

# Synergism Hypothesis

## A Theory of Progressive Evolution

### Introduction: Quo Vadimus?\*

*“Relentlessly accumulating evidence suggests that human life on the planet is headed for a catastrophe.”*

- Charles E. Lindbolm

*“As our century enters its final quarter, I am not persuaded, despite the signs, that the end is necessarily doom. The doomsayers work by extrapolation; they take a trend and extend it, forgetting that the doom factor sooner or later generates a coping mechanism ... History, that is, the human narrative, never follows, and will always fool, the scientific curve. I cannot tell you what twists it will take, but I expect that, like our ancestors, we, too, will muddle through.”*

- Barbara Tuchman

### Politics and Progress

The future remains, as always, problematical and debatable. Yet our current predicament underscores an ancient truth. All human kind and all living species are fellow participants in a three-billion-year-old adventure: the challenge of, and at times the struggle for, survival and the continuity of life.

This evolutionary problematique is the central organizing principle underlying all biological and social systems - our preceptions, illusion, and aspirations to the contrary notwithstanding - and it is, or it should be, the paradigmatic problem of our social sciences. An organized society is a collective survival enterprise; by and large, we are dependent on one another in a myriad of ways, which we often take for granted. Moreover, our evolutionary future always has been, and may always continue to be, contingent; it is not vouchsafed by any law of nature.

In an earlier and more optimistic era, the conventional wisdom of Western society, though never monolithic, was tilted sharply toward the view that material growth and civilizational progress were inherent trends in societal evolution. Indeed, it was a commonplace affectation among the nineteenth-century social theorists to posit a universal law of progress; the dogma of progress was the one article of faith on which socialists such as Karl Marx and “liberals” (conservatives) such as Herbert Spencer could all agree. Progress for whom and how best to get there were questions that were hotly disputed.

In the past decade, though, there has emerged a new conventional wisdom, one which asserts that our species is in grave peril. The prophets of this dour vision have become legion, some of the most articulate and effective being scientists who, fired by sense of urgency, have volunteered to become front-line combatants in the political wars.

Few if any of the scholars who have joined this rising chorus of Cassandras have actually abandoned hope, though some have come close. To the contrary, most of these alarmists believe that their efforts might help induce disaster-averting political and social change. For instance, Charles Lindbolm, a longtime exponent of the “muddling through” image employed by Barbara Tuchman, flatly asserts that the outcome of our “survival crisis” is not predetermined and that politics does matter, perhaps decisively so. Nevertheless we have of late become preoccupied with our present peril.

This book runs against the grain. It is a book about evolutionary progress, but it is not about a “law” of progress.\* Rather, it is about the causes of progress, both in nature and in human societies. Thus it is also a book about politics, and about the relationship between politics and survival. I shall argue that, for better or worse, politics is central to the survival strategies and actions- or inactions - of organized societies: we are dependent

\* This term “progress” will be used here in a very special sense.

on our political systems. And just as political actions and decisions lay behind such historical landmarks as the Russian Revolution, the New Deal, World War II, and the moon program, so too what might be called the anti-matter of politics consists of what we fail to do when both the need and the capabilities exist.

Nor is the centrality of politics a recent development. As I will use the term, politics is as characteristically a part of the human repertoire as are language and our bipedal gait. What is more, it may be traceable in human evolution to a time long before the emergence of formal, specialized institutions of government. I will even argue that political behaviors are not derivative but may have been a major preadaptation and precipitant for the evolution of language and the explosive flowering of modern cultures, rather than the other way around. In any case, politics has been an integral part of the “progressive” evolution of human societies; it is not even uniquely human.

Although few would contest the obvious importance of politics in contemporary society, it is currently unfashionable to be an unabashed believer. People commonly despair of politics; in addition to the hordes who are politically apathetic, activists of the political left and right alike range in attitude from shrugging off politics as a necessary evil to excoriating it as unmitigated evil. The reasons for this are not hard to find. Everywhere - certainly in Western industrial societies - political systems are hamstrung by obstinate economic and political cleavages, choked by byzantine bureaucracies, and corroded by chronic and seemingly ineradicable corruption. At times our leadership seems only marginally competent, and we have become all but inured to successive revelations of bribery and various more subtle forms of venality. Instances of the rapid and inexplicable acquisition of a presidential or regal fortune now fail even to surprise us. Worse, we seem only faintly embarrassed by the hypocrisy of a nation that espouses human rights (or the welfare of the “proletariat”) while covertly and overtly embracing brutal, repressive, and self-serving regimes in the name of the higher morality of national self-interest.

Even if we cannot give most political regimes very high marks, it seems important, in view of the ubiquity and the impact of politics on all our lives, to attempt to gain a better understanding of the nature of politics and its relationship to the evolution of man and society. Furthermore, I believe that if politics is properly defined and interpreted, a more measured and more balanced view is justified; it should be possible to discern in the political sphere a set of trade-offs that involve both inherent costs and offsetting benefits. These costs and benefits are not fixed. Not only do they vary from one regime to another, from one historical era to another, even from one citizen to another, but they can be manipulated within limits to improve (or worsen) the benefit-cost ratio.

Equally important, politics is where the power is; the potential is always there for people to use politics as a tool either for constructive change or for wreaking carnage and destruction, and in this duality lies the supreme incarnation of humankind’s collective capacity to exercise social choices and assert political control, for better or worse, over ourselves and our environment. For this reason alone it behooves us to improve our understanding of the inner workings of politics and its relationship to the fate of our species.

## **Objectives of the Work**

My primary concern, however, has to do with making a contribution to three overlapping and ultimately connected domains of science: (1) evolutionary biology in general and sociobiology in particular; (2) social science as a corporate entity (especially cultural evolution theory); and (3) political science.

With regard to biology and sociobiology, I will advance a theory that addresses two major unresolved issues in evolutionary theory, namely, the causes of the emergence of complex biological systems generally and the emergence of social systems in particular. It has long been dogma among biologists that evolution is a nonteleological process that is governed essentially by the canalization that natural selection imposes on random microlevel genetic changes. Yet it has been known since Darwin’s day that behavioral changes often precede and precipitate changes in biological structures and the underlying genetic substrate. At the turn of the century this insight was elevated into a body of writings known as Organic Selection Theory (though it might better have been called Behavioral Selection Theory). The argument was advanced that behavioral changes should be viewed as a major cause of evolutionary change because they are often the most immediate, proximate cause of

changes in the all-important relationship between an organism and its environment.

The events that resulted in the eclipse of Organic Selection Theory will be recounted in due course; here I would only point out that the role of behavior in evolutionary change remains underrated to this day. The idea needs to be revitalized and given a more central place in evolutionary theory. I also intend to carry the argument a step further, to show how the evolutionary process has been partially purposive (teleonomic) in nature, albeit in a manner consistent with Darwinian theory. That is, one of the most significant trends in evolution has been an increase in the capacity for internally controlled purposive, or goal-directed behavioral changes (I call it "teleonomic selection"), which has in turn played an increasingly important role as a causal agent in the overall course of evolution. The human species is not *sui generis*; it has merely culminated (and greatly amplified) this trend. How this trend has occurred, and its relationship to the emergence of politics (as I define it), will be a significant aspect of this work.

Natural selection and teleonomic selection have also played a central role in the progressive evolutionary trend toward more complex, hierarchically organized systems. But the key to this trend has been functional synergism - combinatorial or co-operative effects that have had positive consequences in relation to various aspects of the problem of survival and reproduction. For example, the light metal sodium and chlorine gas are substances that in themselves are poisonous to humans, but when they are combined, they form a substance that is positively beneficial (in moderate amounts) - ordinary table salt. NaCl has functional synergism in relation to a specific human need. Likewise, the ability of humans to lift and lower various objects with their hands and forearms depends on the coordinated efforts of both the biceps muscle (on the forward part of the upper arm) and the triceps (on the back of the upper arm). The two muscles together achieve effects that would not be possible if they acted alone.

I call this formulation the synergism hypothesis, and I believe that it provides a framework for a general theory of progressive evolution. Let me state the hypothesis: It is the selective advantages arising from various synergistic effects that constitute the underlying cause of the apparently orthogenetic (or directional) aspect of evolutionary history, that is the progressive emergence of complex, hierarchically organized systems.

The second domain with which this book is concerned is the evolution of man and society. In essence, the synergism hypothesis also provides the basis for a theory of human evolution. Man's development as a species - from our earliest small-brained, bipedal ancestors to the most advanced modern nation-states - is quintessentially a special case of my more general theory of progressive evolution. The directional trend in our evolutionary history toward more complex social organization is also attributable to functional synergism.

Finally, I shall cap these theoretical foundations with a general theory of politics. My proposition is that there are fundamentally important commonalities that are shared by such seemingly disparate social entities as families, football teams, corporations, armies, and legislatures, and that it may be possible to reduce certain aspects of family life, team sports, commerce, war, and what is conventionally called politics to a unifying model and casual principle - the so-called cybernetic model and the principle of functional synergism. While there are obviously unique properties and unique casual forces associated with each of these very different types of social processes, synergistic effects of various kinds have nevertheless played a decisive (that is, necessary but not sufficient) role in their emergence and persistence.

A few words of explanation are in order. While the term cybernetics has become familiar in recent years, it is still not well understood. Cybernetics derives from the Greek word *kybernetes*, meaning helmsman or steersman, and our words *government* and *governor* (as in statesman and the old-fashioned automobile carburetor) are among its descendants. As currently employed, cybernetics denotes (1) a science that dates back to the pioneering work of Norbert Wiener and others on the problems of antiaircraft fire control in World War II, and (2) a set of analytical concepts (and models) that have come to be widely employed in various scientific problem areas.

As the word implies, a cybernetic system, whether in the biological realm or in human organizations, involves a dynamic set of processes organized and internally directed toward certain goals or end states. The key elements or aspects of a cybernetic system include (a) the setting of goals (and perhaps subgoals) that are instrumental to higher level goals; (b) the implementation of actions designed to coordinate the behavior of the system and its parts toward goal attainment; and, in furtherance of these activities, processes of

(c) communication and (d) control. In order to carry out these functions, cybernetic systems must necessarily be processors of information, energy, and often material substances.

The cybernetic system par excellence is of course the human being. So also, in a very imperfect way, is a wolf pack, and so is the U.S. government. However, not all cybernetic systems are political systems. As I use the term, political systems include the subset of all imaginable cybernetic systems that are social organizations of some sort. Thus politics is not at heart a separate and specialized sphere of social life; it is an aspect or dimension of all organized social life.

For this one occasion, I will use the controversial organismic analogy to underscore the point. Just as the brain, the neuroendocrine system, and the sense organs together comprise the cybernetic subsystem of a human body, so social organizations require similar subsystems - political systems - to effectuate the cybernation of their behavior.

In these terms, political processes may be highly consensual or highly coercive, highly participatory or highly authoritarian, highly formalized or highly informal, highly advantageous to participants or highly exploitative, just as our common sense and our political history tell us is the case. But whatever the properties from the viewpoint of the participant (or the moralist), the outside observer will always find implicit or explicit goals, activities oriented toward those goals, and flows of information (including feedback), energy (human or exogenous), and probably material substances of various kinds.

My colleagues in the social sciences will immediately recognize that this approach, this vision of the political realm, is not an original one; in recent years a number of social scientists have espoused a similar viewpoint. Yet there is an important distinction. Others have proposed the use of the cybernetic framework as a set of analytical and taxonomic concepts for the study of contemporary social and political life. However, they did not seek to explain *why* social organizations have cybernetic properties, that is, how these properties have come to exist and why they have evolved over time. Why, indeed, is it the case that humans are so readily, so naturally able to create social systems that manifest these properties? From the larger evolutionary perspective, this is unprecedented; it is one of the most distinctive aspects of our survival strategy as a species. Man is the quintessential cybernetic animal (or political animal in a larger sense even than Aristotle meant), with a remarkable ability, unmatched in any other species, for inventing new social goals and organizing (cybernating) collective behavior toward their realization.

If this view is correct, politics is not an epiphenomenon, not a distillate of economic activities, or of the class struggle, or of the machinations of ambitious leaders. Politics is a natural and necessary process of social life, a process that occurs whenever two or more individuals come together to work out a shared problem or to coordinate their efforts toward some shared goal, such as raising children or making war. It is also a process that, as the human species evolved and as cultural life evolved in tandem with it, became specialized and institutionalized in various, increasingly distinct spheres of social life.

Furthermore, this theory of politics is as applicable to other social species as it is to human beings; human politics is but a special case (albeit a very special case) of a class of phenomena that have deep roots in the larger process of biological evolution. When we speak of the politics of, say, *Apis mellifera* (the true honeybee) or *Canis lupus* (the European wolf), it is more than a facile metaphor in the tradition of Bernard Mandeville's infamous allegory *The Fable of the Bees* (1714). Strictly analogous functional processes are involved. Political systems are at bottom an emergent level of biological organization, even when they may be products of human artifice as well. Accordingly, this theory of politics is also a sociobiological theory.

Some skeptics have claimed that no such grand theory is possible. It has been said that the subject matter is inherently too refractory and that the aspiration for a bona fide scientific theory of social and political life should be written off as “a complete failure.” It has also been said that a theory that purports to explain everything would be able to explain nothing. But general theories are not about everything; they are theories about a problem or property shared by all the members of a particular class of phenomena.

Thus, for example, “natural selection” refers to a theory about the history of life on earth, the “decent with modification,” in Darwin’s phrase, of living forms and the pervasiveness of functional design in nature. However, natural selection is not a deterministic, controlling mechanism or agent, and nothing is ever actively “selected.” In reality, natural selection is a way of characterizing an aspect of dynamic process - in fact, a vast array of processes. Some recent definitions to the contrary notwithstanding, natural selection refers to those functionally important factors which are responsible in a given context for causing differential survival and reproduction among genetically variant individuals in a population of organisms, as well as for absolute changes in the numbers and diversity of different population and species over time.

In other words, the consequences, or effects of various functional interactions, both within an organism and between an organism and its environment, at the sources of natural selection. Natural selection is a casual theory, but the precise casual matrix within which natural selection occurs varies widely from one case to another. Only through careful empirical research can one identify those interactions which are responsible in a given instance for inducing evolutionary continuities and changes. Moreover, functional interactions are not the only factor that causes evolutionary change.

What I propose, then, is a general theory about certain directional (or progressive) trends in evolution - inclusive of what Herbert Spencer called “super-organic” evolution - which is strictly analogous to natural selection theory in its structure and which interpenetrates with that theory. The class of phenomena that I include in this theory are the biological processes, inclusive of social processes, that exhibit cybernetic properties; that is, they are cybernetic systems.

Theories of progressive evolution in this sense of the term are hardly a novelty; the venerable tradition of theorizing in this genre can be traced at least to Empedocles. Yet almost without exception these theories have been orthogenetic; they have postulated some form of superordinate teleology, guiding principle, energizing force, or mechanism that supercedes natural selection, such as Aristotle’s *physis*, Jean Baptiste de Lamarck’s “power of life,” Herbert Spencer’s Law of Evolution, Henri Bergson’s *elan vital*, Hans Driesch’s *Entelechie*, Pierre Teilhard de Chardin’s Omega point, Pierre Grasse’s *idiomorphon*, Ilya Prigogine’s “order through fluctuation,” and Jean Piagets *savoir faire*.

Unfortunately, such theories invariably explain away the very problem that requires explanation. They implicitly deny or downgrade the contingent nature of living systems and assume away the fundamental biological problem of survival and reproduction. But as biologist Theodosius Dobzhansky observed, “No theory of evolution which leaves the phenomenon of adaptedness an unexplained mystery can be acceptable.”

By contrast, the theory I advance is entirely compatible with natural selection. The synergism hypothesis involves a subsidiary aspect, or subset of the causal influences that comprise natural selection. Likewise, in relation to sociocultural evolution, functional synergism comprises a subset of the causal influences that have been responsible for orienting teleonomic selection by individuals and organized groups toward more complex forms of social organization. In other words, the synergism hypothesis constitutes a unified explanation for both the directionality that has inspired various orthogenetic theories of biological evolution and the directionality in sociocultural evolution that has inspired various social theorists from Aristotle to Adam Smith, Spencer, and Marx; it is a functional theory of biological and social structures. Furthermore, cybernetic processes - the process that I call political - have played an integral and necessary part in the process of sociocultural evolution, just as both analogous and homologous phenomena have played an integral part in the process of biological evolution.

Some logicians and philosophers of science may argue that this hypothesis does not constitute a bona fide scientific theory. However, I hope to show that, like Darwin’s theory, it does conform to the so-called hypothetico-deductive model of science. That is, there will be logically derived, falsifiable inferences (predictions and “postdictions”) that put the theory at risk. This does not necessarily imply that formulation of a

nomological generalization or a law that conforms to the Newtonian and logical empiricist model of science. Though this theory may well lead to some subsidiary, contingent “laws” of social and political life, a general theory in the biosocial realm cannot confine itself to deterministic phenomena. It must be able to account for the dynamics of a historical process - for the evolution of biosocial phenomena through time - in much the same way that natural selection theory seeks to explain biological evolution. And just as there can be no overarching law of biological evolution, so can there be no law of sociopolitical evolution.

One of Darwin’s greatest and least appreciated contributions to science was his recognition that a special kind of explanation is required for historical processes. Biological evolution, and by extension the evolution of humankind and society, involves an inextricable combination of stochastic (chance), deterministic, and purposive factors. The biologist Francisco Ayala has said that the products of evolution are endowed with an “internal teleology”; but I shall use Colin Pittendrigh’s term teleonomy to differentiate evolved biological purposiveness from the notion of an external design, or external teleology. Accordingly, a general theory must be able to encompass and synthesize the combined influences of “chance, necessity, and teleonomy - to embellish the well-known slogan of the late Jaques Monod.

Evolutionary biology offers a model for resolving the debate of the nineteenth-century social science pioneers about the relationship between history and science of society. If history can be defined as a sequential series of processes and events, sociocultural evolution is the cumulative patterning and functioning of those events and processes over time in relation to the goals and functional requisites of various organized human populations that are embedded in human and natural ecosystems. These functional interaction patterns involve historically discrete configurations of functional relationships and the process of evolutionary change entails systematic alterations in those configurations.

Consider one example, based on some elegant field work by the anthropologist Charles B. Drucker. Drucker showed that the culture of an isolated Philippine people, the Igorot, involves an intricately interwoven network of ecological, technological, social, and political elements - a synergistic system.

The Igorot occupy a remote mountainous area of Luzon, where for centuries they have practiced irrigated rice cultivation within an awe-inspiring system of earthwork terraces, dams, and canals that were laboriously carved with simple tools out of the precipitous mountainsides. It was once thought that these massive structures, characterized by early explorers as the “eighth wonder of the world,” were thousands of years old and had taken a thousand years to build. But now it appears that they are much more recent, the product of a heroic response to a rapid increase in population pressure. This was occasioned by the Spanish conquest and occupation of the choicest lowland and coastal areas in the early sixteenth century and the consequent wavelike flight of the natives into the mountainous regions. Where previously the Igorot inhabitants of some of the more remote areas had practiced a form of low-intensity, shifting cultivation called “slash-and burn” (or swiddening), the sudden increases in population and the demand for food precipitated a radical shift in survival strategies to the present rice terrace technology.

However, the interaction among political-military, demographic, and technological factors is not sufficient to account for the success of this alternative subsistence mode. The remarkable sustained fecundity achieved by the Igorot system also depends on the constant replenishment of soil nutrients, especially nitrogen. Yet in this case the various external sources of nitrogen are not adequate to support such abundant harvests. The key factor is the presence in the rice ponds of a nitrogen-fixing blue-green algae that lives in a symbiotic relationship with the rice plants. Respiration from the root structures of the plants generates the quantities of carbon dioxide that the algae need for photosynthesis and nitrogen fixation. At the same time, leaves of the plants shade the rice terrace mud, where the algae live, keeping temperatures cool enough for the algae to become prolific nitrogen producers. This in turn stimulates the growth of the rice plants, and the result is extremely high productivity coupled with great ecological stability. It is a synergistic system, and, over a period of several centuries, it has been possible for the Igorot to grow almost enough staple food on a single hectare (2.47 acres) to feed a family of five.

Yet this is only half the story. The evolution of the Igorot’s rice terrace system also depended on a radical shift of socioeconomic and political practices. Whereas the ancestral Igorot lived in small family groups that were well suited to shifting, small-scale plant cultivation, the successful adoption of the rice terrace mode

of production required the coalescence of these groups into an integrated organization. Sustained co-operative efforts became necessary, first to design and build this remarkable system and then to utilize, maintain, and expand it over time, for without constant weeding and repair the physical plant would rapidly deteriorate.

Accordingly, the Igorot had to invent a political system, a set of social structures and processes for coordinating in a complex and disciplined manner the activities of many previously isolated family groups. It was by no means inevitable that the Igorot would develop appropriate institutions and forms of co-operative behavior, but they did in fact do so. As a result, they exhibit today a cultural system that would be unrecognizable to the Igorot of an earlier era.

How can we be so sure that the Igorot's survival strategy was dependent on an entire configuration of factors, on a synergistic system? To find out, all we would need to do is remove a single component - say, the blue-green algae - and observe the consequences.

One other lesson can be drawn from this example. While a high degree of cybernetic control is required in order for the Igorot subsistence strategy to function smoothly, it was not predetermined (as Marx would have it) that a particular form of ownership, or a particular kind of decision-making and governing process would flow from these economic patterns. Unlike many comparable food production systems of the past, the Igorot exhibit a relatively egalitarian and communal society. There are individual family units and individual rice terrace plots within the terrace system, but these elements are coupled to a co-operative ethic and a pattern of intensely organized co-operative work groups that also perform social, governmental, military, and even educational functions in the community. The problem of cybernating social behavior may be solved in a variety of ways, within the constraints imposed by the environment and other aspects of a society's cultural experience and survival strategies. Nevertheless the key elements in the progressive evolution of Igorot society were functional synergism coupled with cybernetic social processes.

## **What This Work Is Not**

Having described in a very general way what this book is about, I want to say a few words regarding what this book is *not* about.

First, this is not an exercise in pop biology. The human being is more than a Naked Ape. In the 1960's some popular books equated animal and human behavior, but such ventures, on balance, were not very helpful. Human behavior differs in some very important ways from that of a stickleback fish or an Uganda kob. However, some of the most exciting recent animal research indicates that animal behavior has a far greater degree of malleability than had been supposed. Heretofore unsuspected capacities have been discovered in animals for "cultural" learning, for situational modification of behavior, for intelligent problem solving and rationalistic choice making. In essence, our superlative ability as a species to learn from experience, to set goals, to exercise self-control and control over the environment has many rudimentary parallels in the evolutionary process, as well as in our own evolutionary history. The theoretical significance of this discovery, which is only beginning to be assimilated, is of central importance to my theory.

Second, this work is not another exemplar of biological and social determinism; it is not "vulgar sociobiology," nor is it a political tract wrapped in the mantle of Science. It is not even a polemic either for or against sociobiology. Though I believe with Edward Wilson that sociobiology as the systematic study of social behavior from an evolutionary perspective is "an inevitable discipline," the sociobiologists' early theoretical formulations - in particular, the reductionist genetic models of human nature - now seem inadequate on scientific grounds. To a substantial degree, this book represents an alternative formulation.

Third, this work does not take sides on the bitterly contested nature-nurture (or heredity versus environment) issue. Nor does it avoid the issue. There is a middle ground position that may yet reconcile the two extremes. A clue to what the resolution may entail is contained in a parable that, even though it was suggested by a group of anti-sociobiologists, points the finger at both sides in the nature-nurture debate.

Imagine yourself living at a time when the process of photosynthesis was not known. Suppose that in attempting to understand the phenomenon of plant growth, a group of scientists did numerous experiments in which plant growth rate was studied under different light regimes. From their experiments they concluded that plant growth was caused by light. But, at the same time, another group of scientists did numerous experiments in which plant growth rate was studied under different water regimes. They concluded that plant growth was caused by water. A dialogue between these two groups could easily result in an entrenchment along the two different lines of thought rather than a synthesis of the two sets of experimental results. Arguments would be presented on either side to show how the other side was wrong, with scientists being called upon to align themselves with one group or the other ...

The basic structure of this example is equivalent to the biological versus environmental determinist controversy. To see a question of the origin and maintenance of human social behavior or social institutions as merely a choice between determinisms, with the argument being only what percentage is environmental and what percentage is biological, is just as scientifically absurd as attempting to understand plant growth by assigning a certain fraction to light and another fraction to water. Just as water and light are utilized in the process of photosynthesis to drive the complicated biochemical processes that eventually result in plant growth, biological and environmental factors are intimately related in a complex network of interactions between human and environment, which result in the observed patterns of human behavior and social institutions. What then is the alternative to determinism?

One alternative, which I describe in detail later on, is what I call the Interactional Paradigm. In the *Interactional Paradigm*, social causation is viewed as multileveled, configural, and interactive. It seeks to integrate deterministic, teleonomic (goal-oriented), and stochastic elements and - from a different perspective - internal (biopsychological) and external (social and ecological) elements into a dynamic, hierarchical framework. This paradigm is clearly implied by contemporary research and theoretical work in a number of disciplines. To varying degrees, it has been advocated by a number of theorists in recent years. The pieces need only be brought together in a more coherent and comprehensive manner. The *Interactional Paradigm* is distinctive primarily in that it utilizes a multileveled cybernetic framework, that is, a cybernetic-systems-within-ecosystems framework.

To illustrate, consider the role of fresh water in societal development. Fresh water is an absolute and incessant human need, though modern urbanites often take its presence for granted. This need is not a social fact but a biological fact, though it is of considerable social consequence. It happens that the distribution of human populations correlates highly with the geographic distribution of fresh water resources, the locations of which are evolved geological and climatological facts.

Clearly, in this instance biological facts interacted with environmental facts to shape initial human decisions about where settlements should be located and to determine (subject to some human manipulation) the ultimate capacity of these civilizational zygotes for subsequent growth. It is certainly no accident that almost all the world's major cities are located on or very near rivers or fresh water lakes. Nor is it coincidental that the earliest large-scale civilizations were located in river valleys where sophisticated water management technologies were developed. Yet any beginning student of statistics can tell us that a correlation does not prove causation; we need no statistician to tell us that fresh water supplies do not cause civilization. On the other hand, common sense tells us that the loss by any civilization of its water supply - say, as the result of a climate shift - would indeed cause a rapid and catastrophic decline of that society.

A paradox, but one we do not find difficult to understand; fresh water is a necessary but not a sufficient condition for civilization, and we can make sense of its relationship to human evolution by understanding, first, the causal role of the biological need for water; second, the geographic pattern of fresh water distribution; and third, the fact that people have a configuration of simultaneous basic needs - for various nutrients, clothing, shelter, energy, raw materials, physical security, as well as some important social needs - the satisfaction of which are also causes of civilizational development and decay. These needs create the *a priori* challenge to which human societies have responded.

Thus, if we wish to explain an actual case of societal development, we must take the entire structure of human needs into account. A full explanation of how the sequential patterning of human choices, or teleonomic selections, occurs involves an examination of the dynamic interaction among a great many factors: climate, geography, resources, arable land, demography, technology, economic and sociopolitical organization, and not least, interactions with other human populations. Of course, this is not a new idea. It was expressed in essence by Aristotle in *The Politics* and was revived by Montesquieu in the eighteenth century in *The Spirit of Laws*.

We seem forever to be rediscovering (and then forgetting) what the ancients knew.

In addition, if we seek deeper knowledge of the more remote causes - the causes of the causes - we might want to probe the geological and ecological forces that were responsible for the precise geographical distribution of needed resources, as well as the evolutionary antecedents that produced a species with our precise set of needs and physical and mental capabilities *and*, not least, the evolved cultural preadaptations that enables human populations ultimately to form dense civilizations based on crafts, commerce, agriculture, and pastoralism. The process of cultural evolution has been intensely interactional. Just as it is meaningless to ask which tumbler in the combination is responsible for opening a combination lock, it makes no sense to specify which particular cause in a complex network of causation is responsible for a specific social or political development.

Finally, this book is not a preface or a prolegomenon. It is not an exercise in laying the groundwork; it does not “point toward” anything. Rather, it attempts to make a landing in force and to establish a bridgehead. The very scope and boldness of this theory may be offputting to some; ambitious ideas invite instant antagonism, and it would be disingenuous of me to feign ignorance of the politics of science. However, there is nothing gratuitous about this supertheory, for I am addressing a fundamental aspect of a single (albeit many-faceted) historical process. Mindful of Albert Einstein’s observation that “a theory is all the more impressive the greater is the simplicity of its premises, the more different are the kinds of things it relates and the more extended its range of applicability,” I have come to believe that it is both possible and appropriate to reduce certain fundamental aspects of the evolutionary process, in nature and in human societies alike, to a unifying theoretical framework.

My theory is built on foundations that were laid by many other theorists, past and present. While such a disclaimer is commonplace and platitudinous, I mean this one to be taken literally. The theory I propose is my own, but it is also the explicit outgrowth of a cumulative process to which many others have contributed. I shall identify and evaluate some of these intellectual antecedents as I proceed.

Equally important, my theory has had a life of its own and no longer reflects my original aim. At the outset, more than a decade ago, the objective was to relate social processes to the biological problem of survival and reproduction. As the work proceeded, certain ideas emerged and certain connections were made. In the end, I have been impelled to follow where the theory led me. Only time will tell whether these connections are justified.

\*The title of my introduction is a play on an academic affection. Although the practice has only recently fallen out of favor, for many years it was customary at academic conferences for the chair, or some other designated person, to present a final summation under the heading, *Quo Vadimus?* (Where do we go from here?). Considering the scope (and the bulk) of this volume, it seemed to me that this might be a good way to begin our journey.