected from both avian and mammalian predators, they have sloughed off behaviors common to the ground-nesting variety, such as precipitous flight at the first sign of danger. Adaptation to life on the cliff also required the introduction of new behavioral forms -- such as synchronized searches for nest-building materials, which are not readily at hand, and the elaboration of nest-building techniques.[67]

The fact that the behavior system of each species has its own unique configuration does not mean, however, that resemblances between the behaviors of different species is purely coincidental. On the contrary. Species with the same basic biological needs and pursuing the same general survival strategy will tend to develop convergent behavioral repertoires. Moreover, evolved behaviors which have proven to be adaptive at an earlier stage of evolution are often retained in their general effect and may be further elaborated upon as new species evolve. Thus, while it would be

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[67]Hinde, op. cit., pp. 440-442.

fallacious to make an unqualified identification between any given human behavior and apparently similar behaviors in lower animals, broad functional analogies may nonetheless be appropriate. Territoriality, for example, may well perform some of the same functions in lower animals and man. On the other hand, the converse may be true. Similar behaviors exhibited by different species might be adaptive in quite different ways, reflecting the differing behavioral matrices and survival needs of the two species.

Among the most ubiquitous and important of all the phylogenetically adaptive behavioral categories is group life; just as modern evolutionists recognize the importance of the deme as the basic survival unit, it is now appreciated that social organization represented a decisive step in the evolution of life on earth, and that group life is far from unique to man.[68] (Indeed, biologists have even found

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[68]For detailed discussions of this subject, see: W.C. Allee, The Social Life of Animals (Boston: Beacon Press, 1951), esp. chap 2; Peter H. Klopfer and Jack P. Hailman, An Introduction to Animal Behavior (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), chap.7; and William R. Thompson, "Social Behavior," in Roe and Simpson (eds.), op. cit., pp. 296-307.

coordinated group behavior among one-celled slime molds.)[69] As Dobzhansky points out: "A really solitary animal is a rare phenomenon. Individuals of the same and of different species are interdependent in various degrees....Nature's stern discipline enjoins mutual help at least as often as warfare. The fittest may also be the gentlest."[70] This point was expressed even more broadly by biologist F. Fraser Darling:

> The animal cannot truly stand alone and, as we are now coming to understand, neither can a good many plants. The whole trend of ecological thought at present is towards a realization of the importance of community, and in this respect we are becoming increasingly aware of the social interactions between species and the whole complex of ecologic association ....Sociality is fundamental in life and not a cultivated development of the so-called highest form.[71]

Group life provides many evolutionary advantages. It facilitates reproduction in various ways; it permits a division of labor, particularly with respect to food gathering and

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[69]John Tyler Bonner, "Hormones in Social Amoebae and Mammals," Scientific American, CCXX (1969), No. 12, pp. 78-91.

[70]Dobzhansky, Mankind Evolving, op. cit., p. 134.

[71]Darling, "Social Behavior and Survival," The Auk, LXIX (1952), No. 2, pp. 183-184.

the nurture of the young; group-living animals are also much less subject to predation and frequently display coordinated action against a predator. In fact, the phenomenon of group members closing ranks against an external threat -- a behavior often noted in humans[72] -- is also widespread in the rest of the animal world.

In sum, group life is at heart a biological phenomenon with specific survival value. Whatever else may be involved in the social behavior of human beings, it is clear that altruism, cooperation and group loyalty also have genetic support. Genes which make for group-serving behavior, along with genes for self-serving behavior, would have been favored by natural selection, Thomas Hobbes to the contrary notwithstanding.[73] Wynne-Edwards is emphatic on this point:

> Societies do exist, and the student of social behavior is faced every day with real situations in

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[72]See especially Quincy Wright, A Study of War (reprinted Chicago: University of Chicago "Phoenix," 1965); and Lewis Coser, The Functions of Social Conflict (New York: The Free Press, 1956).

[73]Etkin, op. cit., p. 6. On this crucial point, see also Thompson in Roe and Simpson (eds.), op. cit., pp. 295-296.

> which individual advantage is quite ruthlessly overridden, apparently for the benefit of the group.... The facts demonstrate unequivocally that adaptations have arisen, capable of modifying the fitness of the individual in the overriding interests of group survival. To deny this, it seems to me, is to bury one's head in the sand.[74]

Or, to put it in the cyberneticists language, a deme, or breeding population, in any group-living species fits the specifications of a functionally interrelated, goal-directed system with respect to its on-going evolutionary problem of meeting survival and reproductive needs. Group-living animals comprise cybernetic systems, not by analogy, but as the empirically verifiable result of evolutionary processes and for purely functional reasons.[75] In other words, to say that man has social life because he is a social animal, as both philosophers and empirical political theorists have argued on frequent occasions ever since Aristotle, may be missing the point. Instead,

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[74] "Population Control and Social Selection in Animals," in Glass, op. cit., pp. 161, 163.

[75] See Heinz Von Foerster et al. (eds.), Purposive Systems (New York: Spartan Books, 1968); also Simpson, This View of Life, op. cit., p. 113.

the theory of evolution impels us to argue that man is a social animal and has social life because it is adaptive (functional) for his survival.

Implicit in what was said above about group life is the fact that modern evolutionists reject the idea that natural selection necessarily involves a "tooth and claw" struggle.[76] As Simpson puts it:

> Struggle is sometimes involved, but it usually is not, and when it is, it may even work against rather than toward natural selection. [Natural selection] is usually a peaceful process in which the concept of struggle is really irrelevant. It more often involves such things as better integration into the ecological situation [or "goodness of fit" in the current parlance], maintenance of a balance of nature, more efficient utilization of available food, better care of the young, elimination of intragroup discords (struggles) that might hamper reproduction, exploitation of environmental possibilities that are not objects of competition or are less effectively exploited by others.[77]

(In fact, even the one truly bloody aspect of nature, predator-prey relationships, are now viewed as

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[76]On this point, see Dobzhansky, Mankind Evolving, op. cit., pp. 129, 341; also Lerner, op. cit., pp. 186-187.

[77]Simpson, The Meaning of Evolution, op. cit., p. 222.

far from an unmitigated cruelty to the species being preyed upon. Predators may serve to weed out the old and infirm and help to maintain a population balance which, if upset, could pose a far more grievous threat to the group's survival.[78] Proof of this point are the numerous cases in recent years of a major change in a predator-prey relationship's upsetting the entire ecological balance of a particular region.)

In emphasizing the group basis of survival, however, one cannot deny the role of competition. Recent studies, in particular, have tended to give somewhat more weight to the role of direct, individual competition (primarily between males) in intra-group selection, but such competition is usually contained and limited by the overriding needs of the group. Moreover, it is relatively non-violent (threat displays, ritualized fighting and other "conventional" forms of competition are more the rule). Only under exceptional circumstances (such as extreme overcrowding or a sudden and drastic increase in environmental

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[78]Mayr, op. cit., pp. 80, 574.

pressures) is competition likely to break into mortal combat. And in most group-living species, competitive behaviors are counter-balanced and checked by a variety of group, mate, or progeny-serving behaviors.[79] As Etkin expressed it:

> Evolutionary processes must be expected, at least in vertebrates, to favor competitive and aggressive behaviors on the part of individuals. These would tend to disrupt social life. Since, in spite of this, group formation in vertebrates is very common, we are led to expect that there must be ways in which aggressive behavior is kept under sufficient control to prevent its interference with sociality....There are many contradictory and conflicting forces acting upon any organism, and the behavior system achieved in its evolution represents a compromise or resolution of these forces -- or perhaps, better said, a dynamic equilibrium between them...[80]

Competition also goes on between groups, of course. But as Simpson points out, this competition is often of a relatively benign and passive nature and may well occur without the competing forms being in contact or even aware of their competition with one another. Furthermore, Simpson emphasizes, "selection is not primarily a process

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[79]J.D. Carthy and F.J. Ebling (eds.), The Natural History of Aggression (New York: Academic Press, 1964).

[80]Etkin, op. cit., pp. 33, 116. See also, Dobzhansky, Mankind Evolving, op. cit., p. 336.

of elimination. It is a process of differential reproduction..."[81]

A fifth point, related to the observations above about the evolutionary significance of behavior, is that acceptance of the synthetic theory of biological evolution impels us to adopt a functionalist approach to social behavior. Critics of functionalism in the social sciences have often foccussed their attacks upon supposedly false analogies between morphological functionalism in biology and behavioral functionalism in the social sciences. But in the discussion above it was noted that contemporary evolutionists recognize that both behavior and morphology are relevant to the on-going survival problem of species. As Dobzhansky said of man: "Man is the product of evolutionary development, and evolution is utilitarian. No theory of human evolution [or of human behavior] which ignores its pragmatic aspect can be valid."[82]

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[81]Simpson, The Meaning of Evolution, op. cit., p. 222, 224.

[82]Dobzhansky, Mankind Evolving, op. cit., p. 213.

For man, as for any other species, the first task is to "avoid extinction in an uncertain universe."[83] Survival is rather obviously not guaranteed -- 99.999 percent of all the species that have ever evolved are now extinct.[84] As Simpson notes: "The fossil record... establish[ed] the really startling fact that extinction is the usual fate of species...for one reason or another the vast majority of species have become extinct."[85]

Moreover, the problem of survival (when defined as reproductive efficacy) involes an on-going enterprise which must continually fulfill a range of specific biological needs -- in man, numerous nutritional requirements, fresh water, maintenance of body temperature, defecation, sleep, protection against disease, physical security and the procreation and nurture of the young (not to mention a number of evolved, "social" and "psychological" needs that are instrumental to survival). (See Chapter Six.)

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[83] Richard C. Lewontin (ed.), Population Biology and Evolution (Syracuse: Syracuse University Press, 1968), p. 3.

[84] Ibid., p. 2.

[85] Simpson, This View of Life, op. cit., pp. 79, 152.

And this is by no means all there is to the survival problem. As biologist Bernard G. Campbell points out:

> The fitness of...a deme or 'Mendelian breeding population' requires not only the ability to cope with the existing environment and to reproduce, but also the potentiality to evolve in the future in response to environmental change....The necessary genetic stability, accompanied by flexibility in the form of adaptibility, is the basis of Darwinian fitness, and the balance struck between the two factors determines how fit a population is.[86]

Indeed, functionalism is the unavoidable consequence of the workings of natural selection. Those species which are morphologically or behaviorally sufficiently mal-adaptive are to be found among (or will eventually join) the majority that are now extinct. By the same token, mal-adaptive individual organisms within a species will be less likely to reproduce and leave offspring, whereas those that are best adapted will be more likely to do so.[87] Mettler and Gregg have provided

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[86]Campbell, Human Evolution: An Introduction to Man's Adaptation (Chicago: Aldine Publishing Co., 1966), p. 11.

[87]Wallace and Srb, op. cit., pp. 1-3, 80; Stebbins, op. cit., p. 83.

us with the following explanation:

> The individuals comprising a species differ in many ways. Those that possess certain features which prove useful for their survival and reproduction are considered better adapted. They are naturally selected over the others if there is competition for a limited supply of some factor necessary for life, such as food, a mate, or a place to live. These beneficial characteristics may be associated with the strength of the individual, which would help to insure escape or victory in combat, or they may be more subtle, such as those that increase resistance to disease. They may be even something as seemingly insignificant as the added aerodynamic perfection of the airfoil of the wing of a maple seed. The important aspect of an adaptive trait is that in some way, no matter how slight, it increases the chance that the possessor will contribute offspring to the effective population of the next generation. Of course, survival is an important aspect of adaptedness, because a form must survive to the reproductive stage in order to leave any offspring, but it is only one of many factors determining reproductive success.[88]

Some evolutionists go so far as to exclude the possibility of any neutral or dysfunctional traits being sustained in a population. Campbell, for example, argues:

> It is clear that every gene, every character of the individual, its anatomy, physiology and psychology, contributes to the biological fitness of the deme .... There is no reason to suppose that any character can

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[88]Mettler and Gregg, op. cit., p. 90.

> be neutral in this respect. Whatever characters evolve in a deme, it is the contribution that they make to the deme's fitness that results in their selection, in their survival. ..At the same time, since all parts of an organism require energy for their maintenance, any part that ceases to have a function will be rapidly lost in the process of evolution. Not only any part but any process will be lost.... The function of any character that cannot be interpreted in that light cannot be said to be properly understood.[89]

While Campbell may be correct about species-specific characters viewed over the long run, some important qualifications are necessary with respect to the short-run. First, considering the fact that variation is the rule with organic systems, it seems most unlikely that, at any given time, all of the behaviors of all individuals or all species would be adaptive.[90] Indeed,

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[89]Campbell, op. cit., pp. 11-12.

[90]Ernst Mayr, "Behavior and Systematics" in Roe and Simpson (eds.), op. cit., pp. 352-3. "Genetic variability is universal, a fact which is significant not only for the student of morphology but also for the student of behavior. It is not only wrong to speak of the monkey but even of the behavior of the rhesus monkey. The variability of behavior is evident in the study not only of such a genetically plastic species as man but even of forms with very rigid, sterotyped behaviors such as hunting wasps."Ibid.

variation provides the raw material for evolutionary selection; it is estimated, for example, that more than ten percent of all human zygotes carry a new mutation.[91] Moreover, a deme and its environment are involved in an on-going feedback relationship; as the environment changes, once-adaptive behaviors (or morphologies) may well become maladaptive. Maladaptiveness, after all, must commonly be a prelude to the extinction of a species. Stebbins has suggested several other possible explanations for apparently non-adaptive characters: 1. they might actually be adaptive although we don't realize it; 2. they may be controlled by a gene or genes with pleiotropic effects, some of which are adaptive while others are maladaptive (a good example is the sickling gene in human populations,which is lethal in the homozygous recessive condition, but which confers upon heterozygotes an increased resistance to malaria[92]); 3. they may be genetically linked to adaptive characters (e.g. on the

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[91]Lerner, op. cit., p. 188.

[92]Stebbins, op. cit., p. 76; Dobzhansky, Mankind Evolving, op. cit., pp. 150-154.

same chromosome); 4. they may actually represent alternative ways of adapting to some environmental change; or 5. they may reflect various chance factors, including "genetic drift"[93] or the "founder effect").[94]

In human populations in particular, we might not now be using capacities for the functions for which they evolved in our evolutionary past. Some presently neutral or maladaptive activities may thus be explained as a sort of spin-off from idle or obsolete capacities which are not presently required for our survival; these activities may continue to be sustained on the "margin of profit," so to speak, beyond our immediate survival needs. Or, if sufficiently destructive to our survival, either they -- or we -- will eventually be selected out.

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[93]For discussion of the phenomenon of genetic drift, see especially: Jack Lester King and Thomas H. Jukes, "Non-Darwinian Evolution," Science, Vol. 164, No. 3881 (16 May 1969); and, Luigi Luca Cavalli-Sforza, "'Genetic Drift' in an Italian Population," Scientific American (August 1969).

[94]Stebbins, op. cit., pp. 73-80. The founder effect refers to characteristics of a deme which are a happenstance reflection of the particular genetic characteristics of the deme's founders.

In other words, the generalization applied to other species ultimately holds true for man as well. The rigors of the survival problem impel that most of our behavior be functional (adaptive) if the species is to continue to survive. Etkin puts it as follows: "In the large view, the characteristics of organisms must be expected to be adaptive in the sense of contributing to the long-run reproductive efficacy of the species as it lives in its own particular ecological niche."[95]

As a rule, a "successful" population (in evolutionary terms) may be expected to adopt behaviors designed to maximize its survival potential and minimize the risk of losses with respect to its particular ecological niche. (Indeed, the relationship between a population and its environment may be conceptualized as a two-person game, with the entries in the pay-off matrix being the different levels of population which the environment can be induced to support given various alternative survival strategies

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[95]Etkin, op. cit., p. 3.

and environmental influences.)[96] Again, this expectation is true precisely because evolution is a functionally-oriented process. Natural selection operates so as to reward eufunctional (adaptive) behaviors and penalize dysfunctional (maladaptive) behaviors. By definition, therefore, a "successful" species (with reference to whichever of the specific criteria listed above one chooses to use) must be one whose behaviors are (or at least were in the past) adaptive on balance.[97]

An excellent illustration of this point is described in a recent study of the Karimojong tribe in Uganda.[98] In contrast to the efficient, market-oriented -- and

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[96]On this point, see Peter A. Gould, "Man Against His Environment: A Game Theoretic Framework," in Andrew P. Vayda (ed.), op. cit., chap. 12. In the specific examples discussed by Gould, the entries in the pay-off matrix are more specifically the quantities of a particular survival requisite which can be wrested from the environment. The point is also discussed in Alland, Evolution and Human Behavior, op. cit., pp. 212, 215. Some cautionary notes are expressed, however, by biologist L.B. Slobodkin in "Toward a Predictive Theory of Evolution," in Lewontin (ed.), op. cit., chap. 13.

[97]Dobzhansky, Mankind Evolving, op. cit., p. 213; Wallace and Srb, op. cit., pp. 1-3; and Klopfer and Hailman, op. cit., pp. 176-181.

[98]Rada and Neville Dyson-Hudson, "Subsistence Herding in Uganda," Scientific American (June 1969), pp. 76-89.

supposedly more "rational" -- Western system of cattle ranching, in which a small number of people raise a large number of animals and market their products (meat and milk), the Karimojong practice subsistence herding. No effort is made to produce a surplus for marketing and cattle are rarely slaughtered. Instead, the tribesmen subsist on cattle milk and blood, which is drawn from the animals with great care. In this way, the cattle are conserved in order to support the maximum number of tribesmen.

The explanation for this system lies in the fact that rainfall and forage in the Karimojong tribal area are erratic and scarce. Resources are extremely limited and reliance on agriculture would be perilous. Cattle are the prime food resource, yet frequent unpredictable dry spells can decimate all but the largest cattle herds. The Karimojong report concluded:

> Karimojong herding operations...exhibit a rational solution to the problem of supporting a substantial population in a variable environment. When other approaches are recommended by outsiders as "more rational", it is usually with the implicit assumption that two of the major constraints in the ecological

> situation can be changed; the total energy level in the system can be increased by inputs of various kinds (building dams, drilling for water, importing seedand so on) and the ratio of available resources to dependent humans can be increased by resettling some of the people elsewhere. The first of these changes represents a considerable financial burden for a developing economy; the second, a grave political problem for a new nation. In the ecological system actually presented by the subsistence herding of the Karimojong it is hard to see how their rationality can be improved upon.[99]

Although the question of which specific behaviors are adaptive for survival and in which ways has only recently been posed with respect to human behavior, the principles have been repeatedly demonstrated experimentally in other animal species. One classic experiment, by ethologist Niko Tinbergen, tested the adaptiveness of the gulls' practice of removing eggs shells from the nesting area as soon as the chicks were hatched. The egg shells are conspicuous, and Tinbergen sought to prove that the egg shell removal practice functioned to reduce the danger of predation on the nestlings. To test this hypothesis, Tinbergen laid out two sets of gull nests, one with broken eggs shells nearby and the other without.

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[99] Ibid., p. 99.

The nests which were flagged by broken egg shells were, not surprisingly, raided by predators far more rapidly.[100]

Similarly, in human behavior, anthropologist John Whiting demonstrated in a now famous study that cultural practices related to birth, weaning and puberty correlated world-wide with the availability of protein foods.[101]

The adoption of functional behaviors need not be a conscious, "teleological" process, however. Anthropologist Alexander Alland, Jr., has argued that adaptive behaviors may be the result of a process analogous to operant conditioning, in which the environment selectively rewards and punishes unconscious and perhaps even random behavioral variations.[102] As an example, Alland points to the medical practices of primitive societies. Significantly, some of the most effective hygienic procedures (such as isolation

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[100]Robert A. Hinde, Animal Behavior: A Synthesis of Ethology and Comparative Psychology (New York: McGraw Hill, Inc., 1966), pp. 435-42.

[101]Alland, Evolution and Human Behavior, op. cit., pp. 208-211.

[102]Alland, Adaptation in Cultural Evolution: An Approach to Medical Anthropology, op.cit., p. 7.

of the sick, frequent bathing, thorough cooking of food and the digging of pit latrines) may sometimes lie outside the less effective formal medical doctrines of a society.[103]

This brings us to another point about the processes and mechanisms of evolution -- the roles of "instinct" and "learning" in shaping behavior.[104] Every living organism must interact with the rest of nature (including, usually, its conspecifics) in some manner, and since the effectiveness of that interaction largely determines whether or not the organism will survive to reproduce itself, the question of how each species organizes its behavior is of crucial importance. Alland has observed:

> Adaptive behavior is a general feature of all animal populations, but the behavioral repertoire of some species is more versatile than that of others. The development and expansion of this repertoire is a genetic process. Behavioral repertoires may be innate

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[103] Ibid., pp. vii-viii.

[104] Partly because of their onerous or misleading past connotations, and partly because of their imprecision as ordinarily used even today, the terms "instinct" and "learning" appear to be in disfavor. At present, the preferred terms appear to be "genetically pre-coded" and "experiential". Accordingly, I will put the more familiar terms in quotes and favor the preferred terminology hereafter.

> or learned or a combination of both. What the animal learns is a function of its genetic potential and its experience. Exactly what is learned depends upon the life situation of each organism, but the type of and capacity for learning is genetically controlled [italics added].[105]

In the modern view no actual behavior can be said to be "instinctive" in the sense of inevitable. Only the genetic program, neural and sensorimotor structures can be said to be innate, for even the most rigidly pre-coded behavior may never be realized if the organism does not develop in a "normal" way or in the appropriate environment.[106] This point has been discussed by Mayr:

> "Innate" is of course only the reaction norm, which has a more or less wide range of phenotypic expression ...The fact that the tendency to hoard is "innate" in the Norway rat is not negated by the fact that certain treatments or experiences may reduce this tendency or obliterate it altogether. [Conversely,] most mammals cannot be induced to hoard no matter what treatment they get.[107]

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[105] Alland, Evolution and Human Behavior, op. cit., p. 152.

[106] Simpson, "Behavior and Evolution," in Roe and Simpson (eds.), op. cit., pp. 527-528; Mayr, "Behavior and Systematics," in ibid., pp. 352-353; Jack P. Hailman, "How an Instinct is Learned," Scientific American, Vol. CCXXI, No. 6 (December 1969), pp. 98-106.

[107] Mayr, ibid., p. 353.

However, it is legitimate to make a distinction between genetically pre-coded behavior patterns, which are usually quite stereotyped and inflexible, and behaviors which are shaped to a greater or lesser extent by the organism's experience in the environment.[108] Pre-coded behaviors often play themselves out like a computer program. They have the advantage of predictability and continuity from one generation to the next, but they cannot readily be adapted to new circumstances. Such behaviors may vary from simple approach-avoidance reactions, or reflexes, to elaborate behavior "strings" or "chains" which are triggered by specific environmental "cues", or releasers, and which may or may not be influenced in their manner of execution by experiential factors.[109] Bird songs, for

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[108] Simpson, "Behavior and Evolution," in Roe and Simpson (eds.), op. cit., p. 522; Dobzhansky, Mankind Evolving, op. cit., p. 203. "Instincts are...forms of behavior which may be interpreted as concatenations of unconditioned reflexes released by certain stimuli." (Ibid.)

[109] The manner in which genes affect various behavior traits is extremely complex. Most behaviors are polygenic -- that is, they involve more than one gene. On the other hand, many genes are pleiotropic -- meaning that they influence more than one genetic character. For discussions of these phenomena, see Dobzhansky, Mankind Evolving, op. cit., pp. 33, 104-106.

example, (which play a vital role in avian mating behavior), run the gamut from complete pre-coding to completely "learned" behavior. In some species, if young birds are isolated from birth they are nonetheless able at the proper time to reproduce their characteristic songs perfectly, usually on the first try. In other species, the young bird has the equipment and a general idea of what its normal song should be like, but it can only produce an approximation without hearing it first. Finally, there are cases where the bird cannot sing any song without exposure to its conspecifics, or will learn an approximation of an alien species' song if so reared.[110]

Some "learning" may only serve to complete the "program" for a fairly stereotyped behavior. Imprinting, for instance, is a mechanism by which a newborn animal, during a "critical" or "sensitive" period in its development, makes a powerful attachment to "practically any moving object it sees,"[111] normally the mother. Thereafter,

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[110]Fernando Nottebohm, "Ontogeny of Bird Song," Science, Vol. CLXVII, No. 3920 (13 February 1970), pp. 950-956. Nottebohm argues that differences in the degree of bird song pre-coding can be explained functionally.

[111]Hinde, op. cit., p. 365.

the immature animal will follow its "parent" dutifully, in accordance with a genetically pre-coded "fixed action pattern."[112]

Most behavior in animals though, especially the behavior of higher animals, represents an interaction between pre-coded and experiential factors. In fact, many animals have highly specialized learning abilities which are impressive by any standard. Rats, for example, can learn a maze about as well as a man. In addition, they have a tremendous exploratory drive which is not dependent upon food rewards; in laboratory experiments this drive has been found to be intrinsically "self-satisfying" to the rats.[113] It is what the psychologists like to call "latent learning" but actually that is a misnomer. While such exploration for its own sake may appear to be aimless behavior in a laboratory situation, in the wild it is highly functional. By exploring and learning every feature

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[112] Ibid.; also Dobzhansky, Mankind Evolving, op. cit., p. 62.

[113] Etkin, op. cit., p. 93.

of its range, the rat is better able to take cover without hesitation whenever danger appears.[114]

Similarly, the homing and migratory abilities of many bird and fish species is a continuing source of wonderment to hominids -- who are unable to duplicate such feats without road signs, maps, trail marks, radio beacons, compasses, sextants and other navigational aids. We also marvel at the ability of many animals to recall after long periods the site of a kill or a buried food cache.

Learning frequently plays a role as well in the acquisition or perfection of adult skills, and some animals not only can learn from the environment but can pass on such knowledge from one generation to the next through social traditions.[115]

Outside of such specialized mental skills, of course, other species usually have extremely limited intellectual abilities by our standards. Yet the fact that such skills exist is theoretically significant. Indeed, the particular configuration of mental abilities in a species correlates

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[114]Hirsch, op. cit., pp. 27-28.

[115]Etkin, op. cit., pp. 129, 147-150.

better with ecological factors than with its rank on the evolutionary ladder. "It is clear..." Etkin observes, "that these'mental' capacities are part of the adaptation of the animal to its particular mode of life..."[116]

The evolutionary function of learning abilities has also been discussed by Alland:

> Learning is a mechanism of variation which is adaptive for the individual within its own lifetime. This kind of variation is powerful for the preservation of a species, because learning as positive variation is expressed immediately. Natural selection works to preserve good learners as well as new types of capacities for learning as they develop out of the genetic system. The learning process is a maximizing device for organisms because it provides them with a highly effective feedback system in which information from the environment can be evaluated and acted upon in the continuing process of self-regulation.[117]

It is evident, therefore, that man's highly evolved intellectual skills are but an extension and further development of an adaptive principle which is widespread in the animal kingdom. Even the "quasi-teleological," goal-seeking behavior exhibited by man has its roots in the survival-serving behavior of our animal cousins. And the power we

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[116] Ibid., pp. 91-94.

[117] Alland, Evolution and Human Behavior, op. cit., p. 153.

have gradually accumulated to manipulate our environment is, as Darwin said, different in degree (by several orders of magnitude, of course) but not different in kind from, say, the marvelous hydraulic engineering and elaborate construction work which goes into a beaver dam.

What has been said about learning in general applies equally to the cumulative product of man's learning ability -- culture. Culture has often been thought of as a uniquely human accomplishment which distinguishes us absolutely from other animals. Cultural anthropology, in particular, has been at pains to separate culture from man's biological nature and survival needs and to endow it with a "super-organic" life of its own, subject to its own laws of development.[118] As Alland has noted: "...while Darwin finally had the courage in The Descent of Man to place the human species where it belonged, in the animal kingdom, anthropologists have been busy for one hundred years re-erecting a barrier between man and the rest of the animal kingdom."[119]

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[118]Viz. Leslie White, The Evolution of Culture, op. cit.; and "Culturology," loc. cit.

[119]Alland, Evolution and Human Behavior, op. cit., p. 192.

Yet some of the most distinguished anthropologists have recognized that culture can only be understood within the framework of man's biological needs. Clyde Kluckhohn, for instance, has argued:

> Each different culture deals with universal problems posed by human biology and the human situation. Cultural differences must be delineated against a common humanity ....The broad ground plan of all cultures arises out of the functional prerequisites of human society as such...[120]

Kluckhohn is only among the latest to make this point, however. Though Bronislaw Malinowski's field research was largely preoccupied with comparative sociology, in his posthumously published (and somewhat neglected) "scientific theory of culture,"[121] Malinowski based his model on biological universals.

> The theory of culture must take its stand on biological fact. Human beings are an animal species. They are subject to elemental conditions which have to be fulfilled so that individuals may survive, the race continue and organisms one and all be maintained in working order....The problems set by man's nutritive, reproductive and hygienic needs must be solved. They are solved by the construction of a new, secondary, or

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[120] "Culture and Behavior," in Gardner Lindzey (ed.), Handbook of Social Psychology (Reading, Mass.: Addison-Wesley Publ. Co., 1954 and 1959), Vol. II, pp. 960, 968.

[121] Malinowski, op. cit.

> artificial environment. This environment, which is neither more nor less than culture itself, has to be permanently reproduced, maintained and managed.[122]

The fundamental characteristic of this secondary environment is organization. Thus Malinowski's functionalism is, au fond, the study of how social institutions contribute to the fulfillment of biological needs.

In retrospect, Malinowski's theory was incomplete because he failed to place culture explicitly in a Darwinian model of society. Based on what we now know about animal societies, it is also apparent that Malinowski's list of basic human needs (seven in all) was far too general and vague (never reaching down to the individual level) and it omitted some important instrumental needs. Furthermore, Malinowski was justly criticized when his theory was first published for failing to account adequately for non-functional aspects of culture and for the undeniable differences between cultures, something which can comfortably be accommodated within a Darwinian model of society (see below).

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[122] Ibid., pp. 36-37.

Even Leslie White seems to concede the evolutionary functions of culture:

> The purpose and function of culture are to make life secure and enduring for the human species. All species of living beings behave in such a way as to perpetuate their own kind....Man, as a mere animal, also employs his bodily organs in life-sustaining behavior. But as a human being man [also] employs the extrasomatic tradition that we call culture in order to sustain and perpetuate his existence and give it full expression. We may think of culture, then, as an extrasomatic mechanism employed by a particular animal species in order to make its life secure and continuous....The life process in the human species is carried on collectively, as well as individually, and it is the business of culture to organize human beings for this purpose.[123]

Unfortunately, though, in the next breath White resurrects the barrier between culture and biological man. White asserts that technology is both the basic determinant of the social system and the basic cause of cultural evolution.[124] Technology is said by White to be evolving in a unilinear fashion and in accordance with its own rules. It somehow becomes the causal agent, rather than being treated as a product of man's biological

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[123] White, The Evolution of Culture, op. cit., p.9.

[124] Ibid., p. 19.

needs and evolutionary capacities as related to the challenges and opportunities of the environment. Although it may be a valid partial truth to say that man's technology shapes his behavior, the evolutionary process in general, including human evolution, has been anything but unilinear. Nor can White dissociate culture in this way from biologically rooted patterns of behavior, a point which will be developed in detail later.

In recent years, however, a conceptualization of culture derived explicitly from the theory of biological evolution has been advanced by biologists[125] and, increasingly, by anthropologists. This conceptualization has been explained by Alland:

> Culture is essentially a set of rules for behaving in a human way. Different human groups have different conventions, and so there are cultural differences between peoples, but all members of the human species are part of some social group which can be characterized by its own set of rules....The rule systems with which humans operate are generally adaptive. They make it possible for a group of individuals to survive more successfully than they could either alone or as members of an unorganized horde. The existence of a social tradition enables them to accumulate knowledge about the environment and to pass it down to the next generation so that adaptive behaviors can accumulate through time...Evolution is a process through which

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[125]E.g., Dobzhansky, Mankind Evolving, op. cit., chap. 1.

> systems develop and are modified in relation to specific environmental backgrounds. All the theory requires is that there be mechanisms of variation... and mechanisms of continuity...and that these systems be subject to environmental selection. There is no requirement that these mechanisms be specifically biological in nature. If the theory is seen as a theory about process, the distinctions between so-called biological and cultural evolutions disappear. There is only one evolutionary process -- adaptation..."[126]

Alland's point of view, it should be noted, is an elaboration upon the position taken by biologist Dobzhansky in Mankind Evolving. As Dobzhansky put it:

> The thesis to be set forth in this book is that man has both a nature and a 'history'. Human evolution has two components, the biological or organic, and the cultural or superorganic. These two components are neither mutually exclusive nor independent, but interrelated and interdependent. Human evolution cannot be understood as a purely biological process, nor can it be adequately described as a history of culture. It is the interaction of biology and culture. There exists a feedback between biological and cultural processes.[127]

Thus, Dobzhansky, Alland (and others who accept this point of view) do not deny that culture is extra-somatic and that it is evolving as a separate dimension

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[126]Alland, Evolution and Human Behavior, op. cit., pp. 165, 169, 196.

[127]Dobzhansky, op. cit., p. 18.

in human life. But as Alland emphasizes: "To consider culture extrasomatic does not require us to abandon the biological model of evolution, since behavior based on culture must still solve basically biological problems."[128]

Within the context of the theory of evolution, culture must therefore be viewed as an adaptive mechanism analogous to the genetic code. As anthropologist J.N. Spuhler observes: "Culture is a biological adaptation with a non-genetic mode of inheritance depending upon symbolic contact or communication rather than fusion of gametes. It has greatly supplemented somatic evolution."[129] Just as the genetic code accumulates adaptive morphologies through time, cultural codes enable man to accumulate adaptive behaviors, diffuse these behaviors widely within the species, and modify them in relation to specific environments, or changing environments.

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[128] Alland, Evolution and Human Behavior, op. cit., p. 187.

[129] J.N. Spuhler, "Somatic Paths to Culture," in Spuhler (ed.), The Evolution of Man's Capacity for Culture (Detroit: Wayne State University Press,1959).

Indeed, culture performs a number of necessary species-preserving functions which in many other species are carried out by more nearly pre-coded behavioral "programs." Many basic patterns of human social behavior, some of which have often been considered uniquely human, are in fact common to other animal species as well -- social hierarchies (usually based on male competition), affectional systems (including pair bonding, male bonds, parent-child relationships and group loyalties), cooperation, food sharing, a division of labor, territoriality and territorial defense, play, tool-use, social traditions, exploration, and various forms of communication.[130]

In man, of course, these "cultural" behaviors have been greatly elaborated. In addition, we have evolved a

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[130]For detailed descriptions of our increasing knowledge about the complex and sophisticated behavior of other animals, see especially: Etkin op. cit.; Hinde op. cit.; DeVore op. cit.; Charles H. Southwick (ed.), Primate Social Behavior, (Princeton: Van Nostrand Co., Inc., 1963); Desmond Morris (ed.), Primate Ethology, (Chicago: Aldine Publishing Co., 1967); Thomas E. McGill (ed.), Readings in Animal Behavior, (New York: Holt, Rinehart and Winston, 1965); Niko Tinbergen, Animal Behavior, (New York: Time Incorporated, 1965); Allee, op. cit., and Klopfer and Hailman, op. cit.

powerful new adaptive mechanism unknown to any of our animal relatives -- symbolic language.[131] But from what we know of how evolution operates, our extraordinary human capacities could only have developed very gradually, over a period of several million years. All the while, our ancestors were subject to repeated testing in the field of natural selection. As Washburn and Shirek explain it:

> Most of the differences between the brains of apes and of men evolved in response to the new selection pressures that came with the human way of life: bipedalism, tool use, and hunting. The brain did not evolve first for some unknown reason and then make possible the discovery of the human way; the human way and the structural basis for it evolved at the same time and in a feedback relation to each other.[132]

This viewpoint is supported both by the fossil record and by research among living primates.[133] Significantly, such cultural practices as tool-making, shelter building, hunting in organized groups and treating animal skins were all performed by small-brained early hominids. By the

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[131] See Campbell op. cit.; and Spuhler (ed.), op. cit.

[132] In Hirsch (ed.), op. cit., p. 13.

[133] There is still some debate, though, about why our ancestors adopted a terrestrial life-style. Some believe it was fortuitous; others see it as related to declining food resources in certain forest areas. See Washburn and Shirek, ibid., and Campbell, op. cit., pp. 331-35.

same token, ethologists have observed fairly sophisticated tool use among equally small-brained living primates -- most notably the chimpanzee. Chimps throw stones, break off sticks and prepare them for digging termites out of holes and chew leaves into pulpy "sponges" for use in obtaining drinking water from pools.[134]

In other words, our cultural capacities evolved because they enhanced the ability of our ancestors to survive in their highly dangerous (compared to the arboreal environment) new ecological niche. Culture is not something that flowered mysteriously and in a fashion that was unrelated to our ongoing survival needs. It has arisen as a gradual accretion which, at every step, generally enhanced our survival chances as we interacted with our natural environment and our conspecifics. Indeed, no other explanation of the origin and functions of culture is possible without contradicting well-established knowledge

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[134]Jane Goodall, "Tool-Using and Aimed Throwing in a Community of Free-Living Chimpanzees," Nature, Vol. 201 (1964), pp. 1264-66.

of how evolutionary changes occur. But to subsume human social life and regard it as a means to an evolutionary end is not to downgrade its importance. There can be no doubt that cultural evolution has been crucial to the success of the hominid line.[135]

Furthermore, cultural variation, which created difficulties for Malinowski, is to be expected in an evolutionary model. In the process of adapting to widely varying ecological niches, human societies have been compelled to develop diverse strategies for meeting common human needs, as the Karimojong study above illustrated. In addition, the evolutionary model predicts variations arising from historical specificity and, even, elements of randomness; just as evolution as a whole has not been unilinear or deterministic, so cultural evolution must be viewed as an open and opportunistic process. Though cultural acquisition has been cumulative, it has not been determined solely by some inner dynamic or compulsion without reference to the external environment and the

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[135]Campbell, op. cit., p. 339.

problems of biological survival. Anthropologist Elman R. Service expresses this point succinctly:

> There is no single magical formula that will predict the evolution of every society. The actual evolution of the cultures of particular societies is an adaptive process whereby the society solves problems with respect to the natural and human-competitive environment. These environments are so diverse, the problems so numerous and the solutions so potentially various that no single determinant can be equally powerful for all cases.[136]

Our nature as biological systems imposes many necessities upon us, and our evolved psychological characteristics serve as enablers of behavior. But necessities and enablers are not equivalent to movers.[137] As Service puts it:

> There is a way of thinking about evolution that permits an openness about the locus of causality. Another way to put it is that most of the prime-mover arguments are each probably somewhat, or sometimes, right. This is not an expression of indeterminism, however, but only a statement that the acceptance of one

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[136] Service, "The Prime Mover of Cultural Evolution," Southwestern Journal of Anthropology, Vol. 24 (1968), p. 406.

[137] Service, "Cultural Evolution," in International Encyclopedia of the Social Sciences, (New York: The Macmillan Co., 1968), V, pp. 221-228.

> prime-mover to the exclusion of others inhibits what should be an empirical study of the locus of causality.[138]

Clearly, human cultural evolution has included a variety of "causes" -- problem-solving activities which conform more closely to the otherwise discredited Lamarkian model of purposeful biological evolution,[139] as well as random behavioral variations and "trial and success" responses (in Simpson's phrase) to external environmental challenges.[140] Social conflict and wars have undoubtedly also played a role at various junctures in human evolution.[141] But this does not mean that

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[138]Service, "The Prime Mover of Cultural Evolution," loc. cit., p. 396.

[139]Lerner, op. cit., p. 66; Simpson, The Meaning of Evolution, op. cit., pp. 266-267.

[140]Alland, Supra footnote no. 102.

[141]On this point, see especially: David N. Daniels, Marshall F. Gilula and Frank M. Ochberg (eds.), Violence and the Struggle for Existence (Boston: Little, Brown and Co. 1970) pp. 405-443; Andrew P. Vayda, "Hypotheses About Functions of War," in "War: The Anthropology of Armed Conflict and Aggression," Natural History (special supplement), December 1, 1967, and works cited therein; Vayda, "Maoris and Muskets in New Zealand: Disruption of a War System," (unpublished manuscript 1970); J.D. Carthy and F.J. Ebling,Jr., (eds.), The Natural History of Aggression (New York: Academic Press, 1964); Anthony F.C. Wallace, "Revitalization Movements," American Anthropologist, LVIII, No. 2 (April

conflict is necessarily always adaptive, or that some alternative means of resolving survival problems might not have been more adaptive (or at least have exacted a smaller cost in relation to benefits). Conversely, social cooperation has demonstrably played an important role in the survival of many species, including man,[142] as have imitation and consequent rapid diffusion of adaptive behaviors.[143] In other words, human cultural evolution must be comprehended in terms of a multi-variate, situation-specific interaction between numerous environmental variables and human social processes (mental and behavioral).

To summarize the discussion in this chapter, then:

1. Survival is the basic, pervasive, continuing and unavoidable problem of all species, including man.

1956), pp. 264-281; Bernard J. Siegel, "Defensive Cultural Adaptation," in Hugh Davis Graham and Ted Robert Gurr (eds.), Violence in America: A Report to the National Commission on the Causes and Prevention of Violence (New York: The New York Times/ Bantam Books, 1969), pp. 764-787.

[142]Etkin, op. cit., chap. 1; Dobzhansky, Mankind Evolving, op. cit., pp. 134, 199; Allee, op. cit., chaps. 10, 11; Klopfer and Hailman, op. cit., chap. 7.

[143]Freedman in Etkin, op. cit., p. 171; Allee, op. cit., p. 125.

2. Survival, over the long-run, means reproductive efficacy.

3. The population (or gene pool) is the basic survival unit over the long run and is therefore the ultimate locus of any measure of reproductive efficacy.

4. Of the five possible criteria of reproductive efficacy, or adaptiveness (minimum number, maximum number, relative reproductive success compared to other populations, changes through time within a single population and optimum number), the optimum number (assuming it can be determined) currently seems to be preferred.

5. Survival involves a large number of specific biological needs and therefore impels a many-faceted enterprise.

6. Behavior evolves as well as morphology and is of vital importance to the survival of any species.

7. Organized social life is a ubiquitous and particularly important evolutionary adaptation.

8. The very nature of organic life and the workings of natural selection impel a functional approach to the understanding of social behavior.

9. Learning and culture are not entirely unique to man and must, in any event, be understood functionally in relation to the survival problem of the species.

Dobzhansky has written: "Nothing makes sense in biology except in the light of evolution."[144] It seems clear from the discussion above that the same can be applied to human social and political behavior. Simpson puts it as follows:

> Organic evolution is one of the basic facts and characteristics of the objective world. From one point of view it is the basic thing about that world because it is the process by which the universe's greatest complexities arise and systematic organization culminates. Being the process by which we ourselves came to be, it is crucial for the comprehension of our place in and relationship to the objective world. Its exclusion from the subjective world therefore must seriously falsify the latter.[145]

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[144] Dobzhansky, Heredity and the Nature of Man, op. cit., p. 118.

[145] Simpson, This View of Life, op. cit., p. vii.

CHAPTER SIX

EVOLUTION AND HUMAN BEHAVIOR

Further support for an evolutionary paradigm may be derived from the growing appreciation of the role of biological factors in the shaping of human social life and from the increasing application of evolutionary (functional) analyses to human behavior. It is, of course, impossible to be exhaustive here, but certain major facets will be discussed.

Some of the writings of contemporary social scientists leave one with the impression that man can be considered a genetic tabula rasa. M.F. Ashley-Montagu, for example, has declared:

> Everything a human being does he has had to learn from other human beings....Man has moved into a zone of adaptation in which his behavior is dominated by learned responses. It is within the dimension of culture, the learned, the man-made part of the environment that man grows, develops, and has his being as a behaving organism.[1]

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[1]Ashley-Montagu, Culture and the Evolution of Man (New York: Oxford University Press, 1962), pp. xii-xiii.

While Montagu's statement may be a valid partial truth, as it stands it is misleading. At very least, one could still argue that human culture must nonetheless be adaptive; a functional analogy with pre-coded behaviors would still be valid. However, it is possible to go well beyond such a defensive posture. As psychologist Gardner Murphy put it:

> Men do not behave like cedars, earth worms, cats or elephants; they behave like men. All cultures work with raw human material; in every culture the educative process fails when it stretches human nature too far. We are very flexible, but not putty for the window mender, nor clay for the potter. When one starts with the individual personality, any theory regarding the cultural differences of different groups must be conceived as a difference in the way in which the structural relationships of needs in individual members of these groups are developed by culture...[2]

In the same vein, Alland notes:

> Certain behavioral systems are more compatible with the total physiological and psychological structure of the human organism. It is probably for this reason, among others, that similarities between rather complex systems of behavior appear in widely scattered areas of the world where there is little possibility that these similarities arose as a

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[2]Gardner Murphy, "Social Motivation," in Gardner Lindzey (ed.), Handbook of Social Psychology (Reading, Mass.: 1954), I, p. 629.

> result of borrowing. The cultural traits which develop develop against the background of biologically determined human nature.[3]

On the other hand, certain kinds of environmental "programming" are absolutely essential if the human organism is to develop "normally," As Hinde explains:

> For any organism, there are critical ranges of environmental variables outside which development is distorted or absent. Similarly, there are limits to the environmental conditions under which any pattern of behavior will develop: in some cases these may be coincident with those in which life itself is possible, so that the behavior appears after any conceivalbe deprivation experiment which the animal survives, but usually they are narrower...[4]

Without a "normal sensory environment," some neural structures will not develop, or will tend to degenerate from disuse.[5] Some emotional consequences of an abnormal environment were demonstrated in the now-famous monkey

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[3]Alland, Evolution and Human Behavior, op. cit., pp. 269-270. See also Clyde Kluckhohn, "Culture and Behavior," in Lindzey, op. cit., II, pp. 952-955; and Robert Redfield, "The Universally Human and the Culturally Variable," reprinted in Redfield (Margaret Park Redfield, ed.), Human Nature and the Study of Society (Chicago: University of Chicago Press, 1962).

[4]Hinde, op. cit., p. 316.

[5]Donald O. Hebb, Textbook of Psychology (Philadelphia: W.B. Saunders Co., 1966), p. 147.

isolation experiments by Harry F. and Margaret K. Harlow at the University of Wisconsin's Primate Laboratory. When deprived of "normal" mothering in infancy, laboratory-raised monkeys exhibited a range of "neurotic" behaviors -- passivity, self-aggression, sexual incompetence and so forth.[6]

But more important, the basic structure of every human society, including our own, is "determined" in a general way by a number of on-going and species-specific biological needs (subject to some individual and geographic variation) which must continually be satisfied if the species and the individuals which comprise it, are to survive in the long run. As noted above, these needs include a reasonably pure atmosphere, numerous nutritional requirements, fresh water, sleep (approximately one-third of all of our lives), shelter and clothing (or, more generally, maintenance of body temperature), health care

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[6]Harlow, "A Study of Animal Affection," Natural History, Vol. LXX, No. 10 (December 1961), reprinted in Southwick (ed.), op. cit., pp. 174-184.

(including sanitation),[7] physical security, procreation and the nurture and training of the young.

There is nothing particularly startling about this list of needs, yet it is surprising how often our social theorists have taken them for granted, or else emphasized one particular need to the exclusion of others.

In addition, there appears to exist in man a repertoire of evolved, biologically-based individual "social" and "psychological" needs, capacities, and response mechanisms which are instrumental to the meeting of primary survival needs; that is, they help underpin survival-related cultural patterns by providing a set of internal, pre-programmed preferences for survival-serving behaviors -- for eating, for physical comfort and security, for sleep, for sex and procreation, for group participation, for play and exploration, and <u>against</u> physical injury and death (see below).

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[7]Frederick L. Dunn, "Epidemiological Factors: Health and Disease in Hunter-Gatherers," in Richard B. Lee and Irven DeVore (eds.), <u>Man the Hunter</u> (Chicago: Aldine Publ. Co., 1968), pp. 221-240. Sherwood L. Washburn and C.S. Lancaster, "The Evolution of Hunting," in <u>ibid</u>., pp. 297-298. Alexander Alland, Jr., <u>Adaptation in Cultural Evolution: An Approach to Medical Anthropology</u>, <u>op. cit</u>.

These biologically-based needs and "personality" characteristics set fairly rigid limits upon the range of permissible cultural variability, and if any one of these needs goes unfulfilled for even a relatively short perod of time, a society will experience the kind of "stresses" noted by Easton. If the stresses are severe enough, the social system may even break down or experience a "revitalization movement" of the kind described by anthropologist Anthony F.C. Wallace.[8]

Our conscious "wants," moreover, are not unrelated to these needs.[9] Even such non-self-serving social behaviors as parental altruism toward the young appear

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[8]Wallace, op. cit.

[9]The fundamental linkages between wants ("motives" or "drives") and biological needs are discussed by, among others: Gardner Murphy, "Social Motivation," in Lindzey (ed.), loc. cit., pp. 601ff; Lawrence I. O'Kelly, "Motivation: The Concept," in International Encyclopedia of the Social Sciences (New York: The Macmillan Co., 1968), Vol. X, pp. 507-514; C.J. Adcock, Fundamentals of Psychology (London: Penguin Books, Ltd., 1964); and Robert W. White, "Motivation Reconsidered: The Concept of Competence," Psychological Review, Vol. LXVI, No. 5 (1959), pp. 297-333.

to be supported by genetically based motivational components.[10] In order to appreciate just how important the genetic foundation is, consider the consequences of a small genetic defect, such as mongolism (or Down's syndrome), Klinefelter's syndrome, or phenylketonuria.[11] Although the case is less conclusive, there is also substantial evidence today for the belief that schizophrenia, anxiety neurosis, chronic alcoholism and some "breakdowns" under stress may have at least a partial genetic basis.[12]

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[10]Freedman in Etkin, op. cit., pp. 168-173.

[11]On Down's syndrome, see Lerner, op. cit., pp. 196-197; discussions of Klinefelter's syndrome may be found in Lerner, ibid., pp. 118-119 and Mary A. Telfer et al., "Incidence of Gross Chromosomal Errors Among Tall Criminal American Males," Science, Vol. CLIX (15 March 1968), pp. 1249-1250; and Saleem Shah, "Report on the XYY Chromosomal Abnormality" (Washington: Government Printing Office, 1970); phenylketonuria is discussed in Lerner, ibid., pp. 89-92.

[12]Schizophrenia and schizoid disease are discussed by Leonard L. Heston, "The Genetics of Schizophrenic and Schizoid Disease," Science, Vol. CLXVII (16 January 1970), pp. 249-256; and in Arnold H. and Edith H. Buss (eds.), Theories of Schizophrenia (New York: Atherton Press, 1969). Anxiety neurosis is discussed by Ferris H. Pitts, Jr., "The Biochemistry of Anxiety," Scientific American, Vol. CCXX, No. 6 (June 1969), pp. 69-75. A report on the research by biologist Denes de Torok concerning linkages between chromosomal defects and alcoholism may be found

On the other hand, the fit between needs and wants is obviously imperfect in many human societies. The plasticity of the human genotype permits wide cultural differences in the manner in which various needs are fulfilled. Some socially induced wants may even violate our needs (heroin addiction is probably one of the more dramatic examples), and various needs may come into conflict with one another -- for example, when the pursuit of stimulation and challenge (see below) put the individual into a position in which his physical security is jeopardized.

The elemental structure of human society can be traced back to our evolutionary origins (the evolutionary equivalent of the philosophers' "state of nature") and to the particular survival strategy which our ancestors evolved for meeting our "species needs." In taking the decisive steps from an arboreal, herbivorous, food-gathering

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in Behavior Today, Vol. I, No. 20 (Oct. 26, 1970), research supplement. The evidence for the linkage between genes and stress breakdowns is discussed by J.N. Spuhler, "Socio-cultural and Biological Inheritance in Man," in Glass (ed.), op. cit., pp. 106-107.

existence to that of a plains-living predator, our ancestors were perforce required, first, to adapt to a terrestrial environment, perhaps as modern baboon troops have done, and then to develop a pack-hunting organization similar in some respects to that of contemporary wolf-packs.[13] Critical to a successful adaptation to the human way was the development of a highly organized social life. Cooperation, planning and foresight were necessary for success as pack-hunters, to provide the basic necessities, to care for the ill, the females in childbirth, and the young, and to defend the tribe against

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[13]Several excellent discussions of man's early life-style have been produced in recent years. See especially, Etkin, op. cit., pp. 138-151 and references cited therein; also Lee and DeVore, op. cit., chap. 32; John Pfeiffer, The Emergence of Man (New York: Harper and Row Publishers, 1969); Elman R. Service, The Hunters (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966); Campbell, op. cit.; and S.L. Washburn and P.C. Jay (eds.), Perspectives on Human Evolution (New York: Holt, Rinehart and Winston, 1968). For discussions of baboon life, see: S.L. Washburn and Irven DeVore, "The Social Life of Baboons," in James L. McGaugh et al. (eds.), Psychobiology: The Biological Bases of Behavior (San Francisco: W.H. Freeman and Co., 1966); and Sarel Eimerl and DeVore, The Primates (New York: Life Books, Inc., 1965). A discussion of the social organization of wolf packs is contained in Etkin, op. cit., pp. 129-131.

other predators and conspecifics.[14] Indeed, in the course of our evolution, the problem of reproduction and child-rearing became one of the most important determinants of our social life. The marked helplessness of the newborn and the extreme prolongation of childhood dependency (accompanied by the development of the cerebral cortex) were principal sources of man's extraordinary openness to learning,[15] but this important evolutionary adaptation exacted a high price. It required a stable family group and physical support for a minimum of about ten years per child. And because we do not have our children in litters but one at a time, each family unit had to sustain a viable economic and social environment for the young for an average of perhaps twenty years or more.[16] In other words, a

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[14]Service, op. cit., pp. 29-32; Etkin, op. cit., pp. 21-33; also Pfeiffer, op. cit.; Spuhler (ed.), op. cit.; and Lee and DeVore, op. cit.

[15]Part of the process of neoteny, this phenomenon is discussed by Ashley-Montagu, "Time, Morphology, and Neoteny in the Evolution of Man," in Ashley-Montagu, Culture and the Evolution of Man, op. cit., pp. 324-342.

[16]See Bernard Berelson and Gary A. Steiner, Human Behavior (New York: Harcourt, Brace and World, Inc., 1967), p. 122.

species-specific biological characteristic created a cultural imperative (or to be precise, the nuclear family ecology and the prolongation of juvenile dependency probably evolved contemporaneously and very gradually, as Etkin has pointed out).[17]

Indeed, the nuclear family (or a close equivalent) appears to be a cultural universal.[18] Furthermore, this basic cultural building block seems to be reinforced biologically. Our propensity for making semi-permanent "pair-bonds,"[19] also a cultural universal, is supported genetically. Apparently, the emotional centers of the brain are so constructed that, at the end of the maturation

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[17]Etkin, op. cit., p. 144.

[18]See George Peter Murdock, "The Universality of the Nuclear Family," reprinted in Norman W. Bell and Ezra F. Vogel (eds.), A Modern Introduction to the Family (Glencoe: The Free Press, 1960), pp. 37-44; and Clyde Kluckhohn, "Variations in the Human Family," (ibid.), pp. 45-51.

[19]Again, a certain flexibility is an adaptive advantage. If pair bonds were rigidly fixed, a male or female whose mate died prematurately would be unable to make a new bond. Furthermore, the ability of the male to impregnate a number of females (as in countries where polygamy is practiced) would be highly adaptive in a situation where the male population had been decimated.

process, we normally experience an emotional "need" for a pair relationship and are "rewarded" emotionally when a pair bond is achieved -- subject always to individual genetic variations and considerable environmental shaping. That pair bonding is not purely a cultural phenomenon is evidenced by the fact that, in cultures where marriages are typically arranged by the parents, males and females continue to form pair bonds -- in and out of wedlock. Similarly, in Sweden, where in recent years the social pressures associated with the institution of marriage have all but dissolved, couples continue to form relatively stable pair bonds, by personal preference.

By the same token, it has been hypothesized that human males are endowed with a capacity for experiencing paternal feelings, as are a number of our primate relatives.[20] In addition, it is now believed that our sexual characteristics are designed in part to reinforce the pair bond. Because of

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[20]G.D. Mitchell, "Paternalistic Behavior in Primates," Psychological Bulletin, Vol. 71, No. 6 (June 1969), pp. 399-417.

our high degree of sexuality, far beyond what is necessary for purely reproductive functions, our sexual activity is believed to serve as an "emotional reinforcer." This latter function is further supported by the permanent receptivity of the female, a phenomenon unique to our species.[21]

Finally, in order to maximize the effectiveness of the nuclear family as an economic unit, males and females were moderately differentiated genetically through sexual dimorphism. The development of complementary physical and hormonal characteristics helped to support the necessary division of labor.

Although the human infant arrives in a surprisingly helpless state, considering what he will ultimately become, he is nonetheless able to communicate with adults in a rudimentary way from the very beginning. The baby's cry seems to be an innate releaser signal, evoking a state of anxiety in the normal adult which leads to caretaking activities. This serves the infant's needs and seems

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[21]Etkin, op. cit., pp. 143-144.

emotionally rewarding to the parents. Thus a feedback net is established at the outset. Before long, the infant can further reward the parent figures with smiles, an apparently universal and innate social releaser which appears within the first few weeks after birth -- even, significantly, in blind children.[22] The emergence of the cry and the smile are also the first steps in the socialization process, because they will remain with him and serve him in social interactions throughout the rest of his life.[23]

Very quickly, too, an affectional system begins to develop between the infant and its mother, which lays the foundation for the child's development into a social animal. It is doubly significant, therefore, that his affectional bond is not purely a product of stimulus-response conditioning,

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[22]D.G. Freedman, "Smiling in Blind Infants and the Issue of Innate Versus Acquired," Journal of Child Psychology and Psychiatry, Vol 5 (1964), pp. 171-84.

[23]Richard J. Andrew, "The Origins of Facial Expressions," Scientific American, August 1965, pp. 88-94; and Freedman in Etkin, op. cit., p. 169; also, Paul Ekman, E. Richard Sorenson and Wallace V. Friesen, "Pan-Cultural Elements in Facial Displays of Emotion," Science, Vol. CLXIV (4 April 1969), pp. 86-88.

as some social scientists have long supposed. The infant (in other animals as well as man) seems to have a genetically based psychological "need" for such an emotional attachment, and in its absence may become highly neurotic. The child may be unable to develop into a competent adult and may exhibit such aberrations as a lowered resistance to disease and extraordinarily high rates of infant mortality (a tragic, infantile form of "pining away").[24] In the experiments at the University of Wisconsin, Harlow demonstrated that infant monkeys actually preferred a soft, terrycloth surrogate "mother" to a wire "mother" which supplied it with milk, an utter contradiction of the classical conditioning paradigm.[25]

It is apparent, therefore, that the emotional underpinnings of the affectional bonds which glue human societies together have a genetic basis. We are indeed social animals

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[24]Harry Bakwin, "Emotional Deprivation in Infants," Journal of Pediatrics, October 1949, pp. 512-21; also supra, footnote No. 6.

[25]Harlow, "Love in Infant Monkeys," Scientific American, Vol. 200, No. 6, (June 1965), reprinted in James L. McGaugh et al., op. cit., pp. 100-106. Interestingly, the Harlow article concludes: "There appears to be no reason why we cannot at some future time investigate the fundamental neurophysiological and biochemical variables underlying affection and love."

and our development is seriously retarded without a minimal attachment to a parent figure.[26] In fact, parental love, coupled with firm, but not draconian or sadistic discipline, appears to be vitally connected with the development of self-esteem in a growing child.[27]

Likewise, an interactional and evolutionary-adaptive approach has been applied to fear, which begins to develop in human infants between six and nine months of age. As psychologist Gordon W. Bronson has observed, fear has not traditionally been treated by psychologists as a useful characteristic; it has instead generally been assumed to be a disruptive emotion which prevents "rational" action.[28]

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[26]Many studies have indicated the vital importance of "mothering" to the emotional -- and even physical -- well-being of the child. The successful Kibbutz practice of multiple mother figures, coupled with close peer relationships, indicates, however, that the affectional system may be more diffuse than that of a single mother-child relationship and still produce competent and neurosis-free individuals. See Bruno Bettelheim, Children of the Dream (New York: The Macmillan Co., 1969). Nonetheless, there is little doubt that the absence of loving relationships has devastating consequences.

[27]Stanley Coopersmith, The Antecedents of Self-Esteem (San Francisco: W.H. Freeman and Co., 1967).

Freud held that fear has its basis in the traumatic events of birth, infancy or early childhood. But Freud failed to consider the possibility that man may be predisposed because of his evolutionary past and present bio-psychological makeup to experience fear in certain kinds of situations. To be wary of the unknown might, after all, be highly adaptive for survival -- particularly for an animal which is subject to predators, as early man most certainly was. Indeed, if fear responses were dependent solely upon an animal's previous experience, no species subject to predation would be likely to survive. Therefore, there had to be -- and apparently is, at least in most surviving species of higher animals -- built-in mechanisms in the brain which automatically produce fear when the nervous system receives certain kinds of inputs. Furthermore, in most higher animals as well as man, this potential for fear of the strange does not appear immediately, but emerges only after the newborn has familiarized himself with his

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[28] Bronson, "The Development of Fear in Man and Other Animals," Child Development, Vol. 39 No. 2 (June 1968); Bronson, "On the Nature and Function of Fear," Mills Magazine, Series 1, No. 2 (1969), pp. 11-16.

surroundings and his own kind. Of course, what each individual regards as "strange" depends to some extent upon his experience. In addition, seemingly unrelated life experiences can influence the intensity of each individual's fear responses. One key factor in reducing later fearfulness over novelty, according to Bronson, is a healthy mother-infant relationship during early childhood.[29] Bronson concludes: "A potential to fear the strange must be regarded as inherent in many animal species -- it is no longer tenable to maintain that all instances of fear have roots in a painful experience."[30]

Almost from the very beginning, human children also manifest an active, internally motivated effort to learn -- to organize sensory inputs, develop motor and mental skills and gain greater control over their environment. Conceptualized somewhat differently by different writers

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[29]Bronson, "On the Nature and Function of Fear," ibid.

[30]Bronson, "The Development of Fear in Man and Other Animals," op. cit.

and called variously a "competence" or "effectance" motivation,[31] an "achievement motive"[32] and a "growth motivation,"[33] there is certainly considerable evidence today that the child is not merely a passive receptor.[34] Almost from the very outset, the child responds to stimuli selectively -- showing definite stimulus preferences. He rapidly develops some voluntary control of his behavior and some internal control of his attention. Very early too, he shows evidence of an innate "curiosity" -- a tendency to fix attention with heightened learning receptivity to novel, incongruous or unexpected environmental stimuli. It is a capacity we share with other primates.

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[31]R.W. White, "Motivation Reconsidered: The Concept of Competence," Psychological Review, Vol. 66 (1959), pp. 297-333; also, Richard de Charms, Personal Causation (New York: Academic Press, 1968). De Charms conceives of competence as man's "primary motivational propensity," rather than as a motivation which is instrumental to the fulfillment of the organism's evolutionary purpose, as this writer would prefer.

[32]Roger Brown, Social Psychology (New York: Free Press, 1965), Chapter IX.

[33]Abraham Maslow, "Deficiency Motivation and Growth Motivation," in Richard C. Teevan and Robert C. Birney, Theories of Motivation (Princeton: Van Nostrand, 1964).

[34]Maya Pines, "Why Some 3-Year-Olds Get A's -- And Some Get C's," The New York Times Magazine, July 6, 1969, p. 13; also Jerome Bruner, "Up from Helplessness," Psychology Today, January 1969, p. 31.

As psychologist Robert A. Butler observes: "The curiosity motives are largely responsible for the early and extensive learning which unquestionably contributes to the biological success of the primates."[35]

Nor does the human infant wait for stimuli to appear within the range of his receptors. As he matures he begins to seek out excitation -- exhibiting the same intrinsically self-satisfying exploratory behavior so often observed in other species. The basic explanation for the child's activism is, again, genetic. Curiosity and exploratory behavior are closely linked to the functioning of the individual's "arousal system" (or "non-specific projection system"), which serves as a sort of "governor" over cortical and physiological activity.[36] Centered in the reticular formation of the brain stem (and tied to other major brain

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[35] "Curiosity in Monkeys," Scientific American, February 1954, reprinted in McGaugh et al. (eds.), (op. cit.), pp. 173-77.

[36] Daniel E. Berlyne, Conflict, Arousal and Curiosity (New York: McGraw Hill 1960); and "Conflict and Arousal," Scientific American, Vol. 217, No. 2 (August 1966), pp. 82-87; also Hebb, op. cit., pp. 207-13, 226-228.

and neural structures), the arousal system "pools" both sensory and internal stimuli and acts to maintain an optimum level of activity in the total system

It is a highly complex mechanism, but, at the risk of oversimplifying, certain facets are relevant here. First, in a state of high arousal (triggered perhaps by internal stimuli, external stimuli, or both), the arousal system will set off a number of internal changes in the organism. Cortical activity will increase and the individual will display a heightened ability to learn. This will be accompanied by other bodily changes -- increased blood pressure, faster heart and respiration rates, alterations in skin temperature and electrical conductivity, and so on. On the other hand, cortical outputs may become inputs into the arousal system, so that the cortical region can in turn exercise some influence over the level of system activity.

If the total volume of stimuli impinging upon the system becomes too great, however, the arousal system may experience input overload. The result may be withdrawal of attention, confusion, anxiety, fear or aggression,

depending upon the particular situation. Conversely, in a state of high energy output and low arousal (we would call it "boredom") the functioning of the total system may become impaired.[37] To prevent this, the arousal system is so constructed as to make a low arousal state frustrating (or boring) to the individual. The individual may then be motivated internally to go out seeking stimulation.

In other words, one of our basic human needs is stimulation and activity -- although the particular outlet may range from such mundane things as a walk in the park to such extraterrestrial adventures as a walk on the moon. As Berlyne notes: "The nervous system of a higher animal is made to cope with environments that present a fair amount of challenge to its capacities."[38] Accordingly, the psychological motivation for a great variety of both purposeful and otherwise purposeless activities by humans as well as the accompanying emotions can be derived from a

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[37]See Woodburn Heron, "The Pathology of Boredom," Scientific American, January 1957, reprinted in McGaugh et al. (eds.), op. cit., pp. 178-82.

[38]Berlyne, "Conflict and Arousal," op. cit., p. 83.

genetically-based, evolutionary adaptation. The egoistic self-assertiveness which such a motivation produces in the developing child is offset by two specific counter-forces -- the developing capacity to fear the strange (as mentioned above) and the capacity to accept authority and internalize moral inhibitions, a capacity which Waddington, Simpson, Dobzhansky, Huxley, Piaget and others believe to be genetically based (see below).

Another mechanism which does not fit a simple stimulus-response model relates to the human animal's unequaled imitative abilities. Imitation plays an important role in child development (it is crucial, for example, in the acquisition of language skills), yet it cannot satisfactorily be tied to specific rewards and often follows a logic of its own. If an adult uses corporal punishment to discourage aggressive acts, the results will be the opposite of what is intended. Instead of becoming non-aggressive, the child's aggressiveness increases.[39]

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[39] Roger Brown, op. cit., pp. 387-88; Berelson and Steiner, op. cit., p. 177.

Furthermore, there must be a "pre-potency" or "pre-programming" for the particular things imitated. Language is an excellent example. In Biological Foundations of Language,[40] Eric H. Lenneberg integrated a large number of studies in various fields and concluded that there was strong evidence for the existence of a basic, biologically organized, language patterning mechanism. Lenneberg believes social contacts and environmental stimuli serve as releasers, resonators or models for imitation on the part of the young child, whose language skills appear to develop in definite stages. In fact, the same order obtains in brain-injured or deaf children, even though the rate of language acquisition slows down. Lenneberg categorically rejects the behaviorist "associative chain" theory.

Although, it is not clear what genetic factors are involved, the next major step in the social development of the child is the formation of peer-groups. It is a

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[40]Lenneberg, Biological Foundations of Language (New York: John Wiley and Sons 1967).

universal phenomenon; as Berelson and Steiner put it: "Everyone needs them."[41] And it appears to be intimately linked to play.

Play has always been something of an embarrassment to psychologists, as it appears unmotivated and purposeless in any obvious, biological sense. Yet it is ubiquitous and obviously rewarding to those who engage in it. Over the years there have been numerous theories which have sought to explain it (although there is still a relative dearth of solid empirical research on the subject). Play has been viewed variously as a way of discharging surplus energy, of "recapitulating" or re-enacting the behavioral history of the species, of practicing adult skills (and thus performing an adaptive function) and, according to Piaget, as an aspect of cognitive development.[42] However, the ethologists, working with non-human behavior, have suggested that play, which is widespread among higher

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[41]Berelson and Steiner, op. cit., p. 61.

[42]See especially, Susanna Millar, The Psychology of Play (Baltimore: Penguin Books "Pelican", 1968); J. Bernard Gilmore, "Play: A Special Behavior," in Ralph Norman Haber (ed.), Current Research in Motivation (New York: Holt, Rinehart & Winston, Inc., 1967), pp. 343-55; P. A. Jewell and Caroline Loizos (eds.), Play, Exploration and Territory in Mammals (New York: Academic Press, 1966).

animals, may serve a number of adaptive functions at once: Motor development and exercise, imitation and practice of adult skills, stimulation of the arousal mechanism, energy discharge and, not least, the development and maintenance of direct interpersonal social bonds between adolescent members of the pack or tribe.[43]

If play serves a similar group bonding and group coordinating function -- among other things -- in man, then it must be recognized as instrumental to the development of one of man's most important behavioral adaptations -- social organization.

In male children, significantly, the formation of peer groups also coincides with a marked increase in aggressiveness, which seems related to an increase in the level of androgens (or male hormones) in the bloodstream.[44] It is at this point that boys begin to exhibit a preliminary version of what will become the basic social structure of adult male societies.

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[43] Etkin, op. cit., p. 147.

[44] Freedman in Etkin, op. cit., pp. 157-58; Kenneth Evan Moyer, "Kinds of Aggression and Their Physiological Basis," Communications in Behavioral Biology, Part A, Vol. II, No. 2 (August 1968), (New York: Academic Press, Inc.), pp. 70-71.

At the time homo sapiens was emerging, male aggressiveness would obviously have been of great adaptive value -- particularly for hunting and for defending females and children against other predators and conspecifics. There can be little doubt, therefore, that selection pressures operated to encourage and fix a biological foundation for such behaviors (see below). But just as highly aggressive behavior was functional for certain survival purposes, pack-hunting and group and family life also required an unusually high degree of cooperation and subordination to the group. The result was a conflicting set of behavioral requirements which somehow had to be harmonized. The social structure which our hominid ancestors evolved for doing so proved to be strikingly similar to the social structure common throughout the animal world -- particularly among group-living vertebrates. Etkin calls this familiar social structure the "behavioral triad " (although there are apparently several other biologically supported pillars in the human social structure as well).

In order to contain male aggressiveness and subordinate it to the needs of the group, males tend to form relatively stable dominance-submission hierarchies. The pattern begins to emerge with the increase in rivalrous behavior on the part of juvenile males.[45] Competition of various kinds, varying to some extent between cultures, soon leads to a "pecking order," which may be more or less stable depending upon the degree to which it is accepted by the members of the play group. As Etkin puts it: "The great importance of dominance in social life is that it acts as an organizing principle which minimizes aggression by, in effect, securing to the

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[45]Freedman in Etkin, op. cit., p. 175. There is good evidence of a linkage between androgens and aggressive behavior. See Moyer, "Internal Impulses to Aggression," Transactions of the New York Academy of Sciences, Series II, Vol. XXXI (1969), No. 2, 104-114; David A. Hamburg, "Recent Research on Hormonal Regulation of Aggressive Behavior," paper for the UNESCO Interdisciplinary Expert Meeting on the Implications of Recent Scientific Research on the Understanding of Human Aggressiveness, Paris, 19-23 May 1969; and R. Charles Boelkins and Jon F. Heiser, "Biological Bases of Aggression," in Daniels, Gilula and Ochberg (eds.), op. cit., pp. 31-33.

dominants the fruits of victory without disrupting group life by conflict."[46]

Significantly, dominance hierarchies are most clearcut in those species which show a high degree of individual aggressiveness.[47]

So essential, apparently, is this check on male aggressiveness that hierarchical relationships are a cultural universal.[48] (One must hasten to add, however, that this is not to say that any given hierarchy is necessarily adaptive. A peculiarity of advanced, highly-structured human cultures is that they often perpetuate a particular hierarchy and protect dominants from being challenged for leadership long past the point where they

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[46] Etkin, op. cit., p. 15. Dominance does not, however, entail a license for unlimited exploitation. If this were the case, an animal would more often fight to the death before accepting inferior status. A necessary concommitant of dominance in any species is restraint and social responsibility on the part of the dominants.

[47] Ibid., p. 21.

[48] Berelson and Steiner, op. cit., p. 76; also Kingsley Davis, Human Society (New York: The Macmillan Co., 1949) p. 366.

have become dysfunctional for the society.[49] Certainly any system which is able to replace maladaptive leaders bloodlessly, as other animal species are able to do -- is more likely to remain adaptive over the long run.)

A second device for containing aggressiveness in group-living species is territoriality. Individual territories (as distinct from group territories) may serve various functions: establishing individual food supplies, helping to coordinate mating behavior and the nurture of the young, regulating population density and so on. Equally important, in highly aggressive species, territory minimizes the amount of conflict between males and may even facilitate reproduction by reducing the feelings of "psychological castration" which subordinate males often experience. Again, territoriality -- in the sense of a minimal personal "space" -- appears to be species-specific.[50]

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[49]Etkin notes that dominance is not synonymous with leadership, but in the case of humans, who evolved as closely cooperating pack-hunters, dominance would have tended toward the relatively benign leadership pattern which is common today. Op. cit., pp. 17, 140.

[50]See Stanford M. Lyman and Marvin B. Scott, "Territoriality: a Neglected Sociological Dimension," Social

Another device which helps to contain aggressiveness is the semi-permanent pair bond. Not only does it involve affectional ties, but it reduces the degree of male competition over mates.

Other devices which may also serve to minimize aggressive confrontations include male bonding,[51] group loyalties, man's ethical and authority-accepting capacity (see below) and various cultural mechanisms, such as ritualization of male competition (another cultural phenomenon with parallels in the animal world), rule systems and social norms.

Although many of these possible constraints upon aggressiveness come into play only in adulthood, the basic

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Problems, Vol. XV, No. 2 (Fall 1967), 236-49; Edward T. Hall, The Hidden Dimension (Garden City, N.Y.: Doubleday Inc., 1969) and "Proxemics," Current Anthropology, Vol. IX, Nos. 2-3 (April-June 1968), 83-108 (with comments); P.D. Roos, "Jurisdiction: An Ecological Concept," Human Relations, Vol. XXI (1968), 75-84; E. Goffman, Behavior in Public Places (Glencoe: The Free Press, 1963); and Hans Kummer, "Spacing Mechanisms in Social Behavior" (unpublished). See also papers from the "Use of Space by Animals and Men" symposium of the annual meeting of the American Association for the Advancement of Science, 29-31 December 1968, Dallas, Texas.

[51]See Lionel Tiger, Men in Groups, (New York: Random House, 1969).

pattern emerges in childhood -- and it is linked to the simultaneous development of peer group bonds and individual male aggressiveness.

Having suggested above that aggressiveness has a biological basis, I have, of course, opened a Pandora's box. Unfortunately a full discussion of this urgent and hotly debated subject is not possible here, but a brief synthesis of some of the current thinking is in order.

In recent years, innumerable books, articles and studies have been published on aggressiveness,[52] but some of them have only succeeded in confusing the issue. There is, first of all, a problem of definition -- of semantics. Some writers treat "aggression" and "violence"

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[52] Supra, chap. V., footnote no.141 ; also, Robert Ardrey, The Territorial Imperative (New York: Atheneum Publishers, Inc.,1966); Konrad Lorenz, On Aggression (New York: Harcourt, Brace and World, 1966); and their critics in Ashley-Montagu (ed.), Man and Aggression (New York: Oxford University Press, 1968); Leonard Berkowitz, Aggression: A Social Psychological Analysis (New York: McGraw-Hill Book Co., 1962); and Berkowitz (ed.), Roots of Aggression (New York: Atherton Press, 1969); Ted Robert Gurr, Why Men Rebel (Princeton, N.J.: Princeton University Press, 1970); Robert Bigelow, The Dawn Warriors (Boston: Atlantic-Little, Brown and Co., 1969); and the works cited below.

as equivalent to one another and, furthermore, link both terms exclusively to the "intent" to do physical injury to a person or his property. This may be a workable political or legal definition, but from an evolutionary perspective it is unwarrantedly narrow. It is not defined in terms of the basic neurophysiological and biochemical mechanisms involved but, apparently, in terms of conscious human "will". Furthermore, self-inflicted "violence," displaced "violence," and sublimated "violence" (verbal or psychological aggression) would have to be excluded. An attack on another man's reputation, let us say, would not be considered aggressive by this definition, even if harm was intended and the target felt injured by the onslaught. Finally, it would exclude forceful and sometimes "violent" goal-seeking behaviors not directed toward other persons or their property, as well as the non-injurious inter-individual competition which is so ubiquitous among man and a great many other animal species.

Accordingly, this writer prefers to distinguish between aggression and violence. Following the approach of the Committee on Violence of the Stanford University

School of Medicine,[53] violence will be treated here as a special case of the more general category of aggressiveness. Aggressiveness is here defined as an aspect of the entire spectrum (or class) of assertive and attacking behaviors found in man and other animal species. It includes overt and covert attacks, self-directed attacks, displacement attacks, dominance behavior, defamatory acts and the motivational and emotional components of any determined attempt to accomplish a task. Violence, on the other hand, will be limited to destructive forms of aggression.

Of course, even this limited definition of violence leaves us with a very complex array of behaviors. It includes the uncontrollable individual compulsions of a Richard Speck, the calculated, if pathological, "political" violence of a Lee Harvey Oswald or a Sirhan Sirhan, and the "carnival violence" of some ghetto riots -- or following a soccer match. Just as it is possible to have anger without violence (say in a family quarrel),

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[53]The committee's work has been published in Daniels, Gilula and Ochberg (eds.), op. cit. See also Gilula and Daniels, "Violence and Man's Struggle to Adapt," Science, Vol. CLXIV, No. 3878 (25 April 1969), pp. 396-405.

it is also possible to have violence without anger (for instance, in the cold-blooded use of torture or terror, or in the deliberate resort to war or revolution as an instrument for achieving a particular goal).

Aggression and violence are thus not unitary concepts.[54] Indeed, psychologist Kenneth Moyer has identified seven different categories of aggression (whether violent or non-violent) that are found in other animals and/or man (see below).[55]

A second problem with respect to aggression involves the issue of causation. In recent years, three presumptively competing explanations have been espoused (frustration-aggression, social learning and biological), though as time goes on they appear to be increasingly convergent. The first, and most widely employed by political scientists, is the frustration-aggression model

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[54]A number of scientists have suggested this conclusion in recent years. See especially: Scott, op. cit.; Kenneth E. Moyer, "Kinds of Aggression and Their Physiological Basis," op. cit.; and Berkowitz, "Simple Views of Aggression," American Scientist, LVII (1969), No. 3, 372-383.

[55]Moyer, ibid.

originally put forward in 1939 by members of the Yale Institute of Human Relations (Dollard, Doob, Miller, Mowrer and Sears)[56] and more recently associated with psychologist Leonard Berkowitz.[57] As originally formulated, an essentially one-to-one relationship was posited between environmental frustration (or the interference with goal-directed activities) and aggressive responses. There were no intervening variables, and what went on inside the organism was irrelevant -- a mechanistically predictable innate reaction. Berkowitz' current position, however, is far removed from this and much more interactional. In a 1969 essay, Berkowitz spoke of aggression as the result of a "complex interplay between nature and nurture."[58] Biological determinants

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[56] J.D.L. Dollard, L.W. Doob, N.E. Miller, O.H. Mowrer, and R.R. Sears, Frustration and Aggression (New Haven: Yale University Press, 1939).

[57] Berkowitz, Aggression: A Social Psychological Analysis, op. cit.

[58] Berkowitz, "Simple Views of Aggression," op. cit., p. 373. See also Berkowitz (ed.), Roots of Aggression, op. cit. Actually the Yale group later modified its theory to account for responses to frustration that were other than aggressive (whether natural or learned). However,

and social learning are thus acknowledged by him to be variables which may contribute to or inhibit aggressive responses to frustration.[59] In utilizing this model, political scientists have adapted it to their own purposes. James C. Davies links violence at the individual level to the frustration of the hierarchy of psychological needs hypothesized by Abraham Maslow[60] and, at the macro-level, to severe short-term increases in the gap between rising expectations and the systemic ability to fulfill those expectations, which Davies has visualized graphically as

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frustration remained the necessary prerequisite to aggression. Reviewed by A. Bandura and R.H. Walters, Social Learning and Personality Development (New York: Holt, Rinehart and Winston, 1963), pp. 110-112; and Berkowitz (ed.), op. cit., chap. 1.

[59]Berkowitz, "Simple Views of Aggression," loc. cit. In addition to "innate determinants" and social learning, Berkowitz also observes that some aggression can result from pain.

[60]Davies, "Violence and Aggression: Innate or Not?", paper prepared for the VIIIth World Congress of the International Political Science Association, Munich, Germany, August 31 to September 5, 1970 (unpublished).

an inverted J-curve.[61] Ted Robert Gurr, applying the model to large-scale political violence, asserts a causal relationship between violence and perceived "relative deprivations" among the individual members of a society,[62] while Ivo K. Feierabend, Rosalind L. Feierabend and Betty A. Nesvold associate such violence with "systemic frustrations."[63]

Like Berkowitz, political scientists are not insensitive to the interrelationship between frustration and the effects of social learning. Gurr, for instance, treats relative deprivations as the key variable, but he emphasizes that it is not deprivations _per se_ but the "perception" of _unjustified_ deprivations (which is quite obviously susceptible

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[61] Davies, "The J-Curve of Rising and Declining Satisfactions as a Cause of Some Great Revolutions and a Contained Rebellion," in Graham and Gurr (eds.), _op. cit._, pp. 690-730.

[62] Gurr, "A Causal Model of Civil Strife: A Comparative Analysis Using New Indices," _American Political Science Review_, Vol. LXII, No. 4 (Dec. 1968), pp. 1104-24; _Why Men Rebel_, _op. cit._; and "A Comparative Study of Civil Strife," in Graham and Gurr (eds.), _op. cit._, 572-631.

[63] Feierabend, Feierabend and Nesvold, "Social Change and Political Violence: Cross-National Patterns," in Graham and Gurr (eds.), _ibid._, pp. 632-687.

to in situ learning) that is the necessary pre-condition for civil violence. Furthermore, Gurr introduces as mediating factors the individual's attitude toward the propriety of violence and his perception of its potential efficacy (that is, the perceived likelihood of success). Again, such perceptions are highly responsive to social learning, even though Gurr chooses in the end to put most of his stress on the underlying deprivations.

On the other hand, while biological factors are not unappreciated by the political scientists, these factors seem to be treated as constants. Davies, for example, assumes that biologically "each man is like every other man."[64] Similarly, Gurr introduces a biological mechanism into his explanation in order to establish the linkage between frustration and violent responses, but he appears to treat this mechanism as a constant: "The underlying causal mechanism," he tells us, "is derived from psychological theory and evidence to the effect that

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[64]Davies, "Violence and Aggression: Innate or Not?", op. cit., p. 8.

one innate response to perceived deprivation is discontent or anger, and that anger is a motivating state for which aggression is an inherently satisfying response."[65] He assures us that the degree of anger and violence thus evoked is directly proportional to the intensity of the perceived deprivation.[66] This is analogous, he says, to the law of gravity.[67] Elsewhere, though, Gurr inserts the idea (following Berkowitz) that threat-aggression or fear-aggression might result from "avoidance-survival" mechanisms.[68] Also, he concedes that there might ("infrequently") be instrumental aggression that is not motivated directly by anger.[69] Furthermore, he acknowledges at one point that there may be a distribution of individual responses to frustration -- although he doesn't explain whether or not such differences might be due to heredity or environment.[70]

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[65]Gurr, "A Causal Model of Civil Strife..." op. cit., p. 1104.

[66]Gurr, Why Men Rebel, op. cit., p. 9.

[67]Ibid., p. 37.

[68]Ibid., p. 35.

[69]Ibid., p. 36.

[70]Ibid., p. 9.

The second approach to aggression has been associated with Albert Bandura and Richard H. Walters.[71] Originally developed as an alternative to the frustration-aggression model, Bandura and Walters' explanation asserted that social learning alone could account for aggression. By social learning, they meant "antecedent social stimulus events," including models from which learning takes place imitatively, classical reinforcement learning and the methods of training utilized in childhood development. While frustration situations may elicit aggression, aggression is only one of many possible responses to frustration; the reaction of the individual is controlled by the "response pattern that is currently dominant in the subjects' response hierarchy" -- and this response pattern is developed through social learning; indeed, biological or "constitutional" factors are seen by

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[71]Bandura and Walters, Social Learning and Personality Development, op. cit.; and Adolescent Aggression: A Study of the Influence of Child-Training Practices and Family Interrelationships (New York: Ronald Press Co., 1959).

Bandura and Walters as having only the most indirect influence.[72]

The third alternative is the so-called biological-instinctual hypothesis -- which has a long history, but which has most recently been associated with Konrad Lorenz,[73] Anthony Storr[74] and others (although Lorenz, like Berkowitz, has recently modified his earlier, more dogmatic position). At the risk of oversimplifying, in its most extreme form this approach postulated an instinctive and spontaneously generated "drive" which often asserts itself independently of environmental factors. Aggressiveness is thus not always learned, or necessarily evoked by environmental stresses or stimuli, and cannot be totally eliminated. In its natural forms, it can only be channeled or, as many Freudian psychiatrists would argue, turned inward.

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[72]Bandura and Walters, Social Learning and Personality Development, op. cit., pp. 26-29, 136. The authors suggest that patterns of social reinforcement may vary for individuals due to the possible variations in preferences for and responses to different constitutional characteristics (e.g. body build or I.Q.) on the part of parents and society. The significant variable is not, then, the biological variation of individuals but rather in society's response to these variations. This conceptualization embodies a curious notion of causation. Nor can they explain why society expresses differential preferences for these "constitutional factors."

Although evidence has been adduced in support of each of these three models of aggression, by the same token objections have been raised against the more extreme versions, at least when put forward as exclusive explanations.[75] As Berkowitz concedes, a simplistic frustration-aggression model ignores non-anger-induced instrumental aggression and threat or attack responses. It also cannot account adequately for disproportionate responses, for individual

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[73]Lorenz, op. cit.

[74]Storr, Human Aggression (New York: Atheneum Publ., 1968).

[75]A useful review of the various hypotheses about aggression has been made by the Stanford Committee (Daniels, Gilula and Ochberg (eds.), op. cit. Proponents of the frustration model include Dollard, et al., op. cit.; Berkowitz, supra footnotes 52 and 54); Davies, supra footnotes 60 and 61; Gurr, supra footnotes 52 and 62; and the Feierabends, op. cit. Shortcomings of the frustration model are discussed by Bandura and Walters, Social Learning and Personality Development, op. cit., pp. 110-112, 115-117 and 133-137, among others. Bandura and Walters (ibid.) advance the case for social learning causation; relevant research is also surveyed by Roger Brown, Social Psychology (New York: The Free Press, 1965), pp. 350-401. The insufficiency of this model is commented upon by, among others, ethologist Niko Tinbergen, "On War and Peace in Animals and Man," Science, Vol. CLX (28 June 1968), pp. 1411-1418. Biological instinctual models are advanced by Lorenz, op. cit.; Storr, op. cit.; Ardrey, op. cit.; and in Carthy and Ebling, op. cit. Criticisms may be found in Ashley-Montagu (ed.), Man and Aggression, op. cit.

variation in the response to frustration and for cultural variations in the response to frustration. Even more tellingly, it is insensitive to differences between sexes, age-groups and species (see below).

On the other hand, the social learning approach cannot explain why aggressive behaviors are so easily learned and, more important, why there can be individual differences despite similar learning environments.

The instinctual model, likewise, cannot account for the differences between cultures and for the clear evidence that linkages do exist between both frustration and aggression, and social learning and aggression.

Finally, none of these models can adequately explain the origins of such behaviors or their functions in light of our evolutionary history. Why is it, for example, that violence is an "inherently satisfying" release for anger, as Gurr puts it?[76] Why is anger an "innate" response to frustration? And why is frustration sometimes released in, say, tears instead of in violent aggression?

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[76]Gurr, "A Causal Model of Civil Strife..." op. cit., p. 1104.

A resolution of some of these difficulties may possibly be found in a fourth approach -- an interactional, evolutionary-adaptive model which includes a synthesis of the three alternatives posed above, an approach first suggested by Marshall F. Gilula and David N. Daniels of the Committee on Violence.[77]

The evolutionary approach proceeds from the thesis suggested above that aggressiveness in man (including the propensity to violence) is a product of evolution and can only be understood in terms of its functional contribution (at least as a behavioral category) to the ongoing survival problem of the species.[78] Aggressiveness has aided man (and many other species as well) in adapting to his environment -- that is, in goal-directed efforts

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[77]Gilula and Daniels, op. cit.

[78]Daniels and Gilula, "Violence and the Struggle for Existence," in Daniels, Gilula and Ochberg (eds.), op. cit., pp. 405-443; Andrew P. Vayda, "Hypotheses About Functions of War," in "War: The Anthropology of Armed Conflict and Aggression," Natural History (special supplement), Dec. 1, 1967, and works cited therein; Vayda, "Maoris and Muskets in New Zealand: Disruption of a War System" (unpublished manuscript, 1970); Bernard J. Siegel, "Defensive Cultural Adaptation," in Graham and Gurr (eds.), op. cit., pp. 764-787; and Anthony F.C. Wallace, "Revitalization Movements," op. cit.

to satisfy his continuing survival needs and in coping with various stressful and threatening situations (both natural and man-made).

Aggressiveness may thus be measured empirically as the threshold and intensity of various assertive responses (as opposed to flight) and as the relative intensity and energy with which an individual endows various goal-directed behaviors. In other words, aggressiveness may be treated as a substrate of a number of different motivational and emotional states -- curiosity, problem-solving activities, interpersonal competition, responses to stress or deprivation and, of course, calculated instrumental violence.

In any specific instance, furthermore, aggressiveness will be the product of an <u>interaction</u> between environmental and biological factors, both of which must be treated as <u>variables</u>. There is increasing evidence that biological factors represent not merely the necessary linkage between environmental stimulus and behavioral response, but also a highly complex source of variance in aggressive behavior.

Over the years, a great many experiments with other animals have illuminated some of the neural and endocrine mechanisms involved in aggressive behavior, and there is now convincing evidence for other species that differences in aggressiveness are influenced by genetic factors.[79] Relatively less evidence has been accumulated to date for man, but one of the most striking pieces of evidence is some as yet unpublished data from an experiment conducted by Steven G. Vandenberg of the Institute for Behavioral Genetics at the University of Colorado. Using the well-validated twin methodology (with a sample of about 200 sets of twins of high-school age) and a specially developed personality assessment test, Vandenberg found that (subject to certain caveats), .76 (or 76 percent) of the inter-individual variance in aggressive responses could be attributed to genetic inheritance.[80]

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[79]On this point, see especially, Gerald E. McClearn, "Biological Bases of Social Behavior with Specific Reference to Violent Behavior," Crimes of Violence (A Staff Report to The Commission on The Causes and Prevention of Violence) (Washington: Government Printing Office, 1969). Hamburg, op. cit., Moyer, supra footnotes 44 and 45; and Boelkins and Heiser in Daniels, Gilula and Ochberg (eds.), op. cit.

[80]My deep appreciation to Dr. Vandenberg for permitting me to make use of his data.

Another possible source of biologically-based variation is chromosomal abnormalities such as Klinefelter's syndrome. Some individual males are born with one or more extra male sex chromosomes (XYY,XYYY, XYYYY etc.). And there is a strong suspicion that this condition, which often results in heightened male hormonal levels (among other things), may be more than coincidentally related to the fact that such abnormalities are represented to a disproportionately high degree in delinquent and violently criminal cases.[81] It is consistent with the growing evidence that hormonal patterns represent a significant mediator and cause of variation in aggressive behavior.[82]

Also, there is the disquieting estimate by Drs. John R. Lion, George Bach-Y-Rita and Frank R. Ervin of the Department of Psychiatry at Massachusetts General Hospital that at least 10 million and possibly as many as 20 million Americans suffer from impaired brain functions to a degree which limits their potential to

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[81] Supra footnote no. 12.

[82] Supra footnote no. 45.

"understand, channel and re-direct aggressive energies."[83] Some individuals experience "spontaneous firings" of the cells in the temporal lobe and other areas of the brain, which correlate with subjective feelings of rage and a high incidence of uncontrollable violent behavior. These firings are detected by 6/second and 14/second positive spikes on an EEG record, and a number of studies have associated this brain anomaly with acts of violence such as fire-setting, aggressive sex behavior and murder.[84] Moyer comments: "There appears to be good evidence that some individuals are born with a tendency for certain neurones to fire spontaneously and that the amount of spontaneous firing is on a continuum, occurring more in some individuals than in others....A mechanism for internally activated aggressive behavior appears to exist. Perhaps it occurs in many people, but less frequently in most."[85]

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[83]John R. Lion, George Bach-Y-Rita, Frank R. Ervin, letter to the editors, Science, Vol. CLXIV (27 June 1969), p. 1465; V. Mark and F.R. Ervin, Violence and the Brain (in press).

[84]Moyer, "Internal Impulses to Aggression," op. cit., p. 146.

[85]Ibid.

Conversely, there has been some success in reducing violent, psychotic behavior without interfering with normal motor response, by stimulation of the septal region of the brain. Likewise, specifically located brain lesions both in lower animals and man can either result in increased hostile tendencies (by "cutting off" circuits which tend to inhibit aggressiveness) or decreased aggressiveness (by "cutting off" those circuits which are associated with aggressiveness).

A complete causal model of violent aggression, moreover, must be able to account for certain striking behavioral anomalies. Regardless of culture, the great preponderance of violence is perpetrated by young males in their 'teens and early twenties, whereas very little violence proportionately is attributable to old men[86] (excepting, of course, political leaders and generals). Likewise, very little violence can be ascribed to women(though, significantly, most of it is clustered during the pre-menstrual week).[87] One could argue,

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[86]Berelson and Steiner, op. cit., pp. 30-31; and Boelkins and Heiser in Daniels, Gilula and Ochberg, op. cit., p. 31.

[87]In one study of female prisoners, 62 percent of the crimes of violence had been committed in the prisoners' premenstrual week. J.H. Morton, et al., "A Clinical Study of Premenstrual Tension," American Journal of Obstetrics and Gynecology, Vol. LXV (1953), pp. 1182-1191.

I suppose, that young males suffer a sufficiently greater degree of deprivation (or are subject to sufficiently different social learning) to be able to account for these anomalies. A more plausable explanation, however, is that such anomalies are the result of an interaction between environmental stresses, social learning and biological factors; for reasons which are not yet completely understood, young males of the species seem to have a relatively lower threshold of tolerance to stress and respond relatively more intensely. Doubtless a number of physiological attributes are involved, including hormonal patterns.[88]

Perhaps the single most persuasive piece of evidence that aggressiveness is not solely the product of cultural acquisition but is rooted, ultimately, in our evolutionary past is Kenneth Moyer's tentative seven-fold classification of aggression: predatory, inter-male, fear-induced, irritable, territorial, maternal and instrumental.[89] Not only does this taxonomy conform to

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[88]These anomalies all correlate with observed hormonal patterns.

[89]Moyer, "Kinds of Aggression and Their Physiological Basis," op. cit.

the repertoire of functional, survival-serving behaviors so widely observed by ethologists, but Moyer has amassed considerable evidence for the proposition that each of these forms of aggression may have a particular neural and endocrine basis and that each is characteristically elicited by different stimulus situations.[90] Furthermore, there is some reason to believe that the neurophysiological and biochemical differences between species will be found to correlate well with the different behavioral matrices worked out by different species for meeting their survival needs.

A third problem with respect to aggressiveness is the question of how to control it. To suggest that the conspicuously high degree of human aggressiveness, including

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[90] Ibid. Moyer suggests that his approach to violence does not require hypothesizing a spontaneous drive. However, in many animals, attacking behaviors are the pre-programmed and highly specific responses to specific stimuli -- either external or internal. See also Robert A. Hinde, "The Nature and Control of Aggressive Behavior," paper for UNESCO Interdisciplinary Expert Meeting, Paris, May 19-23, 1969.

violence,[91] may have a biological basis, and that these proclivities must have evolved in a functional relationship to our survival problems, is not to say that violent aggression is always functional. Far from it. Because man's environment has radically changed virtually overnight (in terms of evolutionary time), many behaviors that have strong support and encouragment, so to speak, at the biological level may be increasingly dysfunctional. As Gilula and Daniels observe: "Where violent aggressive behavior once served to maintain the human species in time of danger, it now threatens our continued existence."[92]

But more important, if the causes of violent aggression are interactional and multi-variate in nature, then our

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[91] Lewis Richardson has estimated that 59 million humans have died from wars and other murderous quarrels in the 125 years from 1820 to 1945 -- one every 68 seconds. Richardson, Statistics of Deadly Quarrels (Pittsburgh: Boxwood Press, 1960), p. 153. Derek Freeman considers this figure "almost certainly an underestimate." Freeman, "Human Aggression in Anthropological Perspective," in Carthy and Ebling (eds.), op. cit., p. 110. This excludes, of course, the countless members of other species killed by homo sapiens, many for sport.

[92] Gilula and Daniels, op. cit., p. 404.

efforts at controlling aggression must also be multiform. It may well be, as Gurr argues, that socio-economic deprivations are of relatively greater importance in evoking mass political violence. Accordingly, remedial socio-economic measures, coupled with the creation and teaching of non-violent means for seeking redress, may be the most appropriate action in such situations. Conversely, bio-meliorative measures might be the most direct and effective way to cope with those individual pathologies where genetic factors are of relatively greater significance.

Another major dimension of human behavior in which biological factors and evolutionary functions can be discerned is norms and ethics. Because the human animal has a far greater degree of behavioral flexibility than any other species, his behavioral choices, including those we call "ethical," can profoundly affect his survival chances. As Huxley put it, ethical choices have evolutionary consequences. It is thus perfectly possible -- indeed, it is an evolutionary imperative -- that we sustain those ethical directives which will help us to organize social behavior in a manner most conducive to the long-run

survival potential of the gene pool. In other words, survival, as contemporary biologists understand the term, involves a degree of altruism and considerable individual subordination to the needs of the offspring and the deme.[93]

At a very minimum, therefore, ethics can be seen as a means to a biological end. Waddington expressed it as follows: "The function of ethicizing is to mediate the progress of human evolution, a progress which now takes place mainly in the social and psychological sphere."[94]

Not only are social norms functionally necessary, but there now seems to be strong support among biologists for the hypothesis that ethicizing is a species-specific biological adaptation; among other things, man is an "ethical animal."[95] As Simpson says:

> There is no real doubt, and neither Julian Huxley nor Waddington has doubted, that the capacity or, one

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[93]Klopfer and Hailman, op. cit., pp. 138-139, 150, 180-181; and W.D. Hamilton, "The Evolution of Altruistic Behavior," American Naturalist, Vol. 97 (1963), pp. 354-356.

[94]Quoted in George Gaylord Simpson, Biology and Man (New York: Harcourt, Brace and World, 1969), p. 134.

[95]See C.H. Waddington, The Ethical Animal (Chicago: University of Chicago Press, Phoenix Books, 1967).

> can say, the necessity for ethicizing is in fact a biological characteristic of the human species developed by natural selection because it is adaptive for the species....The direction of human adaptation early became one depending upon individual flexibility with mainly learned abilities, with alternatives of action and necessary choice among them, with foresight as to the results of action, and with consequent responsibility for those actions. This kind of adaptation has always been carried out in a co-operative social milieu. It follows inevitably that men must and do learn, both from their fellows (parents, elders, priests, etc.) and from their own experience and introspection, to consider some actions "right" and some "wrong."[96]

This is not to say that specific ethical principles are transmitted in the genes. Instead, what is transmitted is a genetic capacity for developing a conscience, or "superego."

As with other aspects of the modern approach, the process of ethical development is held to be interactional. Waddington explains it thus:

> The moulding of the newborn infant into an ethicizing being is not due wholly to intrinsic forces, but requires an interaction between him and his external circumstances....For present-day biology the old alternative, between a naturalistic ethic arising wholly from the external world and a non-naturalistic ethic arising wholly from the innate qualities of man,

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[96] Simpson, Biology and Man, op. cit., p. 134.

> appears quite unsatisfactory....No characteristic of a living thing arises either wholly from nature or wholly from nurture. We are always dealing with systems which have certain innate potentialities which are realized to a greater or lesser extent, or in different forms, according to the external circumstances in which they find themselves.[97]

If ethical development conforms with other behavioral traits, three sources of variation are to be expected -- variations attributable to differences in the genotype, variations attributable to differences in the individual's environment, and variations due to the interaction between the two.

The view that ethics has a biological component and serves an evolutionary function is supported from four separate sources. One is the work of ethologists, who find many examples among group-living animals of behaviors we characterize as moral -- the altruism of parents toward the young, self-sacrifice in the interest of group survival, food-sharing, inhibitions against killing a conspecific, and so forth. In many instances,

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[97]Waddington, op. cit., pp. 27-28.

these behaviors are clearly pre-coded in the genes.[98] But since our behavior is organized and shaped to a far greater degree in the domain of culture, it is not surprising to find ethical behavior organized at this level also.

A second source of support comes from child psychology and related fields (the current sobriquet being "the growth sciences"). Of particular importance is the work of Jean Piaget and Lawrence Kohlberg. Piaget, the Swiss psychologist whose pioneering work in child development spans 40 years, concluded many years ago that moral development was a predictable facet of the maturational process, and occurs in regular stages.[99] Moreover, while the content of the individual's ethical thought is drawn from the environment, it is not so much taught as learned.

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[98]Hebb, op. cit., pp. 247-248; William R. Thompson, "Social Behavior," in Roe and Simpson (eds.), op. cit., pp. 295-296; Mitchell, op. cit.; Etkin, op. cit., 38-49, 64-68; Jane van Lawick-Goodall, "A Preliminary Report on Expressive Movements and Communication in the Gombe Stream Chimpanzees,"in Phyllis C. Jay (ed.), Primates: Studies in Adaptation and Variability (New York: Holt, Rinehart and Winston, 1968), 368-371 and a variety of reports on other primates therein.

[99]The Moral Development of the Child (1932) (reprinted New York: The Free Press, 1965). See also discussions by J.H. Flavell, The Developmental Psychology of Jean Piaget (Princeton: D.Van Nostrand Co., 1963); and Roger Brown, op. cit., pp. 384-401.

Ethical directives may be internalized at the subconscious level, or as the result of individual cognitive processes. There are also elements of selection and imitation involved. The ethical structure which the individual child erects may even contradict in some respects what he has been "taught."

Piaget's work has been reinforced by the cross-cultural studies of the American psychologist Lawrence Kohlberg. In a recent article, Kohlberg concluded:

> In our research, we found definite and universal levels of development in moral thought.... Moreover, the nature of our sequence is not significantly affected by widely varying social, cultural or religious conditions. The only thing that is affected is the rate at which individuals progress through this sequence.[100]

A third source of support comes from psychologists working with primates in the laboratory. Hebb cites, for instance, the experiments of H.W. Nissen and M.P. Crawford on begging among chimpanzees. In a situation where one of two animals in adjoining cages is given food, and the two are friends, the privileged chimp is likely to share his food. But even more interesting is the situation in which

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[100] Kohlberg, "The Child as a Moral Philosopher," Psychology Today, September 1968, pp. 25-40; see also Roger Brown, op. cit., Chapter 8.

the deprived animal is not a friend. In this case, the importuning of the second chimp will prove equally irresistible, but highly annoying, to the first, who may end up throwing the food violently at the begger.[101] Hebb concludes: "The evidence from infrahuman mammals indicates that altruism is a product of evolution and not something that must be beaten into the growing human child because of the needs of society."[102]

The fourth source of support comes from laboratory research relating to neuro-physiological and hormonal influences on behavior. Brain stimulation, chemical (hormonal) stimulation and brain lesions have all been found to produce marked effects on affective behavior -- including maternal and paternal behavior, social responsiveness and communicativeness -- in animals and, in some cases, in man.[103]

Although there may be some unforeseen problems with the formulation presented here of the origins and functions of ethics, one major objection should be mentioned. This is

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[101] Hebb, op. cit., p. 247.

[102] Ibid., p. 248.

[103] Moyer, "The Physiology of Affiliation and Hostility" (unpublished, 1969).

the problem of ethical relativity. Different cultures and religions have different ethical systems, after all, and this has often been used as an argument against the validity of any ethical system whatsoever. From an evolutionary perspective, however, such a variety is to be expected and does not contradict what was said above. As Simpson notes: "We know that a great number of ideologically and theologically conflicting religious and ethical systems have all served adaptive biological and psychosocial functions with considerable success..."[104]

Since the culture of every society is historically unique, and since its survival problems and strategies are to some extent situation specific, the relevant question is whether or not a particular ethical precept or system is adaptive for a particular society at a given time. But in any event, some system of ethics is functionally necessary; every society has an ethical system of some sort.[105]

Though the above discussion has not begun to do justice to the subject of biological aspects of human behavior,

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[104]Simpson, Biology and Man, op. cit., p. 134.

[105]Lucy Mair, Primitive Government (Baltimore: Penguin Books, Inc., 1964), p. 35.

certain general points should be made by way of a summary.

First, it should be evident that in fundamental respects, our social life has been shaped by our biological needs and by the characteristics of our evolved survival-related psychological equipment. Some apparently intrinsically motivated behaviors are not the result, as Abraham Maslow would have us believe, of "higher" motivations, but can be seen as instrumental to the development of the individual and, ultimately, to the survival needs of the group.[106] Even such supposedly "subjective" phenomena as emotions prove in fact to be measurable neurophysiological events which are the responses of specific brain centers to various internal and external stimuli. Our emotional repertoire is inborn (apparently it is seated in the hypothalamus, although it involves other brain sub-systems), and it undergoes definite stages of maturation, as does the rest of the organism.[107] As research psychiatrist

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[106]This is not to deny, however, the reality of higher spiritual or esthetic experience which goes beyond survival needs. As Berelson and Steiner observe: "All known societies have religions." Op. cit., p. 46.

[107]Clifford T. Morgan, Physiological Psychology (3rd Ed.), (New York: McGraw-Hill Book Co., 1965), p. 307.

David Hamburg expressed it: "Social life is rooted in emotion....Society is not composed of neutral actors but emotional beings -- whether we speak of baboons, chimpanzees, or man, emotion lies at the core of the social process."[108]

To assert that there is indeed a biologically based "human nature," on the other hand, is not to suggest that we are all psychologically identical. Far from it. Just as we differ greatly in gross physical characteristics -- around certain norms -- so do we differ apparently in those areas which relate to "personality" characteristics.

Vandenberg's suggestive evidence that much of the variability in male aggressiveness might be attributable to genetic factors was cited above. In addition, Vandenberg has reported on the results of fifteen studies which consistently support the conclusion that the trait variously described as "sociable" or "extroverted," as well as its antipode, "shy," "withdrawn," or "introverted," has an

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[108] "Emotions in the Perspective of Human Evolution," in Peter H. Knapp (ed.), Symposium on Expression of the Emotions in Man (New York: International Universities Press, 1963), p. 316.

hereditary component.[109] That is, each human being possesses a certain innate predisposition in this particular dimension of personality, which varies between individuals. (But again, this predisposition is also highly susceptible to shaping by environmental variables.) Similar evidence exists, Vandenberg reported, for a number of other personality characteristics as well -- self-confidence, vigor or general energy output, need for achievement and so forth.

Furthermore, even for each individual, "human nature" is not fixed. It is no more to be found in the crib (as the Watsonian Behaviorists believed) than it is to be found in Rousseau's hypothetical state of nature. Instead, it is a continuum, reflecting the life cycle of the organism itself. The child's brain triples in size within the first year, during and after which he is able to develop latent

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[109] Steven G. Vandenberg, "The Nature and Nurture of Intelligence," in Glass (ed.), op. cit., pp. 47-48. Vandenberg's conclusions have also been confirmed in extensive studies of newborns in recent years. See also, Vandenberg, "Hereditary Factors in Normal Personality Traits (As Measured by Inventories)," in Recent Advances in Biological Psychiatry (New York: Plenum Press, 1967), Vol. IX, chap. 6.

capacities, both intellectual and sensory.[110] Biological changes associated with puberty, pregnancy, lactation, menopause, senility and so forth also affect behavior in more or less obvious ways. Conversely, it is now appreciated that environmental influences are at work even while the baby is *in utero*. Thus, it is not possible to choose any one point in the biological life-cycle and designate it "human nature."

Perhaps the most eloquent, as well as authoritative, writer on the subject of genetic diversity is Dobzhansky, who has written:

> Human nature is not a constant. Instead of a single, invariant and unchanging human nature there are about as many different human natures as there are persons living. This does not mean, of course, that what a person is or can become is foreordained by his fixed nature, but neither are the genetic differences so insignificant as to be negligible....every human being is a genetically unique and unrepeatable individual....Mutation generates stores of variant genes; sexual recombination creates countless genetic endowments, genotypes, of individuals. Every individual is a biological experiment in adaptedness.[111]

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[110] Loren Eisely, *The Immense Journey* (New York: Random House "Modern Library," 1967) p. 109.

[111] "Genetics and the Social Sciences," in Glass, *op. cit.*, pp. 130, 132; see also *Mankind Evolving*, *op. cit.*, Chaps. 4 and 5.

CHAPTER SEVEN

SOME IMPLICATIONS FOR POLITICAL SCIENCE

From the preceding chapters it should be clear that there is no theoretical obstacle to analyzing and explaining human social and political behaviors, processes and institutions within the framework of concepts and evidence that constitute the synthetic theory of evolution. Some of the implications of such a paradigm for political science were touched upon above, but in this chapter we will deal with the implications in a more systematic manner.

In the first place, evolution is a process, not a trend or a goal. It is thus historical in nature but does not project any ultimate end. While certain evolutionary trends have been postulated at one time or another (such as decrease in entropy, maximization of metabolism, minimization of effort, increase in homeostasis, a growth in complexity, an increase in cooperation, and progress in feeling, knowing, willing and

understanding), there is no agreement on this point among biologists.[1] Indeed, as Simpson notes: "Whatever criterion you choose to adopt, you are sure to find that by it the history of life provides examples not only of progress but also of retrogression or degeneration."[2]

The main "causal agent" of evolution is natural selection, but it is not purposive; it acts rather as an editor. Whichever organic or behavioral processes "work" in the sense of enhancing the survival chances of an organism, its progeny and/or a deme are rewarded only in the sense that the probabilities are increased that those individuals or demes will survive and reproduce. Thus, natural selection converts partially random changes into apparent directionality. It cannot work

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[1] Summarized by George Gaylord Simpson, Biology and Man, op. cit., pp. 139-142.

[2] Simpson, The Meaning of Evolution, op. cit., p. 242; also chap. 15.

to complete a design and cannot plan ahead; it can only produce results of immediate biological advantage and has frequently led species into blind alleys that result in extinction.[3]

By the same token, cultural (including political) evolution in man must be viewed as an open, opportunistic process of adaptation. Specifically, the evolution of human societies must be viewed as an historical process in which human populations seek to satisfy specific survival and reproductive needs in specific environments. Thus, the particular configuration of a culture and the course of social change represent the resultant vector of a very large number of partial determinants. As mentioned above (p.234), no one causal variable determines the course of social evolution in all instances, Karl Marx and Tielhard de Chardin to the contrary notwithstanding.[4] Any social factor which effects reproductive

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[3] Huxley, Evolution in Action, op. cit., p. 48; Dobzhansky, Mankind Evolving, op. cit., pp. 17-18.

[4] Neither the evidence of evolution nor our records of human social evolution support anything but an open, contingent conception of social life. The evidence does not support the determinism or utopian postulates of either Marx or Tielhard.

efficacy represents a selection pressure of more or less significance. Cooperation, imitation, competition, wars and revolutions, military power (or possibly non-belligerent postures),education, innovation, technology, ideology, ethical precepts, political leadership, political institutions, political decisions, the behavior of external populations and so forth may all have survival consequences for particular individuals within a society and/or the society as a collectivity.

Because of the very nature of this process, it will never be fully susceptible to statistical control.[5] To begin with, most geneticists despair of ever being able to predict genetic changes in human populations--changes which are going on all the time.[6] This would be possible only if we knew the precise genetic composition of each individual member of a deme, if we could predict the pattern of assortative mating (and thus genetic re-

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[5] Simpson, This View of Life, op. cit., p. 189.

[6] Lerner, op. cit., pp. 186-187; Wallace and Srb, op. cit., pp. 7, 12; Stebbins, op. cit., pp. 173-174.

combination), if we could anticipate the outcomes of random mutations, and delineate the matrix of selection pressures (the ecological and sociological variables) which are operative at any time. Nor can human behavioral adaptations be predicted with certainty.

But to say that there are elements of randomness, or unpredictability, in the evolutionary process, is not to say that it has no structure at all. Because it is an historical process, it is cumulative. Evolution combines elements of continuity and change (both genetic and behavioral)[7], and it is certainly possible to get a better fix on the forces which have shaped our present world and are operative today. Moreover, if we cannot entirely predict or control our evolutionary future, we can greatly increase our leverage; long-run unpredictability may not rule out short-run regularities and probabilistic, "if-then" projections. Furthermore, to say that evolution has no goal is not to suggest that

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[7] Simpson, This View of Life, op. cit., pp. 71, 74, 76, 176-189.

its products--individuals and societies--are purposeless. In order to survive, individuals and the societies of which they are a part must actively seek to survive; the demands of survival and the efforts required to maintain a viable society are such that natural selection would "select out" any group not sufficiently diligent in the pursuit of survival.[8]

Because survival is such a basic, pervasive and unavoidable problem, the products of evolution must perforce be teleological systems--though in the cybernetics' rather than the metaphysicians' sense of the term. That is, all complex organic systems fit the cybernetics model of a self-controlling learning net and, as such, are endowed with systemic purposes--purposes which are inherent in the design and functioning of their systems, inclusive of their behavior. As Simpson observes: "The organization of organisms certainly has utility, and the evolution leading to them

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[8] Lewontin (ed.), op. cit., p. 2; also Wallace and Srb, op. cit., p. 3.

has that utility as a goal in a sense. That sense is, however, quite special and does not at all correspond with teleology in the classic meaning of correspondence with a preordained plan, with divine providence..."[9] This observation also applies to the macro level, to the collectivity--not by analogy or through the loose use of an organismic metaphor, but as a descriptive statement of the functional relationship of social structures to the survival problem of the species. This point was well summarized by ethologist Niko Tinbergen:

> The very nature of living things, their unstable state, leads us to ask: how is it possible that living things do not succumb to the omnipresent destructive influences of the environment? How do living things manage to survive, to maintain and to reproduce themselves? The purpose, end,

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[9] Simpson, This View of Life, op. cit., p. 173; On this basic point about evolution, see also Ibid., pp. 173-175, 100ff., 111ff., 134ff., 202, 210, 212; Deutsch, The Nerves of Government, op. cit., chaps. 5 and 6; Charles R. Dechert, "The Development of Cybernetics," in Dechert (ed.), The Social Impact of Cybernetics (New York: Simon and Schuster "Clarion Books", 1967); Norbert Weiner, The Human Use of Human Beings: Cybernetics and Society (New York: Avon Books, 1967); Morton Beckner, The Biological Way of Thought (Berkeley: University of California Press, 1968); and Alexander S. Fraser, "The Evolution of Purposive Behavior," in Heinz von Foerster et al., Purposive Systems, op. cit., p. 15ff.

> or goal of life processes in this restricted sense is maintenance, of the individual, of the group, and of the species. A community of individuals has to be kept going, has to be protected against disintegration just as much as an organism, which, as its name implies, is a community of parts... Just as the physiologist asks how the individual, or the organ, or the cell, manages to maintain itself by organized cooperation of its constituents, so the sociologist has to ask how the constituents of the group--the individuals--manage to maintain the group.[10]

Indeed, though it has been phrased in different ways throughout the centuries, this point is as old as Plato (see p. 141 ff.). Societies represent, quintessentially, a division of labor with respect to the satisfaction of basic needs.

Accordingly, every biologically distinct breeding population (whether it be a tribe, principality, city-state, or nation) can be conceived of as a collective survival enterprise. This term was chosen with care and requires some further explanation.

First, as was explained above, the basic survival unit for any group-living, sexually-reproducing species

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[10] Tinbergen, Social Behavior in Animals (London: Science Paperbacks and Methuen Co., Ltd., 1965), p. 2.

such as ourselves is the collectivity, although this fact does not--as will be explained below--invalidate individualist values.

Second, survival, even "mere" survival, is the basic problem for all societies. At very least, each new generation must be conceived, brought into the world, nurtured, trained, and perhaps most important, motivated to take over responsibility at the appropriate time for carrying on the survival enterprise. But more to the point, if our culture and technology have temporarily enhanced our survival potential and reduced selection pressures, short-run gains may have been purchased at the cost of long-run disaster. A partial list of some of the more pressing issues confronting us today makes it clear that even "mere" survival is uncertain and a continuing challenge. Consider: The population explosion, the exhaustion of natural resources, environmental (soil, air, water) pollution, social disorganization and all its pathologies, and, of course, the arms race.

A third point, and a further reiteration of what

has been discussed above, is that survival--as biologists use the word--does not just mean "mere" survival. Survival must be understood to connote an enterprise of varying complexity and requiring varying degrees of struggle and cooperation, depending upon the species, the particular population within the species and its particular ecological situation. Long-range survival involves not only the immediate problem of physical security, but also living in harmony with the environment and organizing society in such a way that priority is given to the interests of subsequent generations. (As biologists are fond of saying, evolution favors the offspring.)

It should also be noted that, although it may be biologically correct to characterize a human collective survival enterprise as a "breeding population," there are certain difficulties involved. In the contemporary world a biologically distinct breeding population may not necessarily be coextensive with a territorial or political unit, or with a self-sufficient economy. Furthermore, world communications, travel, trade, the

shared "biosphere" or "eco-system," and even world conflict have moved us toward greater interdependence. The exceptions and qualifications necessary for applying the concept of a collective survival enterprise to a given human society do not invalidate the concept. However, it may ultimately be necessary to expand the definition to take account of the growing internationalization of the survival problem. In the parlance of the systems analysts, each breeding population may ultimately have to be viewed as a subsystem in the global system, or global survival enterprise (see below).

What is being suggested here is that it is possible to "explain" the origin, nature and "purpose" of society in terms of our relationship to the processes of evolution and our on-going survival problem. Although it may be possible to postulate "ultimate" purposes, goals or value preferences beyond, or in addition to survival, survival is the sine qua non. Value choices of any kind require the existence of a mind, which consists of matter and energy organized into evolved organic systems. One must have survived to the point where any

given value choice is to be made, and life processes must continue to be sustained in order to engage in valuing activities. Survival, and survival-serving values, are thus prerequisites to any other value choices of any kind--except, of course, non-survival.

Presumably one could argue that men do have the freedom to choose non-survival, but such evidence as does exist on this point militates against such an hypothesis. Although we do have the power to be the cause of our own non-survival, it is this writer's contention that we do not ordinarily have the freedom to choose non-survival.

In the first place, as the products of natural selection, we are the "fittest," meaning not necessarily that we are the most aggressive, but that we have been tailored by evolution to be highly goal-oriented with respect to our survival needs (though we may or may not be conscious of the survival functions involved in meeting these needs). As should be clear from the previous chapter, there is increasing evidence that man has a repertoire of "innate" or pre-programmed

"preferences" for survival-serving behaviors (or at least for behaviors that have generally been adaptive in the past though not necessarily so today). Like other animal species, man has been endowed by evolution with internal sources of rewards and punishments as incentives for engaging in survival-serving behaviors. To deny this, one would have to contradict the theory of evolution and posit special creation.

In fact, because of the workings of natural selection--and the odds against continued survival (at least over the long run)--our ancestors must by and large have made adaptive value choices. And, because our very existence is predicated upon the survival and reproductive success of all the previous generations of our progenitors, we are prima facie evidence that survival-serving values were operative in the case of our ancestors and ancestor species.

Statistically, freedom of choice with respect to survival-serving values would require that any individual, if given an option between a survival and non-survival-serving value, would be equally likely to choose either

one. However, it should be possible to demonstrate empirically (if need be) that this is not the case. Given such a choice (assuming the choice is a clear one) most individuals can be expected to opt for the survival-serving value. Even the relatively infrequent cases of suicide may be explainable in most instances either as part of the variation to be expected in any species (as exceptions that do not disprove the rule) or as essentially altruistic acts--acts which may be interpreted as survival-serving for the collectivity, whether consciously intended as such or not.[11]

At the root of the modern weltanschauung is the value relativism stemming from David Hume's arguments in his Treatise of Human Nature (1739-40). Oughts, Hume argued, cannot logically be derived from "is"--from any fact in the empirical world. Hume went on to postulate human needs as the basis for a rationalistic ethics, but others have interpreted Hume's arguments as an attack upon all values. Of course, we cannot say

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[11]On this complex issue, see the extensive bibliography in Bulletin of Suicidology, March 1969.

with the certitude of a natural law theorist that man should survive, or should engage in survival-serving behaviors. On the other hand, we can say that, given the fact that survival is an unavoidable problem and that our value choices with respect to our survival needs are both inescapable and dichotomous (either survival-serving or maladaptive), then we will have to make adaptive choices if we do in fact want to continue to survive.

The conceptualization of society as a collective survival enterprise is not, it should be emphasized, equivalent to asserting that men necessarily pursue survival as a conscious goal. Regardless of the sources of our motivations or the subjective meaning we assign to our activities, all that the evolutionary paradigm requires is that we do have survival needs and that our actions have consequences for our survival and that of the species.

However, if we do accept the evolutionary paradigm, and if we also accept the argument that survival preferences are in fact operative, then

certain normative implications would appear to follow:

In The Nerves of Government, Karl Deutsch enumerates four possible orders of purpose: 1) Immediate satisfaction; 2) self-preservation; 3) preservation of the group or species; and 4) preservation of a process.[12] The first three orders of purpose, at least, seem to be evident in man and are reflected in his behavior. (The fourth might be considered to be implicit in man's relationship to the rest of organic life.) And from what we know of the priorities which are set by "the grand constructor" (natural selection), these purposes can be viewed as forming a hierarchy. The supreme purpose must be the long-run reproductive success of the deme. Self-preservation (and all of the activities which are implied in that term) is usually instrumental to group preservation, but in many cases individual self-interest must be subordinated to the needs of the group.[13]

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[12]Deutsch, op. cit., pp. 92-93.

[13]On this point, see Simpson, Biology and Man, op. cit., p. 147; Allee, op. cit., pp. 30-61, 96-153; and Klopfer and Hailman, op. cit., pp. 138-151.

(A corollary of this point involves the evolutionary status of intellectual freedom, individual creativity and other cherished democratic values. In subordinating them to a collective purpose, one need not abandon them. Quite the opposite. Generally, though not necessarily always, these values are adaptive. Our commitment to equality of opportunity, for example, is also sound genetic practice. As Dobzhansky notes: "If human abilities were not influenced by the individual genetic endowments, the social mobility or the constraints imposed on it would be biologically immaterial. An involvement of genetic variables makes social mobility both a biological and a cultural evolutionary agent of far-from-negligible consequence. Social mobility enhances the fitness of the population groups between which it occurs, and it may lead to the emergence of superior genotypes, which would be less likely to arise without mobility."[14])

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[14]Dobzhansky, "Genetics and the Social Sciences," in Glass (ed.), op. cit., p. 133.

By the same token, group-preservation and self-preservation must take precedence over immediate self-gratification--although as often as not self-gratification may also contribute to "higher" purposes and thus help to ensure that our survival needs are met. Sexual reproduction is an obvious example, but the "personal" satisfactions we derive from parenthood, social interaction and group participation operate in the same manner.

In terms of our evolutionary "purpose," therefore, there is no clearcut ethical dichotomy between the individual and the group. Rather, the problem is one of maintaining a dynamic balance between the two, a balance which may have to be adjusted frequently in order to maintain the adaptiveness of a society. The proper balance is not something that can be determined in all cases a priori. Each problem, or type of problem, may have to be weighed separately. But in theory, at least, there would appear to be three possible forms of self-serving behavior: 1) That which also contributes to the welfare of the group; 2) that

which is neutral in its effects on the group; and 3) that which is maladaptive, or detrimental to the long-run survival potential of the group.

Implicit in the above formulation of the nature and purpose of society is the idea that it should be possible to develop what Easton would call an empirical theory of politics--that is, an evolutionary theory of political life. Given the existential problem of survival, we should be able to analyze and "explain" politics (including ideologies, values, behaviors, decisions and institutions) in terms of its survival consequences. The basic question, then, would be: What effect, if any, does a particular political phenomenon have vis a vis the on-going survival problem of the collectivity.

Essentially, this would involve a functionalist approach to political analysis, but there would be at least five important distinctions between an evolutionary functionalism and other contemporary functionalist paradigms. First, the basic explanatory hypothesis and orienting value premise would be derived deductively

from an already well-established explanatory theory, as discussed above. (Indeed, acceptance of evolution compels a compatible explanation of politics.) Second, the basic hypothesis would be clearly and explicitly stated. Third, analytical criteria can be specified--human "needs" relating to survival and reproductive efficacy. Fourth, the analytical focus would be upon the survival, or "persistence" of a society, or societies, and not upon the survival of the political system per se. Politics would thus be subsumed as functionally related to the overall survival problem of a society (see below). Finally, we ought to be able to avoid some of the "fallacies" associated with previous functionalist paradigms. We need not assume that every recurrent activity is a functional requisite, or that every social or political phenomenon has survival consequences. And, given a clear enough specification of what the survival problem involves, we ought to be able to develop our functionalism inductively--from the observed relationship between a political artifact and the on-going survival problem.

Of course, as Meehan observes, functionalist explanations are only partial explanations. A full-fledged explanatory theory of politics ought to be able to account also for the origins and development of politics, the "causes" of political phenomena, and the "purpose," or purposes of politics. Obviously, it would be premature at this point to advance a fully articulated evolutionary theory of politics. But we can anticipate several facets of such a theory.

First of all, politics must be conceptualized as being the product of evolution and subject to natural selection. That is, a political system must be viewed as a functional division of labor within the collective survival enterprise; it represents an accumulation of evolved cultural responses to the problems of survival in specific natural and cultural environments. In fact, politics may represent a uniquely human adaptation. No other species, apparently, engages in comparable processes of decision-making for the collectivity, and it may well be that politics is an inevitable concomitant of man's interdependency coupled with his behavioral flexibility.

Of course, such a definition of politics contradicts that of power-oriented political scientists such as Robert A. Dahl. Dahl defines politics as that aspect of human behavior involving "power, rule or authority."[15] But if the problem of human survival typically involves interdependency and is thus a problem of collective goal-attainment, then the"nature," "purpose" and "functions" of politics must be defined in relation to the common "purpose" of the collectivity.

Just as an evolutionary conception of the nature and purpose of society accords with that of the Greeks, so does an evolutionary conception of politics. In Politics and Vision, Sheldon Wolin puts it as follows:

> From its very beginnings in Greece, the Western political tradition has looked upon the political order as a *common* order created to deal with those concerns in which all of the members of society have some interest.... The "commonness" of the political order has been reflected in...the basic belief of

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[15]Dahl, Modern Political Analysis (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), pp. 4-7.

> theorists that political rule is concerned with those general interests shared by all the members of the community.... Long ago Aristotle had insisted that the political association, by virtue of its superior comprehensiveness and purpose, had a stronger claim on men's loyalties than any lesser association, and that political membership was therefore superior to other forms of membership. In terms of function and purpose, a lesser association, such as the family or the religious group, served a limited good and hence could justifiably extract only partial loyalty. A political association, however, was conceived by him as promoting a more comprehensive good--that of the whole community--and hence was deserving of fuller obedience. (Italics added.)[16]

The Aristotelian conception of politics was not equivalent to the struggle for power. Nor was it equivalent to the role of refereeing the fights between contending interest groups. Nor was it merely a matter of vying for governmental benefits on the part of this or that interest. Quintessentially, the Aristotelian view fits the evolutionary conception of society as a goal-directed enterprise in which the "authoritative allocation of values for a society" (in Easton's phrase)[17]

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[16]Wolin (Boston: Little, Brown & Co., 1960), p. 433.

[17]Easton, A Framework for Political Analysis, op. cit., p. 29.

must have as its object James Madison's "permanent and aggregate interests of the community."[18]

In an evolutionary paradigm, therefore, power, rule and authority must be seen as a currency (as Deutsch puts it),[19] or as a means which may or may not be used for survival-serving ends.

Indeed, it should be emphasized that an evolutionary conception of politics does not require that everything governments or political leaders do be functional for the survival of the collectivity. As with any other aspect of social life, it is possible to speak of adaptive and maladaptive behaviors, political leaders or political systems, and part of the task of an evolutionary political science should be to make just such appraisals of political phenomena. On the

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[18]The Federalist, Madison 10.

[19]Deutsch, op. cit., pp. 120-122. This accords with Christian Bay's recent distinction between politics (decision-making in the public interest) and "pseudo-politics" (what Madison called "factionalism"). (Christian Bay, "Politics and Pseudo-Politics: A Critical Evaluation of Some Behavioral Literature," The American Political Science Review, Vol. LIX, No. 1, March 1965, pp. 39-51.)

other hand, from an evolutionary point of view, no one form of government is necessarily more adaptive; an evolutionary paradigm would not be ethnocentric. Nor is any one form of social organization, or any particular survival strategy, necessarily the "best." Adaptiveness is situation-specific, so that an evolutionary approach could as readily be used to justify a revolution as the status quo, depending upon the context.

Another important facet of an evolutionary theory of politics is that it should be applicable both at the "micro" level (to individual behaviors) and at the "macro" level (to the behavior of total systems and subsystems). Though analytically distinct for certain purposes, an evolutionary paradigm links micro and macro levels in at least four respects. First, each level can be delineated (and relevant data selected) in terms of the same basic problem--the problem of on-going biological survival. Second, the same Darwinian criterion--reproductive efficacy (and all that it entails)--is applicable at both levels.

Third, both levels are marked by analytical permeability. That is, they interpenetrate one another and affect each other. Though there are important qualifications and exceptions, in general the reproductive success of a deme is inseparable from that of the individuals within it. (As a theoretical generalization about the human animal, one would expect that the fit between the "wants" of the individual and the "needs" of the collectivity would be imperfect, like a Venn diagram.) Finally, both levels of explanation are ultimately dependent upon work that crosses several disciplinary lines. An evolutionary explanation perforce involves the inter-relationship among biological survival needs, evolved psychological characteristics, the natural environment, intra-specific cultural environments (both external and internal), as well as the functional (survival) consequences of behavior in specific situations.

Indeed, the problem of survival and reproduction in complex human societies may have to be conceptualized in terms of several interdependent layers. Take, for example, an individual living in a large city. His

survival problem is partly one of a purely personal nature. Given the means at his disposal (including his genetic and culturally acquired equipment), and given the configuration (and hazards) of his specific social environment, he must attend to a number of personal and family needs. Yet, whether he is aware of it or not, that individual is also dependent upon many others in his community, as well as public services, city and state governments, major subsystems of the American economy, the Federal government and international politics--to the extent that events and activities at each of these other levels (or among them) affect his personal chances of survival and reproductive success. (As noted above, the increasing internationalization of many survival-related activities suggests that to some extent we are dependent upon a <u>global survival enterprise</u>.)

In other words, an evolutionary theory of politics should be applicable at all levels of analysis--from the behavior of individuals to the international system (where we should be able to evaluate the systemic

behavior of nations, groups of nations and various international organizations in terms of its survival consequences for individual societies and for the international system as a whole). Such analyses must be conceived broadly, however, so that the problem of survival at the international level is not reduced to national defense. (In this respect, see the pioneering work by Harold and Margaret Sprout on the role of man-milieu relationships in international politics.)[20] Indeed, a logical next step might be the formal development of an evolutionary-adaptive paradigm for analyzing and explaining international politics.

By the same token, an evolutionary paradigm might fruitfully be applied to systematic, functional comparisons between nations and their socio-economic and political systems (comparative politics). An

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[20]Harold and Margaret Sprout, The Ecological Perspective on Human Affairs (Princeton: Princeton University Press, 1965), and "Environmental Factors in the Study of International Politics," in James N. Rosenau (ed.), International Politics and Foreign Policy: A Reader in Research and Theory (New York: The Free Press, 1969), pp. 41-56.

evolutionary approach would be particularly concerned with such matters as the way in which each society has organized its survival enterprise, its basic survival strategy (see below), the functional relationship of its government to the total survival problem (see below), and the relative effectiveness of various societies in maximizing their long-run survival chances, given their particular ecological, cultural and external human environments.

An evolutionary approach may be particularly relevant to the analysis of "development." As noted above (pp. 155-157), until very recently, development was all too often defined in terms of the "progress" of a society in providing goods and services.[21] Or, to be precise, the problem of development was delimited by what was required for a "developing nation" to achieve a socio-economic system and level of living

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[21]For a sampling of the literature on development, see especially: Gabriel A. Almond and G. Bingham Powell, Comparative Politics: A Developmental Approach (Boston: Little, Brown & Co., 1966); David Apter, The Politics of Modernization (Chicago: University of Chicago Press, 1965); C. E. Black, The Dynamics of Modernization (New York: Harper & Row, 1966); and Jason Finkle and Richard W. Gable, Political Development and Social Change (New York: John Wiley & Sons, 1966).

comparable to that of the industrialized countries. (Political development was, of course, seen as a necessary prerequisite or concomitant of this process.) Thus, development was not ordinarily defined in terms of any fundamental life-and-death problems. Furthermore, development was generally assumed to be a good thing.[22]

In the past few years, however, there have been some serious second thoughts on this issue.[23] Samuel P. Huntington, for example, has introduced us to the converse problem of political decay,[24] and Gunnar Myrdal

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[22]This assumption was often justified on the ground that it accorded with the value premises and goals of the developing nations themselves. Seldom raised was the question of whether or not the goals of the developing (and, perhaps more important, the developed) nations might be misguided.

[23]See especially: Claude E. Welch, Jr. (ed.), Political Modernization: A Reader in Comparative Political Change (Belmont, Calif.: Wadsworth Publishing Co., 1967); Charles W. Anderson, Fred R. von der Mehden and Crawford Young (eds.), Issues of Political Development (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967); Harvey G. Kebschull, Politics in Transitional Societies (New York: Appleton-Century Crofts, 1968); and Samuel P. Huntington, Political Order in Changing Societies (New Haven: Yale University Press, 1968).

[24]Samuel P. Huntington, "Political Development and Political Decay," World Politics, XVII (April, 1965), pp. 386-430.

(among others) has challenged the conventional attitude that Western countries are necessarily good models for "developing" nations.[25]

Perhaps the point of view most closely akin to the evolutionary perspective, though, is that of Fred von der Mehden. As noted above, he has urged political scientists to reduce the concept of political development to its "lowest common denominator"--the ability of a political system to provide security and the necessities of life for its people.[26] This meshes quite well with what one might expect of an evolutionary conceptualization of the nature and purpose of the political system; it relates the system functionally to a society's basic survival problem, with all its many ramifications, while shifting the focus away from more ethnocentric Western conceptions of development. In other words, we could define development empirically as the enhancement of a society's long-run survival

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[25]Gunnar Myrdal, Asian Drama (New York: Twentieth Century Fund, 1968).

[26]Fred von der Mehden, Politics of Developing Nations (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964).

chances; and it may be that part of the explanation for the attractiveness of Western nations as models is their apparently greater success in coping with the basic survival problem.

Equally significant, an evolutionary theory of politics may be capable of linking "is" and "ought" questions within a single theoretical paradigm. In addition to providing a framework for the empirical (functional) analysis of politics, an evolutionary approach permits us to ask: What behaviors, institutional arrangements and policies ought a particular society to pursue if it wishes to maximize its survival chances. In other words, an evolutionary policy science would be consistent with a value-free evolutionary science of politics.

Another possible application of evolution is to explanations of specific categories of politically-relevant behavior. For instance, this writer is developing an evolutionary-adaptive model of human aggression based on the approach discussed above and some projected experimentation at the Institute for

Behavioral Genetics. This writer is also developing an evolutionary-adaptive approach to leadership and leader-follower relationships--from tribal chieftainship to the leadership of revitalization movements and the "institutionalized Presidency." This will involve such considerations as the evolutionary origins of leadership, the survival functions of leadership, "adaptive" versus "maladaptive" leadership, and the question of what factors (biological and cultural) may be involved in the selection of leaders. Likewise, an evolutionary approach may be able to enrich our explanations of such major political phenomena as war and revolution, nationalism, stratification, and organizational behavior.

Finally, it would appear that an evolutionary theory of politics would be capable of providing us with the theoretical core that has been missing (or hidden) in the macro-theoretical frameworks that have been put forward in political science in recent years. As noted above, while these paradigms were put forward as empty analytical frameworks, as heuristic devices,

nonetheless they embody the implicit assumption that the "real" world--which these models are after all supposed to help us analyze--does in fact have a purpose. That is, the real system is teleological or goal-directed.

From the vantage point of an evolutionary perspective, we can perceive that functionalist, communications and systems paradigms are, after all, not merely misbegotten organismic analogies, but intuited descriptions of the empirical world which have been transmogrified into abstract analytical frameworks. What I am suggesting is that we need not abandon the functionalist, communications, and systems frameworks in order to utilize evolution as an explanatory theory. We need only make a proper linkage between the theory of evolution and these paradigms. As should be clear from the above, evolution does not start with an analytical framework or a methodology and then go searching for problems or values to plug into it. Rather, it starts with a major hypothesis about the nature and purpose of society, postulates values

instrumental to that purpose and remains open about the particular framework or methodology appropriate to the application of that theory. (Indeed, it may be that most of the approaches developed by social scientists in recent years--including functionalism, communications models, systems analysis, decision-making theory, game-theory, energy transfer models, and so forth--may be suited to the analysis of one or another aspect of the total survival enterprise and may therefore prove useful in operationalizing an evolutionary paradigm in political science.)

In sum, it would appear that the theory of evolution is capable of serving as the basis for a general theory of political life--normative and empirical, comparative and international. Evolution seems applicable to all of the major substantive concerns of political science and holds the promise of providing us with a fully developed explanatory theory; ultimately, an evolutionary paradigm should be able to provide answers to the kind of questions that have not been faced by other contemporary frameworks: How do political

systems come into existence; why do they exist; what are the necessary conditions for their persistence; and what are the conditions under which they break down?

Such a theory need not, moreover, be fabricated from the whole cloth. Instead of creating a separate and distinct theory of politics, an evolutionary explanation would represent only an additional facet of the theory of evolution. Indeed, it is already implicit in the theory of evolution. As noted above, if the implications of evolution are fully accepted, no other explanation of politics is possible; evolution requires a compatible explanation.

Thus, while it may be true that we do not as yet have a distinct body of "laws" of political behavior (as Meehan notes), the theory of evolution provides a body of laws, law-like propositions, empirical evidence and analytical criteria (see chapter VIII) which embrace all human life, inclusive of political life.

For example, the implicit hypothesis contained in contemporary analytical paradigms that societies and

their political systems are goal-directed, cybernetic systems is supported by the entire corpus of knowledge accumulated by various disciplines about the nature of evolution in general and about human evolutionary history in particular, as suggested above. Only if we deny the existence of the survival problem can we reject the hypothesis of goal-directedness.

By the same token, the evolutionary paradigm provides empirical support for a functionalist approach to the analysis of political behaviors and structures. Functionalist frameworks can be of more than merely heuristic value to political science, assuming they are properly designed (so as to avoid the fallacies described by Young) and provided that evolutionary criteria are utilized. An evolutionary functionalism should be able to generate explanations either of specific political phenomena or of total political systems in terms of the on-going survival problem.

Let us consider, for example, the question of macro-level or systemic functions. The ultimate determination of what functions politics and political

systems perform for the collective survival enterprise must, of course, be determined empirically. But for the sake of discussion, let us take Talcott Parsons' typology as a point of departure.

As noted above (pp. 45-48), Parsons postulates four macro-level functions as requisite to the persistence of any "action system": 1. pattern maintenance, that is, "maintenance of the highest 'governing' or controlling patterns;" 2. internal integration; 3. "orientation to the attainment of goals" in relation to its environment; and 4. "adaptation to the broad conditions of the physical environment" (italics added).[27]

In discussing Parsons' typology above, it was noted that Parsons allocates his functions to specific social structures in such a way that goal-attainment is considered primarily the province of the political system, or "polity." On the other hand, pattern maintenance is performed "primarily" by religious

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[27]Parsons, Societies: Evolutionary and Comparative Perspectives, op. cit., p. 7.

groups and the family, while integration is associated by Parsons with the "law," or legal system, and adaptation is identified with the "economy."[28]

Unfortunately, there are a number of problems with such a formulation. Though religious groups may frequently (even usually) perform a pattern-maintaining function, they have also upon occasion spear-headed social movements (witness the Christians in Rome, the Puritans in England and, more recently, Martin Luther King's Southern Christian Leadership Conference in the United States). Again, Parsons tells us that the integrative function is performed preeminently by the "Law." But experience tells us that the law may also be disintegrative; it may become an instrument of inter-group conflict and oppression. Furthermore, the law (at least positive law) is a principal tool by which modern polities perform their goal-attainment functions. Likewise, the law may perform some pattern maintenance. Thus, all four of

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[28]Parsons, "The Political Aspect of Social Structure and Process," loc. cit., p. 106.

Parsons' functions may be in evidence within the legal system of a modern nation-state, and it would be difficult to determine empirically which of these functions takes priority at any given time. (At the other end of the political spectrum, an argument could also be made that a charismatic leader might perform multiple functions for the collective survival enterprise: goal-attaining, adapting, integrating and perhaps some pattern-maintaining as well.) In short, Parsons may have achieved conceptual simplicity at the sacrifice of empirical precision.[29]

Even more serious is the fact that there may be in any existential process or social structure a considerable overlap of functions. For example, if we interpret adaptation in broad evolutionary terms rather than limiting ourselves to Parsons' more narrow economic definition, it may become difficult at times to make a

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[29]There are other conceptual problems too. For instance, General Motors engages in goal-attaining activities which may have consequences for the collectivity. Are such activities political? And does that mean GM is part of the political system?

sharp distinction between goal-attainment and adaptation. Many consciously pursued "goals" (especially those that are pursued by political systems) may also represent important survival-serving (or survival-jeopardizing) adaptations for a society. Some adaptation may not entail consciously pursued goals, but some clearly does. Conversely, some goal-attaining activities may not involve survival-related adaptations, but some clearly does.

Accordingly, Parsons' typology requires modification if it is to be used as a working hypothesis.

First, it would seem necessary to distinguish between goal-attainment with respect to the overall survival problem and those functions and activities which are instrumental to that goal. In other words, functions such as adaptation, integration, pattern maintenance and goal-attainment should all be subsumed under the overarching goal of collective survival. (Perhaps, for the sake of clarity, the Parsonian goal-attainment function might be referred to as "sub-goal" attainment.)

Second, in accordance with the conceptualization of politics put forward above, all four of Parsons' functions,or ones that are conceptually similar, might be encompassed in the activities of government, although that is not to say that all governments necessarily perform such functions. One would expect that the degree to which the political system performs the kind of functions postulated by Parsons would vary from one society to another, and probably within the same society at different times. Nor need we necessarily expect that political systems will always perform these functions adequately (see Chapter VIII). As suggested above, we may indeed be able to speak of adaptive and maladaptive policies, leaders, institutions and political systems.

Third, as indicated above, we can expect that any taxonomy of analytically distinguishable functions will prove to be intertwined with one another in the empirical world--or perhaps even in conflict with one another. For example, the pattern maintenance function might well be performed in such a way, or so

effectively, that needed adaptive responses are blocked--or in such a way that the political system becomes a disintegrative rather than an integrative force.

Furthermore, it should be reiterated that an evolutionary paradigm does not require that everything government or political leaders do be functionally related to the survival problem of a society. Some activities may be maladaptive, or even completely unrelated to the survival problem. As noted above, even neutral behavior can be accommodated within an evolutionary framework, which predicts random changes, imperfect copying, and "drift" within the boundaries set by existing selection pressures. That is, a society living comfortably above the margin of survival might be able to afford many behavioral luxuries beyond survival needs--though perhaps not indefinitely.

Finally, goal-attainment as related to the over-arching survival problem must be understood to embrace a possibly very large array of behaviors and activities (or "sub-goals"), some of which may not be consciously

directed toward the meeting of survival needs. As pointed out above, goal-directedness may be impelled by our very nature as living systems, but we may only be able to perceive that goal ex post facto--as the resultant vector, so to speak--of our activities.

On the other hand, many human societies may, particularly through their leaders, more or less consciously pursue systemic survival strategies--strategies against nature (or the eco-system) and/or against other societies. A preliminary typology of such systemic survival strategies might consist of the following: 1. Homeostatic strategies--or strategies designed to stabilize a population in relation to limited resources; or 2. Expansionist strategies. Under expansionist strategies, we might then distinguish several varieties: a. territorial expansion (Nineteenth Century America); b. maximum exploitation of one's internal resource base; c. external trade, permitting a society to sustain a larger population than its internal resource base could support unaided; d. exploitation of the resources of other societies; or e. a combination of the above strategies.

Pursuit of any given survival strategy might then include all manner of "sub-goals" and governmental programs--armies and navies, treaties, scientific research, trade agreements, educational systems, the allocation of resources or of specific survival requisites, and so forth. Indeed, the activities of a political system in furtherance of a society's survival can be expected to reflect a number of situation-specific variables--the physical environment and its challenges, the external political environment, the basic strategy, or strategies, by which a society pursues its survival needs, the kind of technology employed by a society, internal social and political relationships and unique historical factors. In other words, the need for political activity ranges on a continuum from simple, egalitarian hunting or herding societies which exhibit a homeostatic fit with their environments, on the one end,[30] to societies

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[30]Lucy Mair, Primitive Government (Baltimore: Penguin Books, 1964), Introduction; Morton H. Fried, The Evolution of Political Society (New York: Random House, 1967) Chap. 3; Ronald Cohen and John Middleton (eds.), Comparative Political Systems (Garden City, New York: Natural History Press, 1967), Introduction.

in which the need for an adaptive response has become so acute that we have on our hands what Ralph P. Hummel has called a "pre-charismatic crisis"[31] (the frequent outcome of which is some sort of "revitalization movement"[32]).

In light of all this, let us reconsider now some of the issues raised in Chapters I to IV above.

One issue concerned what constitutes a scientific theory. Needless to say, evolution is an empirical, explanatory theory based on a large and rapidly expanding body of laws and law-like propositions about

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[31]Hummel, op. cit.

[32]Anthony F. C. Wallace, "Revitalization Movements," American Anthropologist, Vol. LVIII, No. 2 (April 1956), pp. 264-281. Wallace defines a revitalization movement as a "deliberate, organized, conscious effort by members of a society to construct a more satisfying culture" (ibid., p. 265). He includes in his concept a great variety of social movements (including cargo cults, religious revivals, reform movements, utopian communities, revolutions, charismatic movements, etc.), and though he does not link such phenomena explicitly to the theory of evolution (as adaptive responses), they certainly fit well into an evolutionary paradigm.

the historical development, morphology and behavior of organic systems. Following Meehan's typology, the theory of evolution purports to be able to explain the causes, development, functions and "purposes" of all of organic life, both human and non-human. Whether or not evolution can also succeed in providing an adequate explanation of human political life in particular remains to be seen, of course, but the explanatory power of evolution with respect to other aspects of human life would suggest that it can, and that pessimists such as Wasby, Meehan and Kaplan are wrong.

A propos of Kaplan's arguments in particular (pp. 21-22), it should be apparent that a "completely general theory" need not consist of a single, sweeping, pablum-like proposition. It may consist of a system of integrated and mutually consistent explanatory hypotheses about various aspects of a complex process. Furthermore, evolution also permits comparison and contrast; a particular concern of ethologists, in point of fact, is the similarities and differences

among the behavior of different species (and different populations within a species), and there appears to be no obstacle to doing the same with human societies and their political systems, as suggested above.

A second issue raised above involved the distinction between normative and empirical theory. For the sake of erecting a self-consciously empirical science of politics, it may have been useful at an earlier juncture to distinguish between the philosophical systems of the past and scientific, explanatory theory. But in reality, the distinctions between the "great books" and contemporary theory are methodological rather than substantive. As noted above (pp. 24-25), theories about human behavior, as distinct from theories about the behavior of neutrinos, must ultimately be linked to the motivational roots of human behavior--both biological and psycho-social. Easton's own systems analysis framework would seem to support this contention. "Empirical theory," then, must consist of causal explanations derived from the linkages between

motivational data and behavioral outcomes. And, what Easton calls "normative theory" consists of empirically-based prescriptions for maximizing the values derived from postulated motivations (or value bases).

Now, in terms of the basic mental operations involved, the distinctions between major theorists of the past and the present boil down to two. First, the "philosophers" combined causal explanation and prescription in a single system of thought. Given certain assumptions about the nature of man and society, and about what values were in fact operative, a Plato, Hobbes or Rousseau proceeded to deduce and prescribe certain kinds of social and political arrangements as maximizing devices, so to speak. Modern empirical theorists do not do this. Even if certain values can be demonstrated to be operative, prescription (or policy science) is treated as a separate operation having no necessary connection to descriptive theory.

The second distinction between theorists of the past and present relates to the standards of evidence.

The "philosophers" derived their premises from common sense, from supposedly self-evident axioms, or from unsystematic observation and description. Once the premises were accepted as true, however, the conclusions followed with the same kind of logic employed by modern theorists.

In other words, the fundamental distinction between the theory of evolution and the Aristotelian or Lockean systems are methodological and procedural; evolution has in its favor, not a superior form of logic, but rather the weight of scientific evidence. Also, following current practice, evolutionists maintain the distinction between description and prescription--though, as suggested above, both operations are derived from the same theoretical basis, as was true of the theorists of the past.

A third issue concerns the implicit premise, or normative principle, contained in contemporary macro-theoretical paradigms (pp. 25-26, 58-59). As noted above, the theory of evolution fully supports the hypothesis that society as a whole may be treated as a cybernetic system; again, the hypothesis of

self-regulation with respect to some specified goal-state is not a false analogy. On the other hand, the question of whether or not political systems are also goal-directed, cybernetic systems hinges upon whether or not political systems can be shown to be functionally related to the overall survival problem of a society--whether or not political systems may rightly be treated as open systems which can be defined and explained in terms of the larger system constituting the collective survival enterprise. The ubiquity of politics (as distinct from "The State") and the evidence that politics does have survival consequences suggests that this is so (though it may be that a rigorous defense of this hypothesis will be required before the critics of functionalism--and the Marxists--are satisfied).

In any event, as pointed out above, the "goals" of politics must be defined in terms of the persistence problem of the collectivity and not in terms of the persistence of political systems <u>per se</u>. Indeed, the hypothesis that political systems are above all oriented

to their own persistence may well be the very definition of a pathological, or maladaptive system (see Chapter VIII).

Another major issue concerns the criticisms that have been raised against existing theoretical paradigms (see Chapter III). First, there is the charge that existing frameworks are not sufficiently interesting; they seem to be confined to listing functions or describing processes without really "explaining" them (pp. 65-66). As suggested above, hypotheses of goal-directedness are in evidence, even if they are only implicit. Still, these paradigms do fail to meet the criteria of full-fledged explanatory theories, a deficiency that an evolutionary paradigm should ultimately be able to overcome.

Second, there is the question of whether or not systems paradigms are applicable to social and political life (p. 67 ff.). It was noted above that this line of criticism must stand or fall on the issue of whether or not social and political systems may properly be conceptualized as being goal-directed.

And the answer suggested by the theory of evolution is yes; political systems may be so conceptualized.

Also, there were various criticisms relating to the charge that existing paradigms defy operationalization (pp. 70-75). Specifically, these paradigms are criticized for: 1. deriving functions deductively; 2. failure to specify the criteria for defining functional relationships; 3. failure to provide empirical support for the basic hypothesis of functional requisites; 4. insufficient specification of key variables; 5. inadequate linkages between theoretical concepts and empirical phenomena; 6. failure to specify system boundaries; 7. failure to specify the permissible range of variation of the variables; 8. overformalization; 9. preoccupation with processes to the neglect of outcomes; and 10. the lack of predictive ability.

Some of these criticisms have already been dealt with above, either implicitly or explicitly. For example, we have already discussed the need to derive functions empirically from the observed survival

consequences of politics in specific political systems. In the discussion above it was also pointed out that reproductive efficacy is the basic analytical criterion employed by evolutionists (also, see Chapter VIII), and that the function of any artifact must be related to its ultimate contribution to the survival and reproductive efficacy of a deme. Likewise, the specific biological and psycho-social needs related to survival and reproductive success are posited as the explicit and empirically determinable variables. Functional requisites must in fact be related ultimately to the meeting of these needs.

In the same vein, the problem of linking analytical concepts to the empirical world may be overcome in an evolutionary paradigm by the simple expedient of avoiding analytical constructs in favor of the direct application of analytical criteria to empirical phenomena. By the same token, the problem of defining system boundaries may be overcome by dealing with empirical systems--that is, with actual, interdependent populations of human beings. By

dealing with explicit analytical criteria in empirical systems, moreover, we can avoid the traps of over-formalization and overemphasis upon processes as against outcomes.

The question of predictive capability is more difficult, however. Because social scientists have only recently begun to work within an evolutionary and biological paradigm, the predictive capability of the theory of evolution remains relatively untested, at least with respect to human social and political phenomena. On the other hand, we may reasonably expect eventual success along these lines. For example, it might be predicted that a strong negative correlation will be found to exist between organized political violence and the relative success of a regime in assuring various specific survival requisites to its population (an hypothesis which corresponds closely with Wallace's explanation of revitalization movements). The apparent linkages between revolution and poverty (particularly in association with a highly skewed distribution of income, etc.) and between revolution

and defeat in war have been noted, if not as yet formalized and fully tested.[33]

As for the criticisms mentioned above of specific analytical paradigms, many would seem to be avoidable with the use of an evolutionary framework. An evolutionary approach would be anything but static, a criticism ascribed to functionalism (pp. 76-77). It would emphasize, instead of obscuring, the criteria by which values are allocated and the survival consequences (or outcomes) of politics, a charge levelled at Deutsch (p. 77). Likewise, an evolutionary approach could overcome Holt's vagueness about the relationship between "external" changes and internal political changes and, at the same time, avoid his crude stimulus-response determinism with respect to that interrelationship (p. 78).

Finally, an evolutionary paradigm can correct (or clarify) some of the conceptual issues relating to

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[33]Of course, Gurr's data indicating a linkage between "relative deprivations" and political violence would seem to support this hypothesis (supra, chapter V, footnote no. 62).

Easton's paradigm (pp. 79-86). In particular, by focussing upon the empirical system rather than an analytical construct, and by focussing upon the "persistence" of the gene pool rather than the political system (thus subordinating politics to a larger, systemic goal), we can surmount, I believe, the problems Easton encountered with the concept of persistence. First, we can clarify and explain Easton's apparently inadvertent identification of his political system with the persistence of society as a collectivity. Second, we can resolve in Easton's favor his implication of goal-directedness on the part of his political system (and those who operate it); it is not necessary in an evolutionary paradigm to obscure purposive behavior so as to conform to a postulated stimulus-response (or, input-output) model. But most important, the evolutionary approach does not postulate, or even suggest, that the persistence of the political system be the orienting value premise for the analysis of political behavior. Again, politics is subordinated in an evolutionary paradigm to the overall survival problem of a society.

A fifth major issue raised above involves the conceptual similarities and differences between various contemporary theoretical approaches. In the first place, as noted above, evolution supports the common hypothesis of systemic goal-directedness. However, the evolutionary perspective fits some paradigms better than others. Easton's focus is upon goal-directedness on the part of the political system. He does not assert explicitly that the process of authoritatively allocating values is functionally related to the persistence of a society, whereas Parsons subordinates politics to the persistence needs of the social system. On the other hand, the Parsonian system still leaves something to be desired. The social system is only an analytical construct built out of units of consciously pursued "social action." Ecological and biological factors are not really causal variables in his system.

Likewise, Robert Holt links political change deterministically to "events" in the social environment of a political system, thus arbitrarily

excluding other possible causal variables which would be included within an evolutionary paradigm. (At least Easton, Almond, Deutsch, Parsons and others managed to avoid postulating a crude determinism, albeit at the sacrifice of theoretical elegance and rigor.)

Of all the macro-theorists, perhaps Mitchell (pp. 51-52) is the most compatible with the evolutionary paradigm, although none are entirely compatible without major modifications (as the discussion of Parsons' typology above suggested). Mitchell defines politics as involving goal-attainment for the larger society. Unlike Parsons and Easton, moreover, Mitchell recognizes possibly unconscious needs and expectations, as well as material resources and conscious demands, as inputs into his system. Also, Mitchell includes "system goals" among his outputs, in addition to values and costs.

Finally, there is the issue of how the Darwinian theory of evolution relates to the tradition of discourse and to the various postulates of social and political

evolution (Chapter IV). In order to avoid a lengthy and repetitive discussion, I will merely summarize here some significant features of an evolutionary view of society in contrast to those found in the tradition of discourse.

In the first place, evolution supports, and even compels, a perspective in which the origin, nature and purpose of society are explicitly related to the meeting of basic human needs. Reciprocity based on a division of labor is a fundamental characteristic of society. Moreover, the basic needs must be recognized to be continuing; the ever-present possibility of non-survival must always figure in any set of assumptions about contemporary society. However, all of these points were often obscured or overlooked in the past.

Equally unwarranted were the frequent assumptions by a theorist that the era in which he wrote represented a peculiar "flowering" (e.g., Enlightenment thinkers), or that social processes are directed toward some ultimate end, or goal-state (Hegel, Spencer, Marx, de Chardin). Although conceptions of human

social life as a unique, cumulative historical process conform with the evolutionary weltanschauung, one cannot assume social "progress," as past theorists often did. Things change, but they do not necessarily "develop." And past "trends" are not necessarily predictive of the future. Indeed, postulates of unilinear determinism are a contradiction of evolutionary theory.

In particular, human mentation does not "determine" social life but is only one of several variables and is always confined by the imperatives of survival and the contours of the natural environment. (Perhaps Montesquieu was the closest in spirit to the evolutionary perspective.) On the other hand, the Burkean and Aristotelian emphasis on the role of cumulative adaptations ("tradition" in Burke's case and the "law" in the case of Aristotle) downgrades the role of intelligence. Both "tradition" and "rational" adaptations may have adaptive value and thus be of evolutionary significance.

As for assumptions about human nature, those theorists who postulated either a crude hedonism (Epicurus, Hobbes) or else natural innocence (Rousseau, Marx) were equally erroneous. The sources of human motivation are biologically based, have their origins in the workings of natural selection (pre-dating to a considerable extent the emergence of man) and are exceedingly complex. Man evolved as both a social animal and a predator, a competitor and a cooperator, a problem solver and an imitator--because all of these characteristics proved to have adaptive value. By the same token, man continues to evolve and his "nature" is not forever fixed.

To summarize, then, the theory of evolution represents an intellectual challenge to every political scientist. Not only must we incorporate an evolutionary perspective within the discipline, but we must learn how to apply evolution to the analysis of political phenomena--a formidable task.

Toward that end, though, the problem of operationalizing an evolutionary paradigm at the macro level

will be explored in the following chapter along with one possible analytical approach--an effort to delineate with a greater degree of precision the basic parameters of an adaptive society for use as a baseline against which to evaluate particular societies and their political systems.

CHAPTER EIGHT

TOWARD A FRAMEWORK FOR DARWINIAN MACRO-ANALYSIS

In recent decades, political scientists have tended to focus upon human relationships--leadership and followership, social and economic groups and classes, political organizations (parties, legislatures, etc.), as well as the relationships between levels of government, and between nations. As a result, we have tended to give short shrift to man's relationship to his environment, or, more precisely, to the ways in which a population interacts with its various environments (internal, external, "natural," and human) with respect to the basic problem of survival.

Yet, as suggested above, a fundamental element of any effort to operationalize an evolutionary paradigm in political science must be a set of criteria for analyzing societies with respect to how well or poorly they are coping with their on-going survival problems; a prerequisite to empirically-based evaluations of politics from an evolutionary perspective must be some

sort of baseline for assessing the evolutionary adaptiveness of a society. We must focus upon the interrelationship between: a. the natural and external human environment (their challenges, opportunities and limits in terms of the survival problem); b. the basic survival needs of a particular population; c. the repertoire of behaviors (or survival strategy) employed by a population for satisfying those needs in that environment; and d. the genetic "fitness" of the population.

With this approach in mind, I will here explore the possibility of creating an array of survival-relevant "indicators." An indicator is a measure designed to give us either continuous or periodic information about some aspect of a system. For example, the gauges on the instrument panel of an airplane, or spacecraft, give the pilot, or astronaut, information about the condition and performance of his craft. Similarly, the economic indicators which have been in use in Western countries for many years tell us a great deal about the condition of our economic systems. Within the past few

years, social scientists have also given serious thought to the development of "social indicators,"[1] and the concept of survival-relevant indicators grows out of this work. The basic strategy is to effect a meld between the concept of indicators and the theory of evolution,[2] the object being to devise a way of obtaining

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[1] See especially: Raymond A. Bauer (ed.), Social Indicators (Cambridge: M.I.T. Press, 1966); Bertram M. Gross (ed.), "Social Goals and Indicators for American Society," Annals of the American Academy of Political and Social Science, Nos. 371, 373 (1967); Gross (ed.), Social Intelligence for America's Future (Boston: Allyn and Bacon, Inc., 1969; Eleanor B. Sheldon and Wilbert E. Moore (eds.), Indicators of Social Change (New York: Russell Sage Foundation, 1968); Otis Dudley Duncan, "Social Forecasting: The State of the Art," The Public Interest, No. 17 (Fall 1969), pp. 88-118; Daniel Bell and Mancur Olson, Jr., "Toward a Social Report," The Public Interest, No. 15 (Spring, 1969), pp. 72-97; U.S. Department of Health, Education and Welfare (USDHEW), Toward a Social Report (Washington: Government Printing Office, 1969); and Michael Springer (ed.), "Political Intelligence for America's Future," Annals of the American Academy of Political and Social Science, No. 388 (1970).

[2] Perhaps the most concise definition of what the proponents of social indicators envisage is contained in a report on the subject to the President of the United States from the U.S. Department of Health, Education and Welfare, Toward a Social Report: "A social indicator, as the term is used here, may be defined to be a statistic

a fairly comprehensive picture of the overall evolutionary adaptiveness of a society. Once such a set of indicators exists, we could then proceed to collect relevant data for any particular society and apply it to our baseline. Not only could we then make empirical evaluations of individual societies, but we could also make systematic comparisons between societies. This in turn would lead us to questions about the kind of survival strategy a society had been pursuing and about whether or not its political system was performing adequately its basic "steering," pattern-maintaining, integrating and adapting functions. Furthermore, to the extent that we could link particular indi-

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of direct, normative interest which facilitates concise, comprehensive and balanced judgments about the condition of major aspects of a society. It is in all cases a direct measure of welfare and is subject to the interpretation that, if it changes in the 'right' direction, while other things remain equal, things have gotten better, or people are 'better off.'" (op. cit., p. 97.) Now, if we simply substitute in the definition above the phrase "long-run survival" for "welfare", and if we interpret the phrase "things have gotten better or people are 'better off'" to mean that a society's long-run survival chances have been enhanced, we could employ the same definition for the concept of survival-relevant indicators.

cators to particular behaviors, institutions, policies, etc., we could make evaluations of specific social and political phenomena. In other words, once we have empirically-grounded criteria for evaluating the whole, we would be in a better position to analyze the parts in relation to the whole. In outline, this strategy would involve four steps: 1. develop a set of general criteria, or indicators, of evolutionary adaptiveness; 2. collect data for any specific population under study; 3. assess the adaptiveness of the population in relation to these indicators; and 4. attempt to link this assessment to specific cultural and/or political artifacts.

The full fruition of such a strategy is, needless to say, an ultimate rather than proximate goal, but it is hoped that the following discussion will represent a first step.

As mentioned above, the ultimate criterion of evolutionary adaptiveness is reproductive efficacy. But what does that mean? How does one go about operationalizing this criterion? And, equally important, how does

one relate quantitative measures of reproductive success to qualitative evaluations of a society and its politics without being circular--without saying, in effect: "Because it exists, it is therefore adaptive."?

From the standpoint of an evolutionary approach to the analysis of social and political life, these are the ultimate questions, and it should be noted at the outset that they are immensely complicated and perhaps unanswerable in any definitive sense. Adaptiveness not only involves the problem of providing for a society's immediate survival needs. It also involves problematical questions about meeting survival needs in the future and about future environmental challenges.

Evolutionary adaptiveness is not, therefore, equivalent to per capita income. Indeed, a relatively modest standard of living--enabling a population to husband its resources--might be more adaptive for long-run survival. Nor is adaptiveness necessarily equivalent to having a large population. It is partly a reflection of the challenges and opportunities which exist in a particular environment; some environments are extremely

hostile and provide only limited resources for supporting a human population--or none at all. (All environments have limits, in fact, the only difference being where the threshold lies.) Adaptiveness is also partly a reflection of the characteristics of the gene pool (though shaped by the environment, the gene pool also constitutes an independent variable), and partly a reflection of our behavior--of the efficacy with which we organize our collective survival enterprise. Furthermore, a society which, even by the most rigorous of standards, is highly adapted to its environment may still be subject to unforeseen accidents. Consider Pompeii and the eruption of Mount Vesuvius. Pompeiians just happened to be in the wrong place at the wrong time, and there can be no way of preparing for such unpredictable, catastrophic changes in the environment.[3]

By the same token, a small, ecologically adaptive society maintaining a homeostatic fit with its

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[3] It may be possible, though, to increase our ability to predict at least some potentially disastrous changes, thus enhancing our ability to anticipate and mitigate such catastrophes (for example, hurricane prediction).

natural environment may nevertheless be conquered and all but destroyed by a larger society, or by a society with superior weaponry and technology. Or at least, this has often been true in the past; this was essentially the fate of some American Indian tribes, the Australian aborigines, and many other indigenous peoples.

In other words, adaptiveness may involve more than one kind of relationship, and these relationships may even come into conflict with one another. Ecological adaptiveness may dictate strict limits on population growth, as might the psychological and social dynamics of community life. On the other hand, manufacturing processes have often required large labor pools and rewarded larger markets (which reduce the unit cost of production), thus frequently encouraging population growth. Likewise, an unstable international arena can create an incentive for increasing the birth rate, so as to avoid being outnumbered in a war by potential enemies.

As discussed above (Chapter V), there are at least five different <u>quantitative</u> measures that might

be utilized to determine the reproductive efficacy of a population: 1. a straightforward calculation of increases (or decreases) in population size through time; 2. a statistic reflecting the relative reproductive success of two or more populations; 3. an estimate of the maximum number of individuals that any given environment is able to support; 4. an estimate of the minimum number below which a gene pool greatly diminishes its viability and becomes vulnerable to extinction; and 5. the illusive concept of the optimum number.

Each of the first four measures of evolutionary adaptiveness (changes through time within a single population, relative reproductive efficacy between two or more populations, maximum number, or minimum number) can probably be operationalized (they were listed above in ascending order of difficulty); however each of them is of limited value. Measurement of changes through time within a population must, of necessity, cover a relatively short duration. As an essentially postdictive measure, it is an unreliable indicator of future population levels. Furthermore, it may tell us little in

a qualitative way about the relationship between a population and its ecological environment--not to mention its external human environment. A decrease in numbers might, for instance, represent a favorable adaptation, in the sense that it might serve to reduce environmental degradation by a population.

By the same token, relative reproductive efficacy is just that--relative. As a qualitative measure it is so poor that it could lead to completely erroneous conclusions. Judging by sheer numbers, or birth rates, or population increases over time, we might be led to conclude that the Indians and Chinese were better adapted societies than the Russians, Germans, Japanese or Americans.

Maximum number, on the other hand, speaks to the relationship between a population and its environment, but not to the relationships between populations. An even more serious shortcoming, though, is the fact that the theoretical carrying capacity of an environment over the short run may be far above the number that can be supported over the long run, and any population which expanded up to the current carrying capacity might rapidly

degrade its environment. Likewise, the ecological maximum may be well above the degree of population density which a species can psychologically tolerate without evoking seriously detrimental behavioral pathologies. (This phenomenon may lead to what has come to be known as the "behavioral sink".)[4] It is thus insensitive to qualitative considerations.

Finally, there is the genetically determined minimum number. As already suggested, it is a vital, albeit weak, indicator of evolutionary adaptiveness. At best it could only be used to tell us how much of a reproductive margin a particular population may enjoy in terms of sheer numbers. It cannot tell us anything about the relationship between populations, and it can tell us very little of a qualitative nature about a population. Furthermore, in applying this measure to humans, we can at this point make only crude estimates of population minima. We cannot field

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[4] John B. Calhoun, "Population Density and Social Pathology," Scientific American, Vol. 206, No. 2 (February 1962), pp. 139-148.

test them.

On the other hand, our fifth measure, "optimum number," by its very nature links quantitative and qualitative considerations. It can be defined so as to combine the positive aspects of the other four measures while avoiding many of their shortcomings. But if it is theoretically the most sophisticated indicator of evolutionary adaptiveness, it is also the most difficult one by far to operationalize, and there is as yet no agreement upon which criterion, or criteria, should be selected as the basis for establishing the optimum number.[5]

Of course, the idea of an optimum level of population is very old. In The Republic, Plato postulates a figure of 5040 as the optimum number of citizens for his ideal city-state.[6] However, Plato was applying purely socio-political criteria; he argued that, while a city-state of 5040 was large

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[5]Supra, Chap. V, footnote no. 55.

[6]Cited in Sabine, op. cit., p. 80.

enough to sustain a satisfactory cultural life, it was still small enough to remain a face-to-face political community. (Significantly, the Greek city-states were in the end overwhelmed by a larger political entity--the empire of Philip of Macedon.)

More recently, American political scientist Robert A. Dahl suggested that between 50,000 and 200,000 might be the optimum size for a modern urban population--based on both political and socio-economic considerations.[7] (For instance, he noted that mean expenditures for U.S. city services for the year 1960 were $70 per capita for cities in the 25,000-50,000 range, compared with $123 per capita for cities of 150,000 and above. Yet there is no evidence that inhabitants of the larger cities have more or better services.)

The formal theoretical emergence of the concept of optimum number, though, dates back to the 19th Century economists, who were concerned with finding

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[7] Dahl, "The City in the Future of Democracy," The American Political Science Review, Vol. LXI, No. 4 (December, 1967), pp. 953-970.

the point in a production process where the Law of Diminishing Returns sets in.[8] As early economists defined the term, the optimum number was to be determined by economic criteria; optimum population was the number that generated the highest economic return per unit. Of course, the concept has undergone considerable further refinement in more recent decades, but among economists it remains an economically delimited measure.[9]

The first challenge to a purely economic conception of the optimum number came with the rise of the discipline of demography. In the 1930's, population theorists began to wonder if economic criteria were not too narrow and pressed for a broad conception of the optimum number, in terms of the "general welfare" or the "the numbers socially desirable."[10] The problem, though,

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[8] For detailed discussions of the intellectual history of the concept, see Petersen, op. cit., Hutchinson, op. cit., and sources cited therein.

[9] Paul A. Samuelson, Economics: An Introductory Analysis (7th ed. rev; New York: McGraw-Hill Publishing Co., 1967), pp. 545-546.

[10] Petersen, op. cit., pp. 526-535.

was that the demographers could supply no more than vague definitions of what was meant by the general welfare. As demographer Alfred Sauvy pointed out, any one of several different national, or social objectives could conceivably qualify for the imprimatur of the general welfare--maximum rate of increase of wealth, conservation of natural resources, military power (or defense), full employment, maximum distribution of knowledge and culture, or maximum physical well-being as measured by health, longevity, etc.[11] Each of these objectives might, of course, point to a different optimum population. Because such a broad and ill-defined conception of the optimum number was subject to such widely varying interpretations, it thus lost all empirical utility.

In the past few years, though, the concept has been refurbished by ecologists, who have been employing

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[11] Sauvy, quoted (in translation) in Petersen, ibid., pp. 529-530. From Sauvy, Théorie générale de la population (Paris: Presses Universitaires de France, 1952), Vol. 1, p. 174.

it to designate that level of population (between the genetically viable minimum and the maximum carrying capacity) at which a population can maintain a stable, homeostatic fit with its ecological environment.[12] An ecologically defined optimum number, in other words, represents the long-run maximum population which can be sustained in a given environment without over-exploiting and degrading it.

Although the ecologists' conceptualization is empirically testable and is unquestionably of fundamental importance, it suffers from the same shortcoming for which the economists were criticized. A purely ecological definition disregards other possibly important criteria which might also be utilized in determining the optimum number. Ecologists Ehrlich and Ehrlich acknowledge this point in their most recent work. They ob-

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[12] Ehrlich, op. cit., pp. 131-135, 167-169; Ehrlich and Ehrlich, op. cit., chap. 8; also papers presented at a 1969 symposium, "Is There an Optimum Level of Population?", 136th Annual Meeting of the American Association for the Advancement of Science, December 1969, Boston, Mass.

serve: "Cultural and social factors, as well as physical limitations, must be a part of a discussion of optimum populations."[13] Mentioning specifically the problem of density, they argue for a dynamic conception of optimum population, sensitive to "both technological change, and cultural evolution."[14]

We are thus confronted with a dilemma. While definitions of optimum population based on a single, monochromatic criterion seem to exclude other important considerations, broad definitions based on notions of the general welfare seem too vague, or require the synthesis of two or more possibly conflicting criteria without providing any basis for determining how such a synthesis should be made.

But perhaps a resolution of this quandary can be found in an explicitly evolutionary conceptualization of the optimum number. If we were to define the optimum

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13 Ehrlich and Ehrlich, op. cit., p. 206.

14 Ibid., p. 208.

number as that which would, in a given context, maximize a population's long-run survival chances, we could include any and all criteria that were survival-relevant--ecological, genetic, psychological, economic, political and cultural. And, though we would not have eliminated the problem of reconciling possibly conflicting optimal criteria, we would have a theoretically consistent basis for combining individual criteria into a synthetic optimum.[15]

Of course, this assumes that it would ultimately be possible to assign to various population values probability estimates for different survival-relevant criteria. Empirically speaking, such estimates are probably beyond our powers at the present time. However, political decision-makers are constantly required

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[15] The idea of a synthetic optimum was first put forward in a perceptive theoretical essay by Imre Ferenczi of the International Labour Office. (The Synthetic Optimum of Population. Paris: League of Nations, International Institute of Intellectual Cooperation, 1938.) Ferenczi's conclusion was that, for practical purposes, a "realistic" optimum number should strike a balance between the "best possible standard of living" and the requirements of "national security."

to attempt judgments of this kind. And in view of the pressing urgency of the world-wide population-environment crisis, an evolutionary conceptualization of the optimum number would at least provide us with a dynamic, situation-specific and theoretically relevant framework within which to make policy decisions.

Accordingly, even if the concept of the optimum number cannot at present be operationalized in a very rigorous way, it should nevertheless figure as an element of any larger analytical framework in which we attempt to set up criteria for evaluating the overall evolutionary adaptiveness of a society. As pointed out above, population size, by whatever criterion we choose to evaluate it, is a vital indicator of adaptiveness. And optimum population, as we have defined it here, would represent <u>maximal</u> evolutionary adaptiveness in terms of population size. Furthermore, with the kind of multi-dimensionality we have given the term, it would be an important <u>qualitative</u> as well as <u>quantitative</u> measure. Of all the possible measures of adaptiveness, optimum number is the one which, even at the

present state of the art, could most confidently be used as an indicator of the future survival chances of a society.

Even if broadly conceived, though, optimum population size would only be one indicator of adaptiveness, albeit an important one, for there are many other qualitative considerations which are relevant to the long-run survival of a population, or a species. Therefore, we must try to develop a larger framework, capable of embracing as many of such additional indicators as we can identify and operationalize. And, to that end, a trial framework is set forth and discussed below:

EVOLUTIONARY INDICATORS: MEASURES OF ADAPTIVENESS

I. Adaptive Potential

a. efficiency in the exploitation of the environment (or "dominance" in the nomenclature of Sahlins and Service).[16]

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[16]Sahlins and Service, op. cit., pp. 69-92.

b. behavioral flexibility: or adaptability (which corresponds to what Sahlins and Service call "evolutionary potential").

c. diversity: alternative behavioral configurations or strategies for meeting survival needs.

d. redundancy: an important facet of successful cybernetic (including biological) systems.[17]

e. relative autonomy of sub-populations, such as reproductive units.

II. Ecological Indicators

a. optimum population/resource ratio.

b. rate and direction of change (if any) in population and resource base (e.g., ratio of births to deaths; pollution indices; degradation and loss of non-renewable resources).

c. relative efficiency of resource utilization (i.e., wastage, underexploitation, maldistribution).

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17 Martin Landau, "Redundancy, Rationality, and the Problem of Duplication and Overlap," Public Administration Review, Vol. XXIX, No. 4 (July/August 1969), pp. 346-358.

III. Genetic Indicators

a. mating system: viable minimum population,[18] degree of deviation from random mating, genetic migration.

b. "mutational load"[19]: as measured by such things as rates of fetal and infant mortality,[20] rates of congenital diseases and handicaps, inbreeding studies, and rates of "genetic elimination" or "genetic death"--that is, any genetically explained failure to reproduce.[21]

c. "balanced load" (also referred to as "viability polymorphism" or "balanced polymorphism"): including the degree of "advantageous" heterozygosity (in particular, hybrid vigor) and the frequency in a population of functional isoalleles (almost

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[18]Simpson, The Meaning of Evolution, op. cit., pp. 208-209, 228-229.

[19]Herbert J. Muller, "Our Load of Mutations," American Journal of Human Genetics, Vol. II, No. 2 (June 1950), pp. 111-176.

[20]Ernest J. Sternglass, "Evidence for Low-Level Radiation Effects on the Human Embryo and Fetus," Proceedings, Ninth Hanford Biology Symposium, 1969.

[21]On this complex subject, see especially, Dobzhansky, Mankind Evolving, op. cit., pp. 146-154; Alice M. Brues, "Genetic Load and Its Varieties," Science, Vol. 164 (1969), pp. 1130-36; Christopher Wills, "Genetic Load," Scientific American, Vol. 222, No. 3 (1970), pp. 98-107; and Bruce Wallace, Genetic Load: Its Biological and Conceptual Aspects (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970).

certainly the locus of evolutionary adaptations at the genetic level.[22]

IV. Socio-Economic Indicators

a. social, psychological and economic population optima.

b. social load (see discussion below): percentage of the population in a dependency status; by-product load, or the burden on resources and energies attributable to the activities involved in meeting survival needs (e.g., education, fire departments, pollution control costs, sewage disposal, workmen's compensation for industrial accidents, etc.); "cultural" activities (conspicuous consumption, recreation and the arts, for example).[23]

c. expectation of a healthy life.[24]

d. proportion of fetal and infant mortality attributable to avoidable environmental factors (e.g., poor quality or distribution of health care; nuclear radiation; poor diet).

e. proportion of genetic elimination or genetic deaths attributable to avoidable environmental factors (wars, civil violence, preventable diseases, accidents, etc.).

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[22] Ibid.

[23] Such activities as recreation, the arts, etc., may make important indirect contributions to the maintenance of a society, but there is nonetheless a load associated with them (the cost side of the cost-benefit ledger), just as there is in education and other possibly survival-related activities (see below).

[24] USDHEW, Toward a Social Report, op. cit., pp. xiv-xvi, 1-13.

f. usable energy per capita.

g. income (or resource) distribution.

h. percentage of the population with insufficient income, or resources, to meet essential survival needs.

i. social mobility.[25]

j. measures of subjective feelings of well-being, alienation or anomie.

k. measures of social stability and/or disorganization: e.g., family stability, serious crimes, juvenile delinquency, suicide, alcoholism, drug addiction, stress-induced illness, etc.

V. Political Indicators

a. political optimum number.[26]

b. measures of political integration: including measures of "cleavage" and "consensus".[27]

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25 In addition to Dobzhansky's genetic arguments in favor of this indicator (p. 319 above), see his experimental evidence described in Glass (ed.), op. cit., pp. 129-142, Measurements of social mobility have been made in USDHEW, Toward a Social Report, op. cit., pp. 15-26.

26 Dahl, "The City in the Future of Democracy," op. cit.

27 Dahl, Modern Political Analysis (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 18, Chap. VII; Philip E. Jacob and James V. Toscano (eds.), The Integration of Political Communities (Philadelphia: J.P. Lippincott Co., 1964).

c. measures of pattern maintenance: including measures of "legitimacy"; "allegiance"; "alienation"; "apathy"; "system stress".[28]

d. measures of adaptive load, lag, lead and gain: (as reflections of adaptability and performance of the systemic adaptation function).[29]

e. mechanisms and relative difficulty in removing "dysfunctional" leadership (adaptability; adaptation function).

f. measures of political power: or, negative and positive coercive resources at the disposal of the "State" or leadership (goal attainment; pattern maintenance; integration; adaptation).[30]

g. basic survival strategy (explicit or implicit): appropriateness to a society's survival problems and "effectiveness," or relative success of the strategy (goal attainment; adaptation).[31]

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28 Dahl, ibid., pp. 19, 31-32; Ada W. Finifter, "Dimensions of Political Alienation," The American Political Science Review, Vol. LXIV, No. 2 (June 1970), pp. 389-410; and Easton, A Systems Analysis of Political Life, op. cit., pp. 22-25 and passim.

29 Deutsch, op. cit., pp. 187-188.

30 Dahl, Modern Political Analysis, op. cit., Chaps. V-VIII;Deutsch, op. cit., pp. 113-115, 120-124 and passim.

31 Easton, A Systems Analysis of Political Life, op. cit., pp. 21-33; Parsons, "The Political Aspect of Social Structure and Process," in Easton (ed.), Varieties of Political Theory, op. cit., pp. 71-112. As argued above, I am here treating

h. quality of <u>feedback</u>: as manifested in such phenomena as election processes, surveys, face-to-face communications, functional (interest group) representation, the media, letter-writing, administrative feedback, court litigation, demonstrations, civil disobedience, etc. (goal attainment; pattern maintenance; integration; adaptation).

Before going on to treat some of the many difficulties involved in trying to operationalize the sort of framework proposed above, some clarification and further explanation is in order.

First, it should be noted that the five categories of indicators above were chosen to reflect what may be considered to be different facets of the problem of adaptiveness. But equally important, they more or less reflect the division of labor signified by the boundaries of different academic disciplines and existing categories of data. This should not, however, be taken to imply that the various indicators, and

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goal-attainment as referring to those concrete "sub-goals," (say the recovery of lost territories or the exploitation of untapped resources) which may be <u>instrumental</u> to the overall survival goal of a society.

categories of indicators, are unrelated. On the contrary. They interact with and affect each other. The survival enterprise involves a "seamless web."

For example, category one (Adaptive Potential) is meant to reflect general behavioral qualities that have been hypothesized to contribute to adaptiveness. Apart from the fact that it will be exceedingly difficult, if not impossible, to develop ways of evaluating such qualities empirically (see below), it can readily be seen that these indicators involve some quite possibly contradictory qualities. Efficiency in the exploitation of the environment could well conflict with all four of the other criteria--flexibility, diversity, redundancy and autonomy. Accordingly, in the end it may be that the kind of balance struck between various criteria will prove to be the most important consideration.

By the same token, efficiency in the exploitation of the environment (as measured, perhaps, by energy expenditures), may involve considerable wastage of resources, thereby conflicting with the ecological indicator for efficiency (or economy) of resource utilization.

Second, it should be observed that no attempt was made to incorporate the concept of a "synthetic optimum number" into the above framework. A synthesis of various optimal criteria may be relevant to policy-making in specific situations; however the purpose of a set of indicators is to provide as wide a range of relevant measures as possible. Accordingly, various possible components of a synthetic population optimum have been listed within the categories to which they apply.

Another point is that the Ecological Indicators were specifically designed to provide us with sensitive, qualitative measures of a population's relationship to its natural environment. A key concept here is an ecologically defined optimum population size (which would, of course, be different for each environment). Another key concept is an indicator, or set of indicators, enabling us to project a particular population-environment relationship into the future. Finally, a measure for ecological efficiency was included, on the ground that the theoretical estimate of the optimum number which can be supported in any environment may be well <u>above</u>

the actual maximum capacity in those cases where a society is profligate in the use of resources.

The "Genetic Indicators," likewise, were designed to give us sensitive measures, not only of the behavior of the gene pool as an independent variable, but also the genetic consequences of social behavior. Such indicators as fetal and infant mortality are greatly affected by the quality of medical care, exposure to infection, diet, and the presence in the environment of man-made mutagens (or mutation-causing agents). Heterozygosity and the frequency of functional isoalleles (functional variants of the same gene) represent beneficial forms of genetic diversity and, assuming they could be measured, would tell us something about the general vigor and adaptive potential in a breeding population. Conversely, the rate of genetic elimination, or genetic death, would tell us, first, whether or not there existed an equilibrium between the mutation rate and the rate at which mal-adaptive mutants were being selected <u>out</u> of the gene pool, and second, whether or not genetic elimination was having the effect of

narrowing the diversity of the gene pool. Some genetic elimination is, of course, part of the selection process--a weeding out of mal-adaptive genotypes--but many other genetic deaths, such as the young men (or civilians) who die in war, the innocent victims of accidents, and so forth, may well represent an undesirable loss of diversity in a gene pool. (Note that gross population measures alone might not reveal such qualitative changes. That is, a narrowing of genetic diversity in a gene pool may be masked in the population totals by a very high reproductive rate among the remaining individuals.)

The category assigned to Socio-Economic Indicators requires a special word of explanation. As pointed out above, a considerable amount of spadework has already been done on the development of social indicators.[32] However, the concept is used here in a somewhat different way. Proponents of social indicators have not, thus far, attempted to

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[32] Supra, footnote no. 1.

define what specific societal goals should be reflected in and measured by their indicators. On the other hand, the indicators here have been deliberately conceived to give us empirically-grounded measures of how well a society is doing with respect to the explicitly stated goal of its long-run survival. (Some of the problems created by such an approach are discussed below.) The social indicators included here are thus somewhat different from those suggested by other social indicators advocates. In some cases the indicators suggested here would require the collection of new types of data. In others, it might involve new syntheses or a different way of analyzing existing data.

In particular, I should digress for a moment to discuss the concept of "Social Load," which I proposed above. In genetics, the concept of "genetic load" refers to the accumulation in a population of genetic mutations. Mostly these mutations are harmful--although they are also mostly "recessive" or unexpressed, their presence being masked by functional "dominant" genes.

However, these mutations do represent a long-range burden on the gene pool (those that are expressed show up in fetal and infant mortality rates and in the rate for congenital diseases), except for those few referred to as "balanced load," "viability polymorphism" or "balanced polymorphism" which may ultimately prove to have adaptive value. Although the concept will require considerable further development, by analogy we might be able to employ a socio-economic analogue of genetic load in the social sciences.[33]

As presently conceived, the Social Load would embrace a variety of phenomena. First, there are the survival needs of those individuals who, for one reason or another, are dependents upon society. This would include children (humans must pay a high price for the openness of their offspring to the acquisition of

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[33] The concept of "Load" is also used in cybernetics and has been put forward in a different context by Karl Deutsch as being potentially useful to political science (op. cit., p. 89). Deutsch's conceptualization has been incorporated here as one element of the Political Indicators outlined above.

behavior patterns within a cultural setting), adults with disabling genetic defects,[34] those adults who have become chronically ill or dependent as a result of environmental factors, disabled war veterans, accident victims, alcoholics and drug addicts, the prison population, some,but not all, elderly and, in some countries, a class of wealthy "coupon clippers" who, for the most part, consume resources generated by others; they too must be included in the social load.

A second category of phenomena which might be included under the rubric of social load involves what contemporary economists refer to as "diseconomies" or

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[34] In positing a concept such as social load, one must be careful to avoid facile leaps to the eugenics arguments. In small, primitive societies living close to the margin, only the burden of the dependent young may be tolerable, whereas one mark of an advanced nation whose economy provides a substantial cushion beyond the survival needs of its productive adults and children, is that it can afford to provide more humane treatment for non-contributors many of whom may be casualties of the very socio-economic system responsible for creating a surplus in the first place). Likewise, we must take account of the fact that modern societies are often able to provide opportunities for productive work by individuals who, in more primitive circumstances, would have been a burden upon society--for example, the blind workers at I.B.M.'s computer plants.

"externalities"--that is, the portion of G.N.P. which a society must invest in coping with the destructive by-products or side-effects of activities that are related to the meeting of survival needs. (Until very recently, economists have traditionally added such costs into G.N.P. as contributions to economic "progress," rather than treating them as "offsets."[35] For instance, fire departments are required because we use fire and electricity in meeting our needs. Similarly, measures required to purify for drinking purposes water which has been polluted by factories located upstream would come under the heading of social load, as would the medical costs from air pollution and accidents attributable to the

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[35] One notable, but at the time (1950) little noted, exception was the work of economist Karl William Kapp, who sought to develop the concept of "social costs." The Social Costs of Private Enterprise (Cambridge: Harvard University Press, 1950). In quantitative terms, Kapp tried to calculate the costs of such "diseconomies" as air and water pollution, industrial accidents, soil erosion and even advertising.

automobile. Some of these costs may be borne willingly by a society, because the costs appear to be outweighed by the benefits. On the other hand, it may be possible to minimize such costs--for example, by installing waste-treatment facilities in factories or anti-pollution and safety equipment in cars.

In addition to clearly undesirable by-products of the survival enterprise, Social Load must include the investment of energies and resources required for such socially desirable burdens as public education. In any society where literacy, arithmetical skills, etc., are vital to one's ability to learn about his social environment, not to mention earning a living, education becomes survival-relevant. (For instance, one cannot obtain a driver's license in many Western countries without being able to read increasingly complicated drivers' manuals and pass a written test.) Certainly, wherever technology has become a vital part of a society's survival strategy, education becomes relevant to the maintenance and enhancement of that technology.

Finally, we might also include in the Social Load

all those "cultural activities," some of which may be non-productive or even mal-adaptive, that also increase the maintenance costs of a society. We might put in this category many socially-created "wants," including those that are frequently referred to as "conspicuous consumption." Although recreational activities and the arts must be included here as a part of the Social Load, let me reiterate that such activities may also provide indirect benefits to a society.

Social Load, in other words, would include a diverse assortment of phenomena. Some elements would be genetically based, while others would be the result of environmental factors. Some would represent the unavoidable costs of meeting survival needs, and others might be avoidable, or at least minimized. Furthermore, while the Social Load might be quite burdensome to a society, some elements mignt nonetheless be recognized as desirable and borne willingly (which makes a perfect analogy with genetic load). An example is the burden of dependent children--a burden many industrialized countries voluntarily <u>increased</u> a few generations back

when they enacted child labor laws. Social Load, and the evolutionary framework upon which it is predicated, would thus appear able to give us a systematic way of evaluating the impact of individual and group behaviors upon the collective survival enterprise.

Of course, we are still a long way from making any systematic estimate of a society's Social Load. Moreover, when it comes to applying the concept to the larger question of how the Social Load relates to the survival potential of a society, we will have to develop ways of relating the Social Load to the load-bearing ability of a particular society. For example, Gunnar Myrdal points to the back-breaking burden of young mouths to feed in proportion to the number of productive workers as one of the major contributors to poverty in South Asia.[36] On the other hand, the United States, which has the highest per capita income in the world, expends a smaller percentage of its G.N.P. on public welfare than

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[36] Myrdal, Asian Drama: An Inquiry into the Poverty of Nations (New York: Twentieth Century Fund, 1968), pp. 1465-1467.

many other major industrial countries, with the result that about 20 percent of its population subsists at or below what its government has set as the poverty line in terms of personal income.

The final category--Political Indicators--is based on the premise stated above that political systems do characteristically perform certain basic functions in furtherance of the survival of the collectivity. As argued above, goal attainment (or, for the sake of clarity, let us say "sub-goal" attainment), pattern maintenance, integration and adaptation can be seen as functionally related to the overall survival goal of a society.

In formulating suggestions for Political Indicators, therefore, measuring rods were sought that might reflect how well (or poorly) a given political system is performing survival-related functions. Most of these concepts are thoroughly familiar to political scientists, and some have already been explored in considerable depth. A few could probably be operationalized fairly rigorously without too much difficulty (given substantial

funding, of course). Indeed, some of the ground-work already exists in the literature of the discipline.[37]

Conversely, some of the Political Indicators suggested above, such as a politically defined "optimum number" or "adaptive load, lag, lead and gain," have yet to be moved beyond the most basic conceptual stage.

There is one Political Indicator, however, which should be discussed briefly--the one relating to a society's survival strategy. It should be obvious that a survival strategy is not in itself an indicator. But because political systems typically are charged with the principal responsibility for formulating, orches-

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[37]For example: Gabriel A. Almond and Sidney Verba, The Civic Culture (Princeton, N.J.: Princeton Univ. Press, 1963); Robert Alford, Party and Society (Chicago: Rand-McNally, Inc., 1963); Seymour Martin Lipset and Stein Rokkan (eds.), Party Systems and Voter Alignments (New York: The Free Press, 1967); Angus Campbell, et al., The American Voter (New York: John Wiley & Sons, Inc., 1964); Campbell et al., Elections and the Political Order (New York: John Wiley & Sons, Inc., 1966); Bruce M. Russett et al., World Handbook of Political and Social Indicators (New Haven: Yale University Press, 1964); Arthur S. Banks and Robert B. Textor, A Cross-Polity Survey (Cambridge: M.I.T. Press, 1963); and Finifter, op. cit.

trating and, to a greater or lesser extent, executing the survival strategy (or, the goal attainment and adaptation functions) of a society, we should be interested in how effectively a political system is performing these functions. This may require multi-faceted and highly qualitative analyses, and we do not yet have the tools, quantitative or otherwise, for making such analyses. Indeed, it may prove difficult enough simply to reach agreement upon precisely what survival strategy a given society is in fact pursuing. This remains to be seen. But if it can be operationalized empirically, it would represent a key indicator. Indeed, it may ultimately prove to be something of a summary indicator, because the effectiveness of a political system is partly dependent upon favorable ratings for some of the other Political Indicators listed above: political power, quality of feedback, political integration, pattern maintenance, and adaptive load, lag, lead and gain. This and other, similar, conceptual problems would ultimately have to be ironed out if the framework outlined above were to be developed

further--which brings us to a more general discussion of some caveats and problems involved in attempting to implement the sort of indicators proposed here.

In the first place, no matter how rigorously conceived and applied, indicators designed to measure the evolutionary adaptiveness of a society would never enable us to guarantee the survival of a society. (Witness the many animal species, some doubtless highly adapted to their environments, that have been wiped out by man--sometimes for no other reason than for "sport.") All we could ever say on the basis of the kind of indicators sketched out above is that, given known and existing selection pressures, a society rating relatively well would have a higher statistical probability of surviving for a longer period of time.

A second point is that the basic approach suggested here should not conflict with the work that has already been done on social indicators. Rather, it is seen as entirely compatible. (For example, it should be equally capable ultimately of

lending itself to the technology and methodologies of such optimizing analyses as the Program Planning and Budgeting System, or PPBS.) Indeed, any more thorough-going effort to develop a set of evolutionary indicators must merge with and build upon the work already done on social indicators. Conversely, it would seem desirable for the proponents of social indicators to broaden their conceptual framework to include more survival-relevant indicators--if not necessarily accepting the normative premises embodied in an evolutionary conception of society.

However, if the basic approach to evolutionary indicators and social indicators are similar, so are the problems. For one thing, despite the plethora of statistics generated by modern societies, relatively few of these statistics are presently able to tell us anything meaningful about social conditions. There is a serious deficiency of relevant data, because most of our statistics (at least in the United States) are merely the by-product of routine management, and past decisions about what data should be collected were often ad hoc or

unrelated to any clearly formulated social questions.[38]

Indeed, as suggested above, many potentially useful indicators are no more than concepts at this stage (for example, measures of social stability), and we have only just begun to think about how such indicators might be operationalized.

Such data as does exist, moreover, is often unreliable, or difficult to interpret in its existing form. Suicide statistics, for example, are generally considered to be worse than meaningless; they may actually be misleading. Likewise, crime statistics are not now based on a system of ratings according to severity, so that a decline in murders may be offset in the F.B.I.'s aggregate figure by a rise in "joy-ride" car thefts.

Interpreting the "meaning" of various statistics will also prove to be a thorny problem. Of what actual significance is a divorce rate of 25 percent in terms of social stability? And how much more serious a problem

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[38] USDHEW, op. cit., p. 99.

is it (if at all) than a divorce rate of only 20 percent?

Problems of comparison will be compounded, moreover, by the lack of such data for past eras. In some cases, there will simply be no basis for meaningful comparisons until well into the future.

In addition to these and other problems that correspond to those confronting the proponents of social indicators, the objective set forth here of developing a set of indicators which are specifically survival-relevant creates an even more forbidding obstacle.

So far, at least, the advocates of social indicators have been scrupulous about avoiding premature commitments to any specific normative criteria as a basis for selecting relevant indicators. Recognizing the ancient problem of reaching agreement upon what constitutes the "general welfare," proponents of social indicators have been content to set that thorny question aside for now and let the "felt needs of the times," the "conventional wisdom," or the political process decide such questions in the long run. Instead they have

kept an open mind and explored a wide variety of potentially useful indicators.

By contrast, an evolutionary approach imposes the prerequisite that any data chosen for use as an indicator be survival-relevant. An evolutionary indicator must be able to tell us something meaningful about the adaptiveness of a society--and this, needless to say, is no small task. We may be quite unable to demonstrate in any rigorous way that all of the indicators we believe intuitively should be included are in fact survival relevant. Conversely, we may not be able to determine if we have excluded some important but as yet unrecognized indicators. In short, our reach may be considerably beyond the grasp of our scientific enterprise at its present stage of development.

A further, and equally knotty, problem created by the evolutionary approach involves the interrelationships among various indicators (a point touched upon above). We know that adaptiveness is the product of a multitude of factors--it is the outcome of a complex configuration of organic and behavioral relationships

and processes. Thus, if a society were to attempt to maximize for any particular indicator without regard for the possible effects upon other indicators, the costs might well prove to outweigh the benefits. Infant mortality may be a case in point. Because man's reproductive patterns were attuned by evolution to an environment that produced a high rate of infant mortality, recent reductions in infant mortality due to better sanitation, medical care and so forth have measurably contributed to the world-wide population crisis. Moreover, decreases in infant mortality without the application of other therapeutic techniques or genetic controls ("positive eugenics") can lead to an increase in the load of congenital diseases and handicaps in a gene pool. (See below, footnote no. 45.)

Another good example of this interrelationship is the total effect of the medical advances which have been applied by the United States in the Vietnam war. While there has been a sharp reduction in the rate of battle deaths for American soldiers compared to previous wars, there has been a substantial increase in the per-

centage of wounded soldiers who have been permanently disabled--thus adding to America's Social Load.

There is therefore likely to be a high degree of interdependency among the various indicators we have postulated above, and optimization of the overall survival chances of a society will inevitably require decision-makers to strike a balance based on exceedingly complex cost-benefit analyses.

Finally, there are the mind-boggling problems of assigning probability estimates to various indicators (and to various values for each of those indicators) and of constructing suitable ways of testing the projective ability of such indicators.

For all of these reasons, it must be concluded that the full development of a set of indicators with which to evaluate the evolutionary adaptiveness of a society is a distant goal.

However, there is no reason why we cannot move forward--one indicator at a time--with those measures which could be operationalized in the not too distant future. It should be possible, for example, to work

up data for the rates of fetal and infant mortality where such data does not already exist. Rates of genetic death could also be computed relatively easily in those countries that keep adequate vital statistics, and various agencies of the United Nations have been working for some time on a more systematic inventory of the world's resources. Likewise, the major industrial nations are planning to establish, through the International Biological Programme, a global system of environmental monitors to generate data on the pollution and degradation of the environment (including mutagenic agents), as well as monitoring rates of congenital diseases.[39] Radiologist Ernest J. Sternglass has also suggested the monitoring of fetal mortality rates, rates of death of congenitally defective children and fluctuations in the death rate from respiratory diseases.[40]

In a similar vein, it might be possible to develop

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39 The New York Times, February 12, 1970.

40 Personal communication, April 1, 1970.

estimates of the Social Load for various societies and then see if these estimates cannot be meaningfully related to a society's load-bearing ability (as measured, perhaps, by such data as per capita income, income distribution, available food resources, disposable energy per capita, per capita productivity, etc.).

Indeed, better focussed evaluations of existing data could yield some immediate pay-offs. To illustrate, consider the following examples:

1. The population of India is in peril of mass starvation. Yet, according to food expert N. W. Pirie, it is estimated that more than one-quarter of the food grown in India each year is destroyed or severely damaged by insects, rats and various human inefficiencies. "If that loss could be prevented," Pirie notes, "India would be self-sufficient in food."[41]

2. England must import half of its food, with burdensome consequences for her international balance of payments. From Government figures for the period 1950 to 1962, Pirie calculated that Britain imported or grew enough food to provide almost 3200 kilocalories per day to each of its inhabitants. Yet the average Englishman was estimated to have required only about 2480 kilocalories per day. In other words, the British appear to be wasting about 720 kilocalories per person per day

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[41] N. W. Pirie, Food Resources: Conventional and Novel (Baltimore: Penguin Books, 1969), p.67.

through poor distribution, spoilage, over-eating, in the garbage, feeding household pets and so forth.[42]

3. A detailed nutrition study in the Dominican Republic in 1969 found that about 20 percent of the women had advanced goiter (from a deficiency of iodine), approximately one-third of the children suffered from malnutrition, 65 percent of those surveyed were deficient in vitamin C and 54 percent were anemic, evidently from a low iron intake. Yet, there are substantial sources of unexploited iron and iodine in the sea and the potential for fruit production in the Dominican environment has not been exploited to anywhere near capacity. As a result, the study concluded, the Dominican population is living under needlessly sub-optimal conditions and is thus more susceptible to disease and more vulnerable to such natural catastrophies as drought and hurricane damage to crops.[43]

4. Although the United States spends more per capita on medical care than any other nation ($60.3 billion or 6.7 percent of its total G.N.P. in 1969), that country ranks 14th among the major industrial nations in infant mortality (considered the most sensitive indicator of the quality of medical care), 12th in the percentage of mothers who die in childbirth, 18th in terms of male life expectancy and 11th in terms of female life expectancy.[44]

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42 Ibid., p. 82.

43 Kendall W. King "Malnutrition in the Caribbean" in "The State of the Species," Natural History, Vol. LXXIX, No. 1 (January 1970), Special Supplement.

44 U.S. Department of Commerce (USDC), Statistical Abstract of the United States (Washington: U.S. Government

It would appear that, in a very basic respect, each of the four nations above is failing to maximize its systemic adaptiveness. The data would seem to be highly suggestive about the cultures and political systems of those nations, and, armed with such facts, we ought to be able to proceed to an empirically grounded evaluation of each of these societies, including its political leadership. The question of why a society has failed to maximize any given survival-related value should certainly be susceptible to analysis, even if the methodological problems involved in trying to "explain" any given political artifact may be no less troublesome than in the past.

Let us take as a test case the figures cited above relating to the quality of health care in the United States.

In the first place, measures of health are of direct relevance in assessing the relative "fitness" of a population. Adaptiveness consists of being able

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Printing Office, 1970), Table 81, p. 63; U.S. ranking with respect to infant mortality, etc., tabulated from United Nations, Demographic Yearbook, 1969. Rankings were computed for the year 1968 and are exclusive of those countries that did not file reports with the United Nations.

to reproduce successfully and rear the offspring until they in turn reach reproductive age. Thus, low levels of infant and maternal mortality, coupled with a low incidence of death or disabling illness during the child-bearing and child rearing years (approximately 16 to 50 years of age), would appear to be advantageous to a society.[45]

In addition, infant and maternal mortality rates are good indirect indicators of the overall quality of health care, as well a reflection of many other health-related environmental conditions, such as sanitation, diet and so forth. As Philip R. Lee, a former Assistant Secretary of Health, Education and Welfare, expressed it: "Gradually we are learning that countless elements are pertinent in health status," including psycho-social,

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[45] Some infant mortality is probably inevitable and must be considered a form of desirable selection. As Dobzhansky notes, there is probably an irreducible minimum. Furthermore, reductions in infant mortality should not be pursued at the cost of increasing the social load of permanent dependents--the clearly maladaptive genotypes. However, reductions related to easily correctable social conditions--diet, hygiene and access to basic medical services--would seem to be desirable.

cultural and economic.[46]

However, as pointed out above, while Americans are paying proportionately more than any other country for health care, they are faring worse than a dozen other countries (in round numbers). In 1963, an estimated 6.2 million man-years were lost through illness, 4.6 million of which would have been economically productive.[47] In 1967 alone, 113,000 Americans lost their lives from accidents, and an even larger number were permanently maimed.[48] On the face of it, then, it would appear that the United States is significantly failing to maximize its adaptiveness; energy and lives are being wasted.

But what is the explanation for this situation? Many causes have been advanced and doubtless all of them have some validity. Air pollution by industry and

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46 Philip R. Lee, "Health and Well-being," in Gross (ed.), op. cit., p. 435.

47 USDHEW, Toward a Social Report, op. cit., p. 10.

48 USDC, Statistical Abstract of the United States, op. cit., Table No. 72.

automobiles may contribute to the toll, though other nations are also afflicted by these hazards. American culture--our rich diets, smoking, lack of exercise and the high pressure of our business and professional life--probably also contribute.[49]

The problem may be further exacerbated by the relatively poor quality of health education in this country, by an overemphasis upon medical research as against the delivery of health services and by a medical insurance system that emphasizes high-cost, curative medicine rather than low-cost preventive care.[50]

Yet, when all of these factors are taken into account, the principal causes of our high-cost, but inefficient, health care system lie in our socio-economic system and our politics.[51] Unlike the medical care systems of most other industrialized countries,

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[49] USDHEW, op. cit., p.8.

[50] Ibid., pp. 8, 11-12.

[51] The following discussion is based upon: Peter A. Corning, The Evolution of Medicare: From Idea to Law (Washington: U.S. Government Printing Office, 1969). See also the references cited therein.

that of the United States is not based upon the principle of relating services to medical needs. Instead it is based upon the ideology of free-enterprise--upon the individual's ability to pay (or "fee for service"). Though publicly supported health care programs have mitigated this situation to some extent, in general it remains true that the extent and quality of medical care are proportional to the individual's ability to pay.

If the cost of medical care were low, and if everyone had sufficient resources to pay for adequate medical care, such a system would create no obstacle to the distribution of medical services based on need. But in fact, the basic socio-economic structure of this country is such that many millions do not have the resources to buy medical care in a free market of this kind.

Consider the following statistics. In 1968, there were 25.4 million people whose incomes were below

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52 Even such recent innovations as Medicare and Medicaid do not effectively cope with the problem. Medicare, for example, only pays about 35 percent of the total medical costs for our elderly population. (USDHEW, op. cit., p. 10).

the poverty level.[53] Furthermore, even for those above the official poverty line, incomes were highly skewed in favor of the wealthy few at the top. The poorest 10 percent of American families in 1968 had 1 percent of the personal income. The next 10 percent had 3 percent of the income, while the third 10 percent had 4 percent and the fourth 10 percent had 6 percent. In other words, the bottom 40 percent of the population had a bare 14 percent of the personal income. Conversely, the uppermost 10 percent had 30 percent of the income while the top 30 percent received almost 60 percent of the total income.[54]

A similar pattern exists for liquid assets (savings, stocks, bonds, etc.). The bottom 19 percent, for the year 1969, had none whatsoever, while the bottom 67 percent (or two-thirds) had less than $2,000 in assets. On the other hand, the top 10 percent had more than $10,000.[55] There

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53 USDC, op. cit., Table No. 499.

54 Ibid., Table No. 490.

55 Ibid., Table No. 485.

were 71,000 people in 1962 who had assets of more than $100,000, and the number has probably doubled since then.[56]

The medical consequences of this highly skewed distribution of wealth are reflected in our health statistics. Infant mortality rates are twice as high in our poorest state as in our richest state, and maternal mortality is four times as high.[57] There is also a five year difference in average life expectancy at birth.[58] For males in the 45-64 age-group, those with low incomes have three-and-one-half times as many disability days as the upper income groups.[59] In a study in one city, 76 percent of the tuberculosis cases came from slum areas with only 25 percent of the population.[60] In short, the poor get sick more frequently, remain ill for a longer duration and get less treatment for their illnesses.

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56 USDC, op. cit., Table No. 509.

57 USDHEW, op. cit., p. 5.

58 Ibid.

59 Ibid., p. 6.

60 Lee, loc. cit., p. 445.

Now there are a number of structural reforms that could be made in our health care delivery system--the creation of greater incentives for preventive care under existing private health insurance plans, better incentives for the efficient operation of medical facilities, encouragement of the trend toward group practice, and better coordination of health care services, the provision of more neighborhood health centers, etc.

However, the single most important reform, by far, would be the enactment of any public health program that would put the dispensation of medical care on the basis of medical need rather than ability to pay. The Germans enacted the first such program in 1883. The English adopted their national health insurance system in 1911, and today the United States is the only major industrialized nation without such a program.

Three times in the past 60 years, proponents of national health insurance tried to obtain enactment of such a program--first in our state legislatures and

later in the Congress--and each time they failed.[61] The explanation for each of those failures is complex, of course, and subject to differing interpretations.[62] However, it is clear that our politics--the political decision-making processes and their outputs (or lack of outputs)--have played a major role in our failure as a nation to maximize our adaptiveness in terms of health.[63]

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61 Detailed accounts and analyses of each of these episodes may be found in Corning, op. cit., Chaps. I-III.

62 See the detailed discussion of this point in ibid., pp. 11-21 and passim.

63 Though we lag behind many other advanced nations, within a larger and longer-range perspective, American health has improved markedly. Over the past 70 years, Americans have in fact made great strides with precisely those indicators that are most relevant to survival. Between 1930 and 1965, maternal mortality dropped from 6.7 per thousand live births to .3 (Lee, loc. cit., p. 438). Infant mortality, likewise, dropped from 47 per thousand in 1940 to 21.7 per thousand in 1968 (USDC, op. cit., Table No. 69). Equally important, mortality rates during the middle years have also declined sharply. In the 1920-21 time period, the death rate per thousand young males at 20 years of age was 4.27. By 1967 the rate had dropped to 1.77. At 40 years of age, the mortality rate for males was 7.5 per thousand in 1920-21, whereas in 1967 it had dropped to 3.37 (ibid., Table No. 66). Total life expectancy at birth also went up markedly between 1920 and 1967, from an average of 54.1 years to 70.5 years (ibid., Table No. 65).

As the report of the national panel on social indicators concluded: "There can be little doubt that appropriate public policy decisions can help to alleviate some of the factors adversely affecting the health status of our population."[64]

But what is particularly significant about those figures is that most of the gain is attributable to lowered infant mortality and mortality during the child-bearing years. During the 1900-1960 period, the average number of years of life remaining at birth increased by 20.9 years, whereas the number of years remaining at 65 increased by only 2.7 years (USDHEW, op. cit., p.1). Thus, in terms of the reproduction problem, it would appear that great gains have been made in this country in recent generations. This gain is all the more striking when our life-expectancy is compared with that of many underdeveloped countries, where averages of 30 to 40 years are not uncommon. Likewise, our infant mortality rates (about 21 per thousand) are considerably better than, say, El Salvador (59.2), Mexico (64.2) and Guatemala (93.8) (United Nations, Demographic Yearbook, 1969). But if we are doing comparatively well in the domain of health care, we are not by any means doing as well as we could, given the quality of our environment, the medical tools available to us, and the resources we have been allocating to the problem.

64 USDHEW, op. cit., p. 13.

Conclusion

By way of conclusion, it should be noted that the discussion here must be viewed as only the beginning. Quite apart from the truly awesome problems of operationalization, there are doubtless many conceptual problems to be worked through. Moreover, because so many complex and highly specialized knowledge modules are embraced in this conceptualization, the task of developing an evolutionary paradigm will perforce require an interdisciplinary effort. To paraphrase Walter Lippmann, we will have to organize ourselves to save ourselves.

Our intellectual heritage being what it is, many social scientists have not as yet confronted the intellectual challenge of biological evolution. But, in fact, there are only four (or perhaps five) alternative postures to choose among. One can argue that evolutionary theory is simply not relevant to social life, because our survival problems have been solved. (I maintain, though, that the burden of proof should be put upon those who so argue.) Second, one might concede the problem of biological survival but assert that social evolution

may indeed have an effect upon our survival chances, but that the process is a deterministic one, the understanding of which requires only that we identify and comprehend the prime-mover involved. Accordingly, it could be argued that we need not concern ourselves with "externals." However, if none of the foregoing arguments are defensible (or, in any event, satisfying), then one must confront the hard choice--either to reject the theory of biological evolution altogether or accept the argument that social life is relevant to the basic problem of survival and that human social structures and mental processes (value-choices, problem-solving activities, etc.) do affect our long-run viability as a species.

However, if we should choose to accept the evolutionary view of society, then we will have to face up to the far more difficult challenge of trying to build a social science based upon it.

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