# DIALECTICS - POLITICS - CYBERNETICS

## THE SOCIOPHYSICS OF COMPLEX SYSTEMS *

### P. ARNOPOULOS

------------

## INTRODUCTION

This study describes and explains the triangular relationship among the functional concepts of Dialectics, Politics, and Cybernetics, on the basis of the new Theory of Sociophysics. According to this theory natural and cultural systems share common roots and significant similarities, therefore they are best understood by a Single Unified Model. The details of these and their underlying Triadic Interface Paradigm have been elucidated by this author in a separate monograph (**Sociophysics**, 1991).

The significance of this presentation stems from the need to increase human control over both the social system and its natural environment. Our thesis here is that such cybernetic need is best met by strengthening political institutions through the improvement of dialectical methods. Due to the constraints of this paper, we will attempt to demonstrate that thesis by a succinct summary argument which may be elaborated separately later.

We shall proceed by analyzing the relevant aspects of each of our functional concepts in three operational categories : phenomenal, logical, and behavioral. This taxonomy intersects natural, social and state variables with factual, ideal, and actual conditions. The resulting two dimensional 3 × 3 contingency matrix serves as the Table of Contents showing the nine chapters of this work, classified by parts (rows) and sections (columns).

## 1. DIALECTICS

We begin with a brief look into what may be considered as the essential nature of reality : i.e. differentiation in comparison. From the yin and yang of oriental thought to the positive and negative charges of occidental science, many opposite dyads have been posited throughout history. These conflicting pairs however can blend in some way to produce harmonic combinations.

This basic structural characteristic leads to our key functional process. As is well known, dialectics proceeds by juxtaposing two contradictory elements (thesis and antithesis) and trying to resolve their conflict by an eclectic selection and fusion of their most complementary components in a viable consensus (synthesis).

------------

P. ARNOPOULOS, Concordia University, Montreal H3G 1M9 - Canada.

The resulting spiral process creates stability and balance, as well as novelty and progress both in physics and politics, so we see it as a fundamental trait of natural statics and social dynamics. To support this thesis, we shall present three aspects of dialectical reality in nature by combining the chaotic, deterministic, and voluntaristic elements of this explanation ; thus drawing the conceptual framework which serves as our universe of discourse.

## 1.1. EXISTENTIAL COMPLEXITY

Within the primordial space-time context of reality, the content of existence manifests itself as various forms of matter-energy. From the singularity of the Big Bang to the variety of the present situation, evolution created different structures held together by a few forces. The resulting systems broke the original simple summetry into a complex of disparities, among which are found atoms and stars as well as plants and men.

Although it has been said that this evolution is the result of random combinations of elements or genetic mutation of systems, it is more likely that the development of increasingly complex structures combines random with cosmic forces. These forces create order out of chaos and form out of mass. In this sense we speak of information as the third reality shaping matter and energy into coherent and cohesive systems.

Cosmic ordering consists of informing material reality with spatial patterns and temporal regularities by which distinct systems can nevertheless share common elements and comparable components. This tendency of information to keep within certain exclusive syntropic channels can be explained by the existence of cosmic codes.

## 1.2. NATURAL LAWS

Casual observation and mature consideration reveals that reality exhibits two distinct tendencies : static and dynamic in time, as well as similarity and individuality in space. The first is shown in the continuity and change of history, while the second is reflected in the sameness and variety of things. Since both patterns can be found in various combinations, it may be said that their blends constitute everything we can see or imagine.

From these ubiquitous phenomena, we can deduce two pairs of opposing general laws : Conservation and Alteration as well as Equation and Differentiation. The former determine the constants and variables in periods, while the latter define the identities and distinctions of patterns. The famous laws of conservation of matter and energy in physics, as well as the general rules of symbolic operation in geometry and mathematics attest to these codes.

Contrary to the Conservation Laws and the Natural Constants which are everywhere and always the same, the Alteration Laws change things either by developing or deteriorating them. The most important of these : the Entropy Law, like the arrow of time, moves everything inexorably from its birth to its death. In between however, the Syntropy Law of Life creates new and complex systems and reverses the flow of entropy in certain limited and temporary, but nevertheless important ways.

## 1.3. GENERAL SYSTEMS

The combination of the chaotic and deterministic aspects of existential reality create the empirical actuality of general systems. These sets of interrelated-interacting units may be classified into three hierarchical types of increasing

complexity. The first and simplest includes physical systems of natural origin, from atomic to astronomic. The second intermediate adds life to matter and energy, thus creating organic bodies.The third and highest forms human society as the paragon of all systems.

Although the first level is exclusively natural, the emergence of humanity in the second introduced artificiality, which came into its own in the third by combining both mechanical and mental systems : the products of the human hand and mind. For that reason human societies are a combination of natural and cultural factors and follow not only random and deterministic, but also intentional laws of convention and codification.

Social systems have various forms and functions reflected in their institutions and policies which we shall divide into three types :

-   Economic-metabolic : extraction, conversion, and consumption of matter and energy in order to maintain the system in a steady state ;
-   Cultural-informatic : creation and communication of data and ideas in order to reproduce and perpetuate the system and its social values ;
-   Political-cybernetic : behavior-controling, problem-solving, rule-setting in order to govern and defend the system.

**SOCIAL SECTORS**

STRUCTURES & PROCESSES
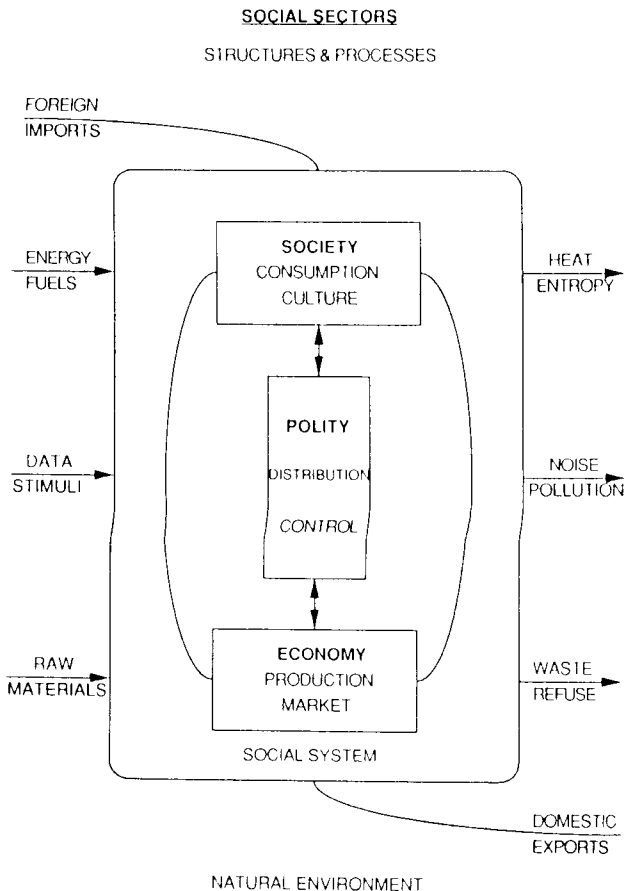
## 2. POLITICS

The polity along with the economy and society form the three subsystems of the social system. Their structures comprise states, markets and nations, whose respective functions include regulating, exchanging and creating. Each of these sub-systems, of course, is further sub-divided into various sectors : primary, secondary and tertiary ; and their relationships intersect at various levels : infrastructural, structural and superstructural.

These structures and relations are held together by shared genes, interests or opinions, as in families, classes or parties. In all cases however, the social bonds which unify each group and separate it from others make up a charged field of attractive and repulsive forces. Social fields are created and maintained by high levels of material transportation, energy transformation and information communication.

The strength of sociofield connections determines the degree of community and solidarity characterizing a group from the strongest intrafamily ties to the weakest international relations. As a result, social systems include a mixure of both cooperative and conflicting interactions, as well as amical and hostile interrelations. The alternating conditions of war and peace represent extreme ratios of these combinations whose parameters we shall now outline.

### 2.1. HUMAN POWER

The concept of power is crucial both in natural and social science because it is related to the effect that bodies have on each other. As the rate of doing work or the speed of applying force, physical power may be translated into social by the degree to which it affects human behavior. In this sense, it should be somewhat differentiated from influence which is a measure of altering human thought.

By its capacity to maintain or change behavior, social power is a major factor in system stabilization and manipulation. The few who wield it, according to the Iron Law of Oligarchy, set the agenda and decide the choices open to society at any particular time. Attaining and exercizing power is therefore one of the basic human drives and social activities, especially in the political arena.

As all social values, power is a scarce commodity, so the competition for it is intense and unrelenting. Power struggles are waged to determine whose interests will be promoted or whose opinions will prevail above those of others, thus settling the question of who gets what, when and how. It is these conflicts of interest and clashes of opinion that produce the various scenaria of the social power play which we follow from the banal micropolitics of everyday life to the crucial macropolitics of the world stage.

### 2.2. MORAL FACTOR

Of course, the will to power is not the only human motive for action. People pursue a multiplicity of values which they attain in different ways, times and places. The depth and extent of their committment or quest for their values depends on the priorities set according to the criteria of basic human needs and inherent natural codes.

Of these, logic ; ethic ; and esthetic are fundamental. The first guides the cognitive processes of human reason, the second juxtaposes the normative element of human conscience, and the third contributes the emotive aspect of

. the human spirit. Together, gnosis, crisis, and poesis, combine in various proportions to extend or extenuate the drive for power, thus making human coexistence and community possible.

For our purposes, it is the moral criteria that are most important because they frame social relations on the basis of considerate behavior. In that sense, an ethical act must take into account the wishes of those it affects ; and the best way to do that is by consultation and communication. Accordingly, morality modulates power relations by demanding that any attempt to affect the behavior of others be done in conformity with the principles of mutuality and reciprocity.

## 2.3. CIVIL ORDER

By balancing force and power with rationality and morality, politics tries to create an optimal civic and civil order. Since its institutionalization in the original *polis*, political conduct meant the citizen interactions in public affairs which aimed at conflict-resolution by dialectical means. This negotiated settlement of disputes and collective decision-making by mutual accomodation of converging interests and opinions, not only became the prototype of democracy, but of civility and civilization.

In order to work in reasonable manner, politics must coexist with a relatively egalitarian distribution of material and spiritual values. Only then can common standards of legitimacy become widely shared so as to moderate individualism with collectivism and human rights with social duties. As a result of such equilibrium of forms and forces, a social order of constitutional legality can operationalize political morality in public life.

On the strength of the argument so far, it seems that limiting the domination of matter and energy by dialogue of ideas and communication of information humanizes our nature and civilized our culture. It is this empathetic-dialectic method of solving social problems that distinguishes man from beast and polite from barbaric behavior.
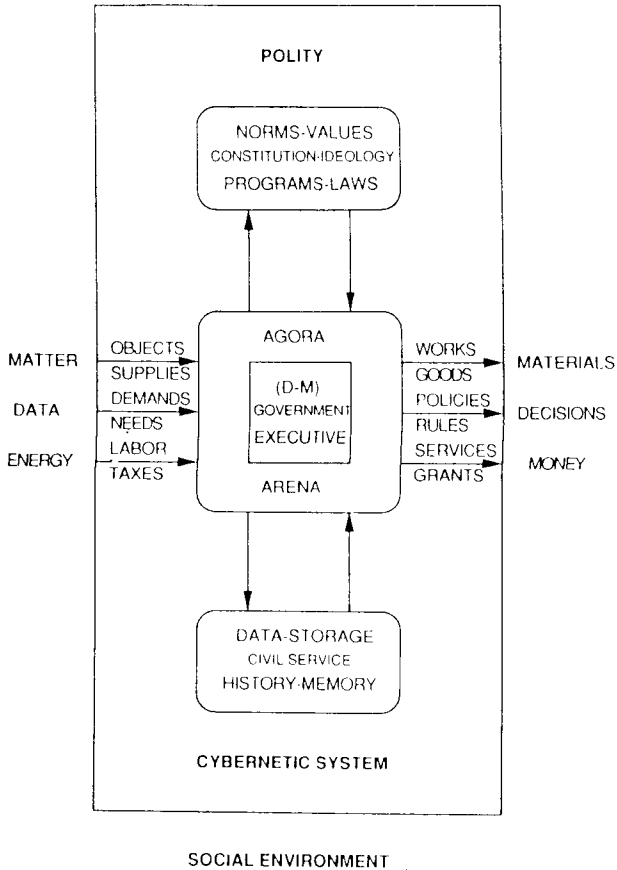
## 3. CYBERNETICS

If humans were perfectly rational or ethical beings, there would be no need of politics ; neither would sociodialectics be necessary in a perfect state of nature. But since evolution supplanted nature with culture and atrophied instinctiveness by emphasizing consciousness, mankind is caught with too many options and too few tools to select among them. By loosening their genetic codes before developing sufficient civic laws to replace them, humans are still groping for a way out of their dilemma of aquiring too much power but not enough wisdom.

Evaluating the human condition to be somewhat above animals, yet way below angels ; it behooves us to develop the necessary arts and sciences to bridge the widening gap between slow-plodding nature and fastpaced culture. Although our technological accumen has bettered the lives of few, it has also worsened those of many by accentuating potential differences and deteriorating the global ecosystem. It is therefore imperative that our outdated political techniques be developed sufficiently to correct and control the abuses of our physical technology.

It is at this point where sociocybernetics may come in to save the day. As shown in the Diagram below, the cybernetic sector of society can control its flows of matter, energy, and information in such way as to make them more acceptable to both natural and cultural values as suggested in the following sections.

SOCIO-CYBERNETICS

POLITY

NORMS-VALUES
CONSTITUTION-IDEOLOGY
PROGRAMS-LAWS

AGORA

(D-M)
GOVERNMENT
EXECUTIVE

ARENA

MATTER

DATA

ENERGY

OBJECTS
SUPPLIES
DEMANDS
NEEDS
LABOR
TAXES

WORKS
GOODS
POLICIES
RULES
SERVICES
GRANTS

MATERIALS

DECISIONS

MONEY

DATA-STORAGE
CIVIL SERVICE
HISTORY-MEMORY

CYBERNETIC SYSTEM

SOCIAL ENVIRONMENT

## 3.1. SOCIAL DYNAMICS

The thesis of sociocybernetics is that since humanity cannot go back to its natural state of innocence, it must become more responsible when intervening in the scheme of things. The complex systems created by natural evolution are so delicately balanced as to be easily upset when interfered with even by slight social tampering. Thus great care must be taken by human institutions and their policies to maintain the natural equilibrium as well as to promote social development.

It is our contention here that advancing cybernetics can improve our command and control of both social systems and their natural environment. Since we are here dealing with complex, dynamic, non-linear systems, it is not only necessary to know how the input-throughput-output process works, but to possess sufficient know-how to calculate and manipulate its positive and negative feedback loops over large areas and long periods.

Yet, our capacity to control the world super-system has sadly lagged behind our capability to affect it in critical ways. A world government, as the global servomechanism, is still in its primitive stage ; while a world market, as the global metabolic sub-system, is already quite integrated. Between these two out-of-step phenomena, a human culture is struggling to create a cosmic ideology combining ecological and anthropological concerns.

## 3.2. LEGAL NORMS

As was mentioned above, the sociocybernetic system, i.e. polity, cannot work properly without the support of its cultural system, i.e. society. It is the latter that determines the underlying values, beliefs, and behavior, which the former needs to set its operating procedures. When the world culture is not yet sufficiently developed to attain a global consensus, its governing institutions flounder in equivocation and ineffectiveness.

Although such cultural consensus is slowly forming, economic and ecologic realities are moving too fast to wait for it to catch up. The cybernetic system must therefore intervene to bridge the gap between them. It is up to the polity to impose by timely legislation what society cannot develop by lagging tradition. Such new global standards must establish the rules of acceptable collective conduct in the emerging planetary order, thus encouraging international law to catch up with inescapable hard facts.

Since the pace of socialization is too slow compared to that of modernization, the required change of behavior must come about by external necessity rather than internal intentionality. The former will either be imposed by natural catastrophe or decided by public policy. It is this latter option that is obviously preferable, so we will see how it can be best brought about.

## 3.3. POLICY CONTROL

In a partly deterministic and randomistic reality, it appears that the human condition precludes perfect control. But, although the imperatives of cosmic order and chaos do not necessarily coincide with human needs and frequently override human desires ; they are sufficiently supple to be taken advantage of, if we can appropriately understand and manipulate them. In this task, cybernetics can make the difference between chasing utopian ideologies and implementing pragmatic policies.

Recent chaos theory emphasizes an implicate fractal order underlying complex systems whose tendency for nonlinear responses makes them quite unpredictable. Moreover, the discrepancy between individual and collective rationality increases the probability of a tragedy of the commons. In this dilemma, catalytic policies can provide the controled activation of strange attractors which keep the system from extreme and explosive fluctuations. Thus even if any particular bifurcation cannot be foreseen, a general leverage strategy can work in a given probability envelop.

By combining chaotic and dialectic principles, it may be possible to develop sophisticated procedures of collective decision-making and action-taking. Applying the precepts of Dialectichaos in cultural and natural dynamics can put us in a better position to arrive at consensual policies and carry out collective controls. Like accupuncture, accurate and prudent intervention upon the body politic at the proper time and place can produce great change with small effort, thus avoiding the extremes of insensitive laissez-faire or brutal totalitarianism.

## CONCLUSION

The constraints of this paper forced us to strict limits and succinct outlines of a very complex argument. Highlighting the salient points of the dialectic-politic-cybernetic interface is not an easy task under the best of circumstances. Yet, its importance made it a worthy challenge whose outline we can now conclude.

Resolving the social issues of conflict and control require an ongoing manipulation of power and prioritization of values. This dialectic process juxtaposes the cybernetic aspects of cultural direction and natural evolution. Thus, if properly played, politics can increase the synergy and morality of collective decisions and actions.

Accordingly, the thesis of this paper correlated social statics and dynamics with ethics and energetics, by emphasizing politics as a moral and rational activity. Since combining social education and political regulation can make people not only self-conscious but also self-governing ; knowing the limits of one's capacity and the margins of one's manoever optimizes the combination of human values in harmony with natural laws, thus increasing the survival probability of our species in the Third Millennium.

# BIBLIOGRAPHY

ARNOPOULOS P. J., Sociophysics, Nova Science, N.Y., 1993.

AULIN A., The Cybernetic Law of Social Progress, Pergamon, Oxford, 1982.

BOULDING K.E., Ecodynamics, Sage, B.H. 1978.

CASTI J.L., Paradigms Lost, Morrow, N.Y., 1989.

ENGELS F., The Dialectics of Nature, Lawrence & Wishart, London, 1940.

FISKE D. & SHWEDER R., Metatheory in Social Science, Chicago U.P., 1986.

GEYER R. & VAN DER ZOUWEN (eds), Sociocybernetics, Nijhoff, Leiden, 1978.

GEYER R. & VAN DER ZOUWEN (eds), Sociocybernetic Paradoxes, Sage, B.H., 1986.

HAKEN H., Synergetics, Springer, N.Y., 1978.

HANKEN A.F., Cybernetic & Society, Abacus Press, Turnbridge Wells, 1981.

IYER R., Parapolitics, Oxford, N.Y., 1979.

KONRAD G., Antipolitics, Harcourt-Brace-Jovanovich, N.Y., 1984.

KOSIK K., Dialectics of the Concrete, Reidel, Dordrecht, 1976.

KUHN A., The Logic of Social Systems, Jossey-Bass, S.F., 1976.

LOEBL E., Humanomics, Random House, N.Y., 1976.

D. & D. MEADOWS, Beyond the Limits, McLelland & Stewart, Toronto, 1992.

PARKMAN R., The Cybernetic Society, Pergamon, N.Y., 1972.

SARTRE J.P., Critique of Dialectical Reason, NLB, London, 1976.

STAMPS J.S., Holonomy, Intersystems, Seaside, 1980.

SUTHERLAND J.W., Societal Systems, North Holland, N.Y., 1978.

VAN GIGCH J.P. (ed), Metasystems & Metamodels, Pergamon, London, 1986.

WATTS M.W. (ed), Biopolitics, Jossey-Bass, S.F., 1981.

WEINER N., Cybernetics, Elsevier, N.Y., 1948.

WHITE E., Sociobiology & Human Politics, Heath, Lexigton, N.Y., 1981.