BIOPOLITICAL BEHAVIORAL THEORY

The most recent issue of the *Reviewer* includes Fred Kort's comprehensive review of my previous books.[1] In their appraisal of my work, the substance and tenor alike of Professor Kort's opinion are so fair-minded and generous that I certainly have no reason to venture a reply to what he wrote. At the same time I do welcome the invitation to respond to his essay by viewing it as a prologue: his concluding paragraph remarks that the final section of my latest book deals explicitly with models drawn from both biology and physics; and although my own predilection favors the more open model implied by modern physics,[2] in what follows here I shall confine myself to the biological connection.

Professor Kort's essay discusses mostly books on the relationship between law and politics, and in particular their conjunction in the process and substance of decision-making by judges and courts. Indeed, my very first book, belatedly published some years after it initially was written, is and purports to be (as he points out) a work in public law; and like my own graduate socialization owes considerably less to the behavioral sciences of psychology, sociology, and anthropology, than do the books that followed it. The impact of the behavioral sciences upon *my* political science came post-doctorally, and was mediated by a process of group learning in the educational context of a developing department that was responding to the academic euphoria of the fifties. (It was only much later in life that I learned of the Harlows' work in the primate laboratories of the University of Wisconsin-Madison, and realized that my indoctrination into the behavioral sciences was somewhat analogous to the way in which Rhesus juveniles learn the psychological postures, social behaviors, and motor skills that enable them to be capable of functioning as effectively coping adult monkeys: age-mates teach each other in and through play.3)

1 Fred Kort, "The Works of Glendon Schubert: The History of a Subdiscipline," *Political Science Reviewer,* Vol. IV (1974), *pp. 193-227.*

2 For a fuller statement of my reasons, see the conclusion to my "Future Stress, Constitutional Strain, and the American Judicial System," chapter 12 in my *Human Jurisprudence* (Honolulu: The University Press of Hawaii, 1975).

3 Harry F. and Margaret Kuenne Harlow, "Social Deprivation in Monkeys," *Scientific American,* Vol. CCVII *(1962), pp.* 136-146; and Caroline Loizos, "Play in Mammals," *Symp. Zool. Soc. Lond.,* Vol. XVIII *(1966),* pp. *1-9.* For discussion of politics as play-and vice versa-see Henry Kariel, *Open Systems: Arenas for Political Action* (Itasca, Ill.: F. E. Peacock Publishers, 1969), especially at pp.

In a mood similar to that inspiring my induction into the behavioral sciences, increasingly during the past decade and in the company of at least a few dozen fellow political scientists,[4] I have found myself swept along by the cultural influences generated by the impact, upon the behavioral sciences, of the revolutionary implications of the new biology that has developed since the end of the second world war.[5] The most spectacular and sweeping changes have come in the interfaces between biology and the "hard core" natural sciences such as chemistry, physics, geology, and astronomy, as evidenced by the discovery of DNA ("the greatest and most comprehensive idea in all science"),[6] the rise of behavioral genetics,[7] the establishment of brain research as a focus of inquiry,[8] and the use of space vehicles to augment exobiology (formerly dis-

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34-36 and 50-54; but *cf.* also his "Expanding the Political Present," *American Political Science Review,* Vol. LXHI (1969), pp. 768-776 at p. 773; and Samuel M. Hines, Jr. "Political Action as Play: An Enquiry into the Epistemological and Psychological Ground of Henry Kariel's Political Theory" [APSA 1975].

4 Perhaps the most objective evidence of this shared interest consists of the panel meetings that have convened annually, beginning in the late sixties. I myself have attended or participated in such panels at the following professional meetings: Southern Political Science Association (New Orleans; November, 1967); Western Political Science Association (Honolulu; April, 1969) [hereinafter cited as: WPSA 1969]; International Political Science Association, Seventh World Congress (Munich; August, 1970) [IPSA 1970]; American Political Science Association (Chicago; September, 1971) [APSA 1971]; American Political Science Association (Washington; September, 1972) [APSA 1972]; International Political Science Association, Eighth World Congress (Montreal; August, 1973) [IPSA 1973]; Biopolitics Conference sponsored by the International Political Science Association and the Harry Frank Guggenheim Foundation (Paris; January, 1975); Midwest Political Science Association (Chicago; May, 1975); and looking to the short-range future, a Colloquium on Biopolitics that I shall present at the University of Connecticut (Storrs; September, 1975), and the Ninth World Congress of the International Political Science Association (Edinburgh; August, 1976).

5 See Philip Handler (ed.), *Biology and the Future of Man* (New York: Oxford University Press, 1970); John A. Behnke (ed.), *Challenging Biological Problems* (New York: Oxford University Press, 1972); and Arnold B. Grobman (ed.), *Social Implications of Biological Education* (Princeton: Darwin Press, 1970).

6 J. D. Bernal, as quoted by Freeman J. Dyson, "The World, the Flesh, and the Devil," reprinted as Appendix D to Carl Sagan (ed.), *Communication with Extraterrestrial Intelligence* (Cambridge: The MIT Press, 1973), **at p. 375; Francis Crick,** ***Of*** *Molecules and Men* (Seattle: University of Washington Press, 1966); James D. Watson, *The Double Helix* (New York: Atheneum, 1968); and Jacques Monod, *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology* (New York: Knopf, 1971).

7 Jerry Hirsch (ed.), *Behavior Genetics Analysis* (New York: Wiley, 1967).

8 James C. Davies, "Brain Condensers and Political Behavior: A Prototheory," in Albert Somit (ed.), *Biology and Politics: Recent Expectations* (Paris: Maison des Sciences de 1'Homme, 1975).

tinguished more for its dystopian role in science fiction) with status as an empirical, field component of astronomical science.[9] Such advances in bionatural sciences are reflected in the proliferation, for purposes of both teaching and research, of such biobehavioral sciences as human genetics, neuromorphology, neurochemistry, endocrinology and reproductive physiology, and neuropsychopharmacology; but these have been accompanied by other fields of biobehavioral science with a more explicitly social orientation, such as biological anthropology,[10] (developmental) psychobiology,[11] biolinguistics,[12] ethology and comparative psychology[13] (including primatology),[14] human ecology and environmental biology,[15] and evolutionary sociology.[16] It is these latter facets of the new social biology[17] that already have proved to be of most direct concern to

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9 Evan Vlachos, "Doomsday and Ecocatastrophe: Dystopial Today" [IPSA 1973]; Carl Sagan, *op. cit* ftn, 6, *supra;* and Carl Sagan, *The Cosmic Connection: An Extraterrestrial Perspective* (Garden City, N.Y.: Doubleday, 1973).

10 Eliot D. Chapple, *Culture and Biological Man: Explorations in Behavioral Anthropology* (New York: Holt, Rinehart and Winston, 1970).

11P. Herbert Leiderman and David Shapiro, *Psychobiological Approaches to Social Behavior* (Stanford: Stanford University Press, 1964); John Nash, *Developmental Psychology: A Psychobiological Approach* (Englewood Cliffs, N.J.: Prentice-Hall, 1970); and William T. Greenough (ed.), *The Nature and Nurture of Behavior: Developmental Psychobiology* (San Francisco: Freeman, 1973; and Solomon H. Katz (ed.), *Biological Anthropology* (San Francisco: W. H. Freeman, 1975).

12 Eric H. Lenneberg, *Biological Foundations of Language* (New York: Wiley, 1967).

13 Here we find an integration of European field-observational zoology, and American laboratory-experimental psychology of animal behavior: Robert A. Hinde, *Animal Behaviour: A Synthesis of Ethology and Comparative Psychology* (New York: McGraw-Hill, rev. ed. 1970); and Robert B. Zajonc, *Animal Social Behavior* (Morristown, N.J.: General Learning Press, 1972); Edward O. Wilson's magnificent *Social Biology* (Cambridge: Harvard University's Belknap Press, 1975).

14 Irven DeVore (ed.), *Primate Behavior: Field Studies of Monkeys and Apes* (New York: Holt, Rinehart and Winston, 1965). For an illustration of positive feedback from priinatology (in this instance, to human speech therapy), see Frank Anders, "If you can teach an ape to read, can you do something for my retarded child?" *New York Times Magazine* (June 1, 1975), pp. 14, 47-58. (Chimpanzees have not, of course, been taught to "read," nor will they ever [for morphological reasons] be able to learn to "speak," human languages well; but several have learned to communicate, in either of two quite different symbolic languages that they can share with humans.)

15 Arthur S. Boughey, *Man and the Environment: An Introduction to Human Ecology and Evolution* (New York: Macmillan, second ed. 1975).

16 Morton H. Fried, *The Evolution of Political Society* (New York: Random House, 1967); Gerhard Lenski, *Human Societies: A Macrolevel Introduction to Sociology* (New York: McGraw-Hill, 1970).

17 Edward O. Wilson, *Sociobiology, The New Synthesis* (Cambridge: Harvard University Press, 1975).

anthropology,[18] psychology,[19] and sociology,[20] and that are most likely to have a critical bearing upon the development during the next ten years of biopolitical behavioral theory.

Political Behavior

If biology is to make a greater contribution to political science, then it becomes necessary to be able to specify what political science is about. As I have argued elsewhere[21]-and as even a superficial examination of the relevant evidence makes clear-there is no simple and easy answer to the latter question.[22] Clearly it is no longer the study of government alone; nor has it for a long time been merely a branch of the humanities. Defining it as the study of politics begs the question, unless and until we are better able to break that tautology of circular definition. It is true that many (and probably most) departments of political science continue to display circular structures that exhibit little change from a now remote past when the functional specializations of the persons teaching the courses did correspond to political philosophy, international relations, comparative government, political parties, public administration, public law, state and local government, and methodology. But research categories are a far better guide, than teaching rubrics, to the locus of the cutting edge of inquiry for the production of new discipli-

18 Hilary Callan, *Ethology and Society: An Anthropolitical View* (New York: Oxford University Press, 1970); David Pilbeam, *The Ascent of Man* (New York: Macmillan, 1972); and Alexander Alland, Jr., *Evolution and Human Behavior: An Introduction to Darwinian Anthropology* (Garden City, N.Y.: Doubleday, second ed. 1973).

19 Daniel P. Kimble, *Psychology as a Biological Science* (Pacific Palisades, Cal.: Goodyear, 1973); Sebastian P. Grossman, *Essentials of Physiological Psychology* (New York: Wiley, 1973); Hans J. Eysenck, *The Biological Basis of Personality* (Springfield, Ill.: Charles Thomas Publisher, 1967); Richard F. Thompson (ed.), *Physiological Psychology* (San Francisco: W. **H.** Freeman, 1972); and Norman F. White, *Ethology and Psychiatry* (Toronto: University of Toronto Press, 1974).

20 John Milton Yinger, *Toward a Field Theory of Behavior: Personality and Social Structure* (New York: McGraw-Hill, 1965); Donald W. Ball, "The Biological Bases of Human Society," chapter 5 in Jack D. Douglas (ed.), *Introduction to Sociology* (New York: The Free Press, 1973); and Pierre L. van den Berghe, *Man in Society: A Biosocial View* (New York: Elsevier, 1975).

21 See my "Politics as a Life Science: How and Why the Impact of Modern Biology Will Revolutionize the Study of Political Behavior," in Somit, *op. cit.* ftn. 8, *supra.*

22 For a sophisticated answer, see Jean A. Laponce, "Of Gods, Devils, Monsters, and One-Eyed Variables," *Canadian Journal of Political Science, Vol.* VII (1974), pp. 199-209, especially at pp. 200-201, 202n.15, and 207-208.

nary knowledge; and political scientists no longer write books or articles to elucidate the classic structure of the profession, however much the latter may continue to dominate the manner in which departments still advertise themselves to (necessarily) naive outlanders.

A much more reliable guide to the contemporary theory that guides research undoubtedly is provided by what is nevertheless the relatively conservative standard of paperbacks intended for use in the introductory course. In today's market and given prevailing criteria for publishability, only books that are expected to sell well-and therefore to lie close to the modal tastes and understandings of instructors-get printed. So I shall use a sample of half a dozen such contemporary, introductory paperbacks, all of which have been sent to me by publishers within the past year of this writing. They are conveniently at hand; I made no attempt to acquire any of them with the present task in mind; and on the basis of my reading of the current journals of the profession, and attendance at a variety of professional meetings, I am convinced-and I do assert[23]-that these books are not only representative but also typical of how political scientists conceptualize their discipline today, for purposes of *both* teaching and research.

Three of these books purport to be general introductions to the study of politics;[24] and while each of the other three[25] undertakes to focus upon one (or another) of the core concepts employed by the more general texts, the result in each case-as I shall demonstrate below-is the presentation of a general theory of politics, refracted through a particular facet and thereby providing a specialized perspective of the whole. All six books cover very much the same ground; and their communality, and mutual complementation, are striking.

Everson and Paine posit an organizing model that is methodo-

23 I invite efforts directed toward the disconfirmation of the stated hypothesis, that these six books are a representative sample of political science thinking today.

24 David H. Everson and Joann Poparad Paine, *An Introduction to Systematic Political Science* (Homewood, Ill.: Dorsey, 1973); Dean Jaros and Lawrence V. Grant, *Political Behavior: Choices and Perspectives* (New York: St. Martin's Press, 1974); Monte Palmer, Larry Stern, and Charles Gaile, *The Interdisciplinary Study of Politics* (New York: Harper and Row, 1974).

25 Dean Jaros, *Socialization to Politics* (New York: Praeger, 1973); Walter A. Rosenbaum, *Political Culture* (New York: Praeger, 1975); Jarol B. Manheim, *The Politics Within: A Primer in Political Attitudes and Behavior* (Englewood Cliffs, N.J.: Prentice-Hall, 1974).

logical: systematic political theory is to be constructed empirically by statistical testing of hypotheses to validate propositions about behavior at various levels of generality ranging from macro to micro. Jaros and Grant also are methodological in approach (although within a more formal philosophy-of-science framework), and they too posit the macro/micro scale to distinguish levels of political organization for purposes of analysis. Palmer, Stern, and Gaile follow suit methodologically, and then present a series of chapters that organize concepts on the basis of their respective disciplinary sources in sociology, anthropology, economics, and psychology, except for a chapter on "General Social Science Concepts" (for which the attribution to disciplinary sources is left unresolved).

Jaros relates his analysis of socialization to groups (nuclear, institutional [academic], and situational [peer]) as agents of cultural transfer, to mass as distinguished from elite populations as subjects of the process, to human (that is, biological) development, and to psychological learning theory (which is, of course, a branch of biology); and he too makes the macro/micro distinction concerning the generality of theory. Rosenbaum, similarly, relates culture to socialization, to attitudes (public opinion), to subcultures (groups), to structural cleavages between elite and mass populations as mutual stressors, and to integration and fragmentation as factors in cultural change. Manheim discusses attitudes in terms of culture, socialization, persuasion (communications), competition (conflict and decision-making), and participation. Manifestly, each of these authors uses a different standpoint to explore what are largely a common set of relationships.

Table 1 reports ten core concepts in terms of which political analysis tends to be organized in the sampled books. These core concepts include: methodology; systems, structures, and functions; communications and control; culture; socialization; role; groups; personality; attitudes; and conflict and decision-making. My specification of concepts related to the ten core concepts certainly is intended to be exemplary rather than exhaustive; and it should be noted, moreover, that many of these other concepts relate to more than a single core concept (e.g., ideology relates to culture and socialization as well as to attitudes; and leadership relates to personality and to groups as well as to communications and control). The first four core concepts are classified as macro because they tend to direct attention to aggregated, collective correlationships at an institutional level of social organization; the remaining six are, relatively,

TABLE 1

LEVELS OF POLITICAL ANALYSIS, DISCIPLINARY SOURCES OF CORE POLITICAL CONCEPTS, AND RELATED POLITICAL CONCEPTS

Level	*Source*	*Core Concepts*	*Related Concepts*
Macro	Mathematics/ Biometrics	Methodology	Empirical or Systematic Theory
	Biology	Systems/Functions/ Structures	Change Policy-making Stratification
	Physics/ Electrical Engineering	Communications/ Control	Leadership Manipulation/Persuasion Symbolization
	Anthropology	Culture	Democratization Integration/Fragmentation Transfer
Micro	Sociology	Socialization	Development Desocialization
		Role	Recruitment Elite/Mass
		Groups	Nuclear/Institutional/Situational
	Psychology	Personality	Needs Motivation Physiology/Perception Cognition
		Attitudes	Ideology Alienation
	Economics	Conflict/ Decision-making	Participation (Activity/Inactivity) Aggression/Violence

micro because their focus is more upon relationships within or among individuals. Evidently it is these core concepts at the micro level that are derived from the cognate disciplines with which political science has been most closely allied-sociology, psychology, and economics-at least, during the past quarter of a century. Of the four macrolevel core concepts, culture has been the outstanding intellectual artifact of the anthropologists; the cybernetic language, theory, and model underlying communications and control stem from mathematics, physics, and electrical engineering, notwithstanding our parochial fiction to the effect that the Great Academic Wall that protects social scientists from the natural sciences winds on in unbreachable splendor; while systems, functions, and structures, like

methodology, come directly and primarily from biology. The systems model has been the overarching paradigm of biological science throughout this century; and although work in probability theory of classical mathematics was an earlier forbear, it was work in biometrics before the first world war that contributed directly to the developing fields of social and psychological (including educational) statistics; and therefore biology was also the cognate disciplinary source for the methodological approach of contemporary political behavioralism. So it is not really very radical to argue for an extension of biological influence upon political inquiry as we now practice it: *both* our meta-theory[26] and our methodology already are primarily biological in their orientation; and what I am proposing is that our substantive theoretical concepts also should become better articulated-both deliberately and consistently-with *their* biological wellsprings.

Indeed, this step is so patently overdue that one finds varying degrees of recognition of it in five of the six books under present consideration-in all except Rosenbaum's discussion of political culture, where one would least expect to find it, on *a priori* grounds, among the books in this sample. In Everson and Paine, for example, we find (at p. 260) a figure portraying "Levels and Linkages of Political Components," which is circular and mostly divided into five sectors, of which only one (linking personality through attitudes and opinions, to groups and then to several levels of culture) is fleshed out. Of the other four, two ("beliefs and ideology" and "primary identifications") are cognitive and sociopsychological; but the other two ("perceptions" and "needs and motivations") invoke -or certainly ought to be deemed to do so-the *physiological* side of psychology, and hence the study of human biology. Moreover, the core of the figure consists of an unbroken outer ring-the five sectors extend externally from it-of "personality" and "traits"; while the innermost core is labelled "physiological structure." Physiological *structure* unequivocally implies biological theory, methods, data, and knowledge; and although the accompanying textual discussion is content to leave the figure virtually uninterpreted (and certainly so in regard to its physiological components), the manifest signification of the figure is that human biology constitutes the core

26 Eugene F. Miller, "David Easton's Political Theory," *Political Science Reviewer,* Vol. I (1971), pp. 184-235; David Easton, "Systems Analysis and Its Classical Critics," *Political Science Reviewer,* Vol. III (1973), *pp.* 269-301.

plus some two-fifths of the relevant superstructure of levels and linkages among political components. I consider Everson and Paine to be right on target in that implication.

Jaros and Grant are considerably more explicit (at pp. 148-149) in discussing the primacy of "physiological factors" as an introduction to their discussion of personality. They suggest two relevant hypotheses: that self-images and alter-images are directly related to political images (as in regard to recruitment); and that individual energy levels (as determined by metabolic rate and general health) are directly related to political participation. Palmer, Stern, and Gaile go even further, and introduce their discussion of psychology and politics (at pp. 137-138) with a summarization of Milton Yinger's field theory of behavior, which attributes political behavior (inter alia) to complex interactions among biological, psychological, social, and cultural forces-and it is Yinger who puts biology foremost.[27] Palmer, Stern, and Gaile follow this up with a discussion of needs and drives; and although much of their emphasis reflects (and entirely properly, in context) the influence of Maslowian social psychology, these authors also cite the Harlows (on how isolation and the deprivation of affection stunt the growth of primates) and they do make the point that certain physiological needs *must* be minimally satisfied before any kind of political behavior is possible-or the continuance of life itself for the affected individual(s), for that matter.

Jaros goes further, and cites the biopolitical research on psychopharmacology, to which he himself has been a contributor, in discussing the limits to traditional socialization (at pp. 66-68), and the probably imminent need for socialization *away* from substantive political orientations, and *toward* acceptance of change-that is, toward functional adaptation in the strictly biological sense and from the biological point of view. Similarly, Manheim concludes his primer on attitudes (at pp. 137-139) with several citations to both biological and biopolitical research, particularly in regard to the possible need to understand psychophysiology (and particularly, endocrinology and neurology), which is what he speculates may emerge as an explanation for attitudes alternative to that provided by social psychology. My own rather different view is that only through greater concern for the hormonal and neural substrates of affective (including biochemical and biophysical) responses, in inter-

[27] *Op. cit.* ftn. 20, *supra,* at p. 28.

action with cognition, will it become possible to work with a theory of political attitudes at other than a superficial level. And Manheim does concede (at p. 138) that "the potential of [psychoendocrinology as a] line of inquiry appears quite great, and the political controversy which it may someday engender, bearing as it does upon man's ability to control his own life and that of his fellow men, could make the decline and fall of demonology [due to its displacement by modern, experimental science] ... look like the proverbial tempest in a teapot." What is most significant for present purposes is that Manheim deemed the possibility of biological explanation of political attitudes to be of such importance that he chose to end his book on that note.

Modern Biology

In undertaking an overview of the more relevant aspects of the biological sciences we *might* accept the academic-catalogue taxonomy of the biological sciences as they too are advertised for purposes of university pedagogy; but there is no reason to assume that such an exercise would be any more fruitful for biology than for political science. So instead, let us follow the lead of a recent consortium of pfeeminent biologists who, when charged with the task of surveying the life sciences' impact on public policy, "soon agreed that the classical subdisciplines of biology are insufficiently instructive as approaches to current understanding and appreciation of life in its variegated manifestations .... The principal departure from conventional practice, omission of such categories as zoology, botany, and microbiology, is, in fact, a reflection of a significant philosophic departure."[28]

Their report (as edited by the President of the National Academy of Sciences, Philip Handler, a distinguished biochemist) fills

28 Handler, op. *cit.* ftn. *5, supra,* pp. v-vi. Political scientists who lament the over-quantification of the discipline, plus our chronic lack of originality and continual borrowing from greener fields, may find some slight solace-however much they may regret his unfortunate initial sentence-in the remainder of Handler's caveat that: "Biology has become a mature science as it has become precise and quantifiable. The biologist is no less dependent upon his apparatus than the physicist. Yet the biologist does not use distinctively biological tools. He is an opportunist who employs a nuclear magnetic resonance spectrometer, a telemetry assembly, or an airplane equipped for infrared photography, depending upon the biological problem he is attacking. In any case, he is always grateful to the physicists, chemists, and engineers who have provided the tools he has adapted to his trade." *Ibid.,* p. 6.

a book of twenty chapters and almost a thousand pages, more than half of which discusses subjects that are of direct and immediate implication for the study of politics; and these chapter titles are, as regrouped by me, the basis for Table 2.

TABLE 2

THE CORE POLITICALLY RELEVANT CONCEPTS OF MODERN BIOLOGY

Biopolitical Concepts	*Biological Concepts*
Evolution [Human Nature]	Biological Structures-From Molecules to Man (only the last two sections, on "Anatomy and Evolutionary Biology of Primates" and "Applied Human Anatomy," of this chapter) Heredity and Evolution
Ethology [Behavior]	The Nervous System The Biology of Behavior
Ecology [Environment]	What is Ecology? On Feeding Mankind Renewable Resources (management of the environment to control growth of human and other forms of life) Biology and Industrial Technology Environmental Health
Equality [Welfare]	Science and Medical Practice

In addition, both the brief Introduction, and the synthesizing final chapter on Biology and the Future of Man, are equally relevant to our concerns.[29]

The first group of chapters, on human evolution, specify a subject that is essential to an appreciation of both the present physiological constraints upon, and the future possibilities for, political behavior; evolution explains how and why humans have become what they are. Thus evolution is the behavioral history of our species over a time span of four million years-which provides a broader perspective from which to appraise both present events and future probabilities than do the more ephemeral population groupings

29 Chapters that I deem less directly relevant to the interests of political scientists include those on: Molecular Biology; The Materials of Life and their Transformations; Cells-Units of Life; The Origins of Life; the Biology of Development; The Functions of Tissues and Organs; the remaining sections of the chapter on Biological Structures-From Molecules to Man; The Diversity of Life; and Digital Computers and the Life Sciences.

and epochs that necessarily are deemed to be of interest by historians of our written culture. Evolution deals also with the biological foundations of language, upon which depend virtually all of those aspects of political behavior which-however incomplete their scope-presently constitute the subject matter of political science." Behavioral genetics bears directly upon the composition and possibilities for future growth and change in both human populations, and other forms of life as well; and therefore it is involved in all of the other major biopolitical concepts to which we now turn: ethology, ecology, and equality.

Ethology investigates how and why animals behave as they do in relation to their physical environment, other life forms, and each other. It does so by putting the subject of human political behavior within the context of comparative animal behavior; and as Roger Masters has demonstrated in a series of important papers,[31] it is not necessary to settle for the popular versions of the "naked ape" syndrome[32] that have titillated casual readers of what is displayed at supermarket paperback stands (whose alternative selection might have been, say, *Fear of Flying* today, or *Valley of the Dolls* a decade ago). Among the principal topics of animal behavior, within which human behavior is included as a particular type with its own special mechanisms, are learning, orientation, perception, exploration, locomotion, circadian rhythms, hormonal and neural systems and behavioral integration, motivation and appetitive behavior, development, reproduction, communication, conflict, and social behavior.[33]

30 See political scientist Roger D. Masters' "Genes, Language, and Evolution," *Seiniotica, Vol.* II (1970), *pp. 295-320.*

31 "The Impact of Ethology on Political Science," in Somit, *op. cit.* ftn. 8, *supra;* "Ethological Comparisons between Animal and Human Social Behavior," paper presented at the Conference on the Relations between Biological and Social Theory, American Academy of Arts and Sciences, Brookline, Mass., March *1-2,* 1974; "On Comparing Humans-and Human Politics-with Animal Behavior" [IPSA *1973];* and "Functional Approaches to Analogical Comparison between Species," *Social Science Information, Vol.* XII, No. *4 (1973), pp.* **7-28.**

32 See David Pilbeam, "An Idea We Could Live Without-the Naked Ape," *Discovery,* Vol. VII, No. *2* (1972), pp. *63-70;* and *cf.* Desmond Morris, *The Naked Ape: A Zoologist's Study of the Human Animal* (New York: Dell, *1969),* Robert Ardrey, *The Social Contract* (New York: Dell, *1970),* and Konrad Lorenz, *On Aggression* (New York: Harcourt Brace, 1966).

33 Compare, for example, "Circadian Rhythms: Exogenous or Endogenous Control?" chapter *2* in Peter Marler and William J. Hamilton III, *Mechanisms of Animal Behavior* (New York: Wiley, *1966);* with chapters *2* and *3,* "Biological Clocks-The Natural Rhythms of Behavior Patterns" and "Biological Rhythms and Personality," in Chapple, *op. cit.* ftn. 10, *supra.*

The comparative and interdisciplinary sciences of animal behavior raise and investigate questions in regard to each of these concepts that do not and cannot arise for students of (only) human behavior, because of the closure imposed by presuming that the particular, species-specific evolutionary solutions, with which humanists happen to be familiar, are the only possible or most efficient ones; a comparative approach makes possible the investigation of relationships that do not exist for social scientists. As Robert Hinde has remarkeed, "The obsolescence of the old distinctions between the biological sciences is nowhere more evident than in the study of animal behavior. The problems it raises not only provide a meeting ground for psychologists, zoologists, physiologists, anatomists, geneticists, ecologists and many others-they demand their cooperation."[34] Those many others must surely include students of social biology and the biology of politics, because the work in animal behavior bears directly upon most of the core concepts of political behavior, including communications and control, socialization, role, groups, personality, attitudes, and conflict and decision-making.

The study of ecology shifts attention away from how and why humans and other animals behave and focuses instead upon how what(ever) they do affects both the living and the physical environment to which they are (or had become) adapted, interactively with-and with crushing urgency today-the reciprocal positive feedback effects of those environments, in the form of the great unfree bads, upon the subject species.[35] The five chapters that define ecology preempt over a fourth of Handler's book, discussing the interrelationships among natural ecosystems, and the nutritional needs of the species and the prospects for attempting to meet these (at least, better than now, or otherwise) by changes in environmental management. They deal also with the (again, interactive) effects of industrialization and population growth and urbanization upon health and survival-not "systemic" survival (to invoke David Easton's wonderfully abstract and vacuous sense of the term) but rather

[34] *Op. cit.* ftn. 13, *supra,* at p. vii.

[35] The major policy problems confronting the world today are precisely a consequence of imbalance among biological demands, cultural demands, and limitations in the responsive capacities of the natural environment: see Lester R. Brown, *In the Human Interest: A Strategy to Stabilize World Population* (New York: Norton, 1974); and *cf.* Roger D. Masters, "Of Marmots and Men: Animal Behavior and Human Altruism," in Lauren Wispe (ed.), *Positive Forms of Social Behavior* [tentative title] (Cambridge: Harvard University Press, in press).

species survival in the Darwinian sense. The latter clearly is an appropriately important subject for a science of political behavior to concern itself with; and one might observe that it escalates our political span of attention, beyond nuclear annihilation to include a variety of alternative if equally deadly global scenarios. Even more familiar and less prepossessing topics, such as mass starvation and overpopulation-long recognized as subjects appropriate for political discussion and policy-making-will be better informed by placing them in the broader and complex context that the biological concept of ecosystemics requires.

Equality deals with the interactive limits between biological factors tending to favor variability, and cultural norms favoring uniformity,[3a] in regard to several major facets of human morphology which I list giving preference to their social science attributions (with corresponding animal behavior analogues parenthetically in apposition): health (survival), age (development), sex (reproduction), race (speciation), and intelligence (adaptation).

Handler's chapter on the application of biological knowledge through the practice of medicine discusses two interrelated attributes of human individuals and populations: health and maturation. Post-industrial societies support policies and practices which have attempted-though with differing success-to counteract by equalization the biological inequalities arising from age differences (at various stages of the life cycle) and health differences (which are biological at least to the extent that these stem from genetic influences). Evidently, public policy with regard to public health (and "private" health as well) and public welfare (at least as concerns children and the elderly) are among the major problems of politics in any society, but especially so for industrialized societies today. Of no lesser significance are the culturally inspired egalitarian drives to overcome biological differences in regard to sex, race, and intelligence-or at least so it must seem to observers of American and West European politics during the past generation. Behavioral genetics and animal behavior are the fields of biology that impinge most directly upon the politics of sex and race and intelligence.

These latter three parameters of biological differentiation arise among all sexually reproducing species of animals: the sex differentiations reflect a rather popular (in recent eons) evolutionary adaptation to the problem of reproduction; the race differentiations re-

36 See Elliott White, "Genetic Diversity and Democratic Theory" [APSA 1975].

flect relatively much more minor adaptations, of particular but geographically isolated subpopulations, to the differential impact of environments in different ecosystems; while differences in the intelligence of individual animals reflect unavoidable consequences of a breeding system that operates to sustain a heterogeneous gene pool-and a homogeneous one proffers a poor survival strategy for most species, however much we may admire sharks and plankton for their superior adaptations to *their* chosen environments. It is true that, for those who may disagree with the preceding assertion, biological engineering offers through cloning a possible (and error-free) equalitarian solution-galite in our time?-for human problems of sexual chauvinism, racial discrimination, and stupidity; but even cloning implies the direct invocation of biological knowledge and skills; so whichever way we go we shall need to come to terms with our biology if we are to act at all effectively politically.

The Biology of Political Behavior

A major limitation of political behavioral research is that it is premised on a paradigm of human behavior that is only skin-deep -because the observations never attempt to get inside the soma except inferentially. Even what is known of cognition is based upon externally observed-or at least, auditioned-behavior. What is always and everywhere most important to all human beings is what is going on *inside* of themselves at any particular moment-and we must specify "moment," because change is often so rapid; but what political behavioralism begins and rests its case with is what can be perceived to have occurred in some monitorable and measurable way *outside of* persons. Our task is to get beyond interactions and into transactions; and the only way to do that is by invoking theories, methods, and skills that permit us to include biological variables in our regression equations. Environment must be seen as a set of variables, not as the sole primal cause of all behavior; the history of politics should begin before our species can be differentiated as such; and our political behavior must contribute to, and become reconciled with, a theory of animal behavior that includes life forms whose morphological appearance is strikingly unanthropomorphic. [37]

The most extensive and probably the best work on political

[37] Por example, see Donald T. Campbell, "On the Genetics of Altruism and the Counter-Hedonic Components in Human Culture," *Journal of Social Issues,* Vol. XXVIII (1972), pp. 21-37.

equalization of the biologically inequitable has been done on various aspects of health in relationship to political behavior. Harold Lasswell has been including health as a variable in his set of key political values for a long time; and this recent work in biopolitics strongly supports his position. A series of studies by David Schwartz and his students have explored the effect of health differences upon political attitudes and participation, of postural and speech differences as indices of states of arousal, and of the (remarkably close) correlation between the way people feel about their own bodies, and their feelings about the body politic.[38] One of my own colleagues has studied the effect of malnutrition upon political participation and attitudes, while another has analyzed the relationship between disease, and foreign and domestic violence, as causes of death in both industrialized and other countries.[39] Wiegele and his associates have investigated how health differences might affect attitudes toward foreign policy decision-making;[40] and indeed, a special note of urgency is lent by a serendipitious by-product of their research. Notwithstanding the prodigious efforts of modern medicine to keep people alive, there is less evident success in keeping them healthy (to say nothing of *fit).* The proportion, of American youth of college age-which from a biological point of view is the life-cycle time for optimal health and fitness-who are unfit, is alarmingly high and increasing; and none of them is likely to get remarkably healthier as he or she grows older. Almost a third are clinically obese; and it is notable that the experimental findings, of Wiegele's most recent paper, were largely vitiated due to the constancy (in the event) of

38 David C. Schwartz, "Perceptions of Personal Energy and the Adoption of Basic Behavioral Orientations to Politics" [IPSA 1970]; David C. Schwartz and Nicholas Zill, "Psychophysiological Arousal as a Predictor of Political Participation" [APSA 1971]; David C. Schwartz, "Health Processes and Body Images as Predictors of Political Attitudes and Behaviors: A Study in Political Socialization" [IPSA 1973]; Peter Shubs, "Political Correlates of Self Body-image" [IPSA 1973].

39 Robert Stauffer, "The Biopolitics of Underdevelopment," *Comparative Political Studies,* Vol. II (1969), pp. 361-387; and Michael Haas, "Toward the Study of Biopolitics: A Cross-Sectional Analysis of Mortality Rates," *Behavioral Science,* Vol. XIV (1969), pp. 257-280.

40 Thomas C. Wiegele, "Toward a Psychophysiological Variable in Conflict Theory," *Experimental Study of Politics, Vol. I* (1971), pp. 51-81; Thomas C. Wiegele, "Decision-Making in an International Crisis: Some Biological Factors," *International Studies Quarterly, Vol.* XVII (1973), pp. 295-335; and Thomas C. Wiegele, Sharon Plowman, and Robert Catey, "International Crisis, Cardiorespiratory Health, and Political Attitudes: A Literature Review and a Pilot Study" [IPSA 1973].

what had been hypothesized to be the independent variable: all fifty of the white, middle-class, minimally twenty-one year old student subjects rated themselves as being in good to excellent health; but when placed on a treadmill, almost half performed *very* poorly, another fourth poorly, less than a fifth were rated fair, and only the remaining 12% were placed in all of the upper four categories combined (ranging from average through good and very good to excellent). If this is a typical sample of the American citizenry who are going to be running (if that be *le mot juste)* the country during the rest of this century, then there surely is a crying need for giving the higher priority in relating health to politics that some writers have demanded.[41]

A related field in which several political scientists contributed to what seemed several years ago to be a promising beginning is that of political psychopharmacology.[42] But there has been no follow-up, probably due more to the tightening up of academic policies and procedures relating to experimentation with human subjects, than to the attenuation in political salience of the subject itself (and certainly not of the public health and personal security problems to which it appertains). The one experimental study that was attempted, which ran into the kinds of technical difficulties typically encountered by prototypes, is suggestive of the kinds of drug effects likely to be found, upon political behavior in a variety of different arenas and situations.[43] There are major correlationships not only between drugs and personality; but also (lest we forget!) between drugs and health-both pro and con; and between drugs and nutrition (because from the point of view of appetitive behavior, drugs are food with special effects-but then, all foods have their particular effects as ingestants for biological processing systems).

The political scientist who undertook the experimental study, Dean Jaros, also introduced (so far as I am aware) the concept of *desocialization* into our professional vocabulary. After surveying the

41 Allan Chase, *The Biological Imperatives: Health, Politics, and Human Survival* (Baltimore: Penguin, 1971).

42 James C. Davies, "The Psychobiology of Political Behavior: Some Provocative Developments" [WPSA 1969]; Albert Somit, "Toward a More Biologically-Oriented Political Science: Ethology and Psychopharmacology," *Midwest Journal of Political Science,* Vol. *XII* (1968), pp. 550-567; Robert Stauffer, *The Role of Drugs in Political Change* (Morristown, N.J.: General Learning Press, 1971).

43 Dean Jaros, "Biochemical Desocialization: Depressants and Political Behavior," *Midwest Journal of Political Science,* Vol. XVI (1972), pp. 1--28.

literature on political socialization, ,and remarking on its presumption that the process relates primarily to learning among children, Jaros observes that the predictible psychological effect of biochemical changes at the physiological level will be loss of (or change in) learning, and therefore at least temporary desocialization. [44] But the concept cuts much more broadly than merely to describe drug effects; it implies the loss or modification of political cultural learning for whatever reason, and two other variables that can be expected to have similar effects are (negative) health and aging. Illness (including physiological loss and impairment) minimally results in some degree of political inactivity and alienation; [46] and typically it will also have other desocialization effects, some temporary and some (e.g., paraplegia) permanent. Aging, however, is a process whose effects (once maturity has been achieved) are strictly unidirectional: "time's arrow" points only and compulsively in the direction of permanent political desocialization, and the relevant questions all relate to differentials in rates of decay in regard to different physiological structures and processes, and therefore also to political cognition and behavior. Only God-or if purists insist, DNA-can make a synapse; and even She does not repair them. The loss of memory, which begins much earlier but troubles most people by initial middle age, is only one of the most literal and obvious behavioral indices to the universally deleterious impact of aging upon political socialization.

In a political society whose population "pyramid" rapidly is beginning to look like a parallelogram, we might expect to find greater concern for the policy problems, posed by both qualitative and quantitative changes in population growth, [46] reflected in political science research into the politics of the later end of the life cycle. There is an excellent beginning in work at the level of social science analysis, [47] but the major causative variables here clearly are oper-

[44] *Ibid.,* p. 6.

45 David C. Schwartz, *Political Alienation and Political Behavior* (Chicago: Aldine, 1973).

46 Richard L. Clinton, William Flash, and R. Kenneth Godwin (eds.), *Political Science in Population Studies* (Lexington, Mass.: Heath, 1972); Richard L. Clinton and R. Kenneth Godwin (eds.), *Research in the Politics of Population* (Lexington, Mass.: Heath, 1972); Richard L. Clinton (ed.), *Population and Politics: New Directions in Political Science Research* (Lexington, Mass.: Heath, 1973).

47 Neal E. Cutler, "Aging and Generations in Politics: The Conflict of Explanations and Inference," pp. 440-462 in Allen R. Wilcox (ed.), *Public Opinion and Political Behavior* (Chicago: Aldine, *1973);* and Neal E. Cutler and Vern L.

ating at the biological level. We can anticipate a great deal more success in our attempts to develop solutions at the level of public policy, if the biogenic causes of social-psychological-economic-political desocialization effects of aging are better understood, and consequently can be shifted out of the category of error variance (where they now necessarily repose) and into the same interaction matrix with our behavioral (intervening and dependent) variables.

Whatever our difficulties, as a profession, in coming to grips with health and age as *biologically* (and not merely socially) important influences upon political behavior, at least we are not inhibited by ideological commitments that preclude us from examining the relevant questions. It is by no means clear that we are equally open-minded in regard to the political significance of biological differences in regard to race, intelligence, and sex. This is understandable, at a time when both liberal and radical ideologies have agreed upon the goal of-if not the means for attaining-the elimination of social-psychological-economic-political inequities. Our enlightenment about the evils of discrimination, whether racial or educational or sexual, has not been accompanied, however, by much concern for the possibility that we may be throwing baby out with the bathwater.

We are not going to resolve real issues-if such there be-in the politics of race (for example) by ignoring them, or by indulging ourselves in acts of affective or intellectual piety. One can find strong support in behavioral genetics for an acceleration of present trends-to the extent that these are not overwhelmed by in-breeding in such autonomous populations as those of China, India, Africa (whether black or white), Southeast Asia, and Japan-in the direction of greater racial heterogeneity in breeding populations of humans. (The general argument is that a more heterogeneous gene pool is more likely to produce the necessary critical number of individuals adaptable in whatever may be the appropriate ways in an unpredictable future, the better to assure species survival.) Given the apparently high level of racial autarchy that will predominate in the international (to say nothing of domestic) politics of the next generation, it might seem unfortunate to fail to take ad-

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Bengston, "Age and Political Alienation: Maturation, Generation and Period Effects," pp. 160-175 in Frederick R. Eisele (ed.), "Political Consequences of Aging," *Annals of the American Academy of Political and Social Science,* Vol. CDXV (September, 1974).

vantage of biological knowledge that bears upon the problem. It is well established, for instance, that there are important relationships between race and health; [48] and the failure to include in the policy process available biological knowledge can only produce results-no matter how laudable the motives of sponsors-that frequently boomerang. [40]

An exceptionally literate study by Elliott White argues that effective political leaders must be, but must avoid seeming to be, of exceptional intelligence. [50] A more general statement of this thesis, supported by considerably more data, has been advanced by a psychologist, [61] leading in turn to a strident rebuttal from one of his political scientist colleagues, who broadened the issue in order to associate it with whatever guilt might be rubbed off (onto his antagonist) from the Jensenist heresy. [52] In view of the dearth of non-environmentalist research by political scientists, in regard to either race or intelligence, it is hardly surprising that we have avoided almost completely the latter issue, which did provoke some momentary concern in other social science disciplines. This was especially true of the anthropologists, for whom the social pressures toward ideological conformity and rectitude were so strong that an official committee of the American Anthropological Association rushed into print [63] with a passionate disclaimer not only of Jensen's substantive argument, but also of the propriety of his having raised the question-in these (sic) troubled times-that there might be a genetic relationship between race and intelligence. [54] Obviously there

48 E.g., A. C. Allison, "Polymorphism and Natural Selection in Human Populations," pp. 166-190 in Carl Jay Bajema (ed.), *Natural Selection in Human Populations: The Measurement of Ongoing Genetic Evolution in Contemporary Societies* (New York: Wiley, 1971).

[45] Mark S. Frankel, "Political Responses to Controversial Issues in the Development of Biomedical Technologies" [APSA 1974]..

50 Elliott White, "The Humility Complex in American Politics: Was Lincoln Created Equal?" *Publius*, Vol. I (1971), pp. 89-114.

51 Richard F. Herrnstein, IQ *in the Meritocracy* (Boston: Little, Brown, 1973).

[62] Karl W. Deutsch and Thomas Edsall, "The Meritocracy Scare," *Society*, Vol. IX (September-October, 1972), pp. 71-79.

53 Loring Brace, George R. Gamble, and James T. Bond, *Race and Intelligence* (Washington, D.C.: American Anthropological Association, 1971).

54 For other discussions by anthropologists, see Richard H. Osborne (ed.), *The Biological and Social Meaning of Race* (San Francisco: Freeman, 1971); and Alexander Alland Jr., *Human Diversity* (New York: Columbia University Press, 1971), especially chapter 7; and for a recent comprehensive review, by two psychologists and an anthropologist, see John Loehlin, Gardner Lindzey, and J. N. Spuhlen, *Race Differences in Intelligence* (San Francisco: W. H. Freeman, 1975).

are some advantages to being on the side of the angels in such academically controversial matters, especially when public discussion is perpetuated by such unlikely antagonists as the aging Nobel laureate and physicist William Shockley, whose lack of suitable academic expertise exacerbates the unscholarly tenor of much of the consequent debate (or the preclusion thereof). At least one psychologist has tended to support Jensen's substantive position; [55] but the more general issue-which concerns the right of scientists to ask questions which, if they were to be answered in a particular way, might challenge prevailing orthodoxies-seems more appropriate to the politics of the Inquisition (or if one prefers a more biopolitical analogy, to Soviet Lysenkoism [56]) than to biobehavioral science inquiry, although it can perhaps serve to remind us that 1984 is now less than a decade away.

A promising line of inquiry, into interaction between intelligence as a neurological (biophysical and biochemical) phenomenon, and political behavior, is found in the recent work of political scientist Jean Laponce. In one paper he explores laterality, the neurophysiological predisposition to favor and develop the use of one side of the body (eye, foot, hand, etc.) over the other. Our predominant dexterity results from the interaction of both culture and evolution, over a very long period of time; but its very universality makes the question, how different societies deal with the problem of the deviant left-hander, of interest to students of political behavior, among other reasons because of the expected correlation between left-handedness and left-wing political attitudes and affiliations, and also because the degree of left-handedness in a society may be a reliable index to the degree of practical democracy operating in the polity. [57]. In any case, inquiry into laterality raises important questions concerning other physiological correlates of political deviance. Laponce himself has pursued some of these matters in the leading article of the current volume of the *American Political Science Review*, [58] in which he puts laterality in

55 Hans J. Eysenck, *The IQ Argument: Race, Intelligence and Education* (New York: Library Press, 1971).

56 For a biologist's critique, see I. Michael Lerner, "Genetics and Politics," chapter 21 in his *Heredity, Evolution, and Society* (San Francisco: Freeman, 1968).

57 Jean A. Laponce, "The Left-Hander and Politics," chapter in Somit, *op. cit.* ftn. *8 supra;* and cf. Jean A. Laponce, "In Search of the Stable Elements of the Left-Right Landscape," *Comparative Politics*, Vol. IV (1972), pp. 455-475.

58 Jean A. Laponce, "Spatial Archetypes and Political Perceptions," *American Political Science Review*, Vol. LXIX (1975), pp. 11-20; and *cf.* his "Hirschman's

the context of a broader set of spatial dimensions, as the basis for an investigation of the semantics of non-verbal political communication and symbolization; and as in his other papers, the questions that he raises demand that biological as well as cultural evidence be examined. The implications of Laponce's work potentially involve several other behavioral concepts in addition to such obvious ones as communications and control, conflict and decision-making, socialization, roles, attitudes, and culture.

The other major biological attribute, which remains almost completely absent-except in a formal sense-in the work of political scientists, is sex. From a population genetics perspective, not only is a chicken the egg's way of making another egg, but also human sexual structural differences retain a biological-quite apart from the proliferation of cultural uses that may obscure this fact-function to perform, if the species is to postpone somewhat longer its no doubt ultimate fate of extinction due to incapacity to change rapidly and drastically enough to adapt to environmental demands. But if sex is indeed here to stay, at least for a while longer, then- at least two questions seem to be in order: (1) assuming that the gender stereotyping of a less enlightened society entailed anti-democratic (inter alia) consequences for personality development, and therefore for political attitudes and role-playing by both males and females (taking these in the sense of their structural capacity to play reproductive roles), what then is the influence of unisex-typing upon personality development, and hence upon political attitudes and role-playing? and (2) in the many societies in which traditional gender distinctions seem likely to obtain for a while longer, is it possible that on physiological grounds females are better qualified than males, to play certain political roles? This latter would seem to be a particularly pertinent question to ask at a time when cultural norms, which in the past have discriminated against full and equal political participation by females, are undergoing rapid change. Laponce indicated, for example, that there is some evidence to suggest that left-handers are more creative and more emotional, as well as more independent in personality, and for physiological as well as cultural reasons. Similar arguments are advanced in much of the female-liberation as well as in the i uman development literature, as a basis for distinguishing the characteristic person-

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Voice and Exit Model as a Spatial Archetype," *Social Science Information,* Vol. XIII, No. 3 (1974), pp. 67-81.

ality of females from that of males;[59] and of course here again we must presume a complex interaction of biogenic and sociogenic causation. The only relevant paper by a political scientist reports the finding that human (like other primate) males are more aggressive than females in every respect save one-and that is verbal aggression.°[60] Were this finding to be confirmed, then we ought to man the hustings in full support of Linda Lovelace for President and of her counterpart in the Soviet Union (where surely many equally well-qualified candidates must be readily available because of the much longer experience that the Russians have had in eliminating sexual bars to socioeconomic and political preferment) to become Mistress of the Kremlin. Surely the hand that rocks the cradle is the better one to place at both ends of the hot-line-or, if one prefers to vary the metaphor, on the fail-safe button. (One recognizes, of course, that there may be empirical obstacles to the implementation of such a policy in polities less enlightened than those that already have passed into post-industrialization, especially in view of the increasing likelihood that pre-industrial female political leaders also will have access to nuclear armaments-and one thinks here of a distaff substitute for, say, Idi Amin[61]). But the arguments that have been voiced against the hypothesis, by pointing to such putatively negative evidence as the examples of Indira Ghandi and Golda Meier,[62] surely are not persuasive; females who have succeeded in the older-fashioned man's political world must be assumed to have had to come across as super-males in all relevant political respects, and to have learned early and well to repress the

[59] Judith M. Barwick, *Psychology of Women: A Study of Bio-Cultural Conflicts* (New York: Harper and Row, 1971); and Eleanor E. Maccoby (ed.), *The Development of Sex Differences* (Stanford: Stanford University Press, 1966).

[60] John Dearden, "Sex-Linked Differences of Political Behavior: An Investigation of their Possibly Innate Origins," *Social Science Information*, Vol. XIII, No. 2 (1974), at p. 28. Dearden quotes (at p. 26) Margaret Mead to the effect that "if women are to be restless and questioning [as are men] ... they must be made so by education." And if that be possible, then surely we should be prepared to entertain the doubly converse proposition, that males can learn to practice the female virtues, described by Dearden (summarizing findings by Lewis Terman and Catherine Cox Miles) as: "actively sympathetic; inward directed dispositions; maternal impulse; domestic-social-personal concern; interest in personal adornment, art, literature."

[61] *Cf.* Ali A. Mazrui, "Phallic Symbols in Politics and War: An African Perspective," paper presented at a colloquium at the University of California at Los Angeles (1973).

[62] Roger D. Masters, "On Comparing Humans-and Human Politics-with Animal Behavior" [IPSA 1973, at p. 10.

very female virtues that our proposed hypothesis would seek to exploit.

The proposition, that the biological understanding of aggression ought to be related to-indeed, incorporated within-the study of political aggression, and of political violence, is so intuitively plausible that political scientists have explored a variety of its dimensions. The most extensive work has been done by Peter A. Corning, who has written a series of papers on the psychophysiological substrates of human aggression.[63] Corning also is the only political scientist who has done experimental work on aggression. His was carried out with laboratory animals, at the Institute for Behavioral Genetics of the University of Colorado in Boulder. Research by others has taken the "behavioral sink" hypothesis, derived from laboratory studies of animal crowding," and tested it with data on a century and a half of European warfare.[65] But certainly the phenomenon of crowding in contemporary life, ranging from its possible relation to violence in urban slums" to the architectonics of the politics of human life in styles that have been forecast by futurists (viz., aloft in space stations; anchored at sea; or buried underground, lends a note of urgency to the hypothesis, put forth by serious students of animal behavior[al] as well as by more popular writers,[68] that we ought to

63 Peter A. Corning, "An Evolutionary-Adaptive Theory of Aggression" [APSA 1971]; Peter A. and Constance Hellyer Corning, "Toward a General Theory of Violent Aggression," *Social Science Information,* Vol. XI, Nos. 3 & 4 (1972), pp. 7-35; Peter A. Corning, "Human Violence: Some Causes and Implications," pp. 119-143 in Charles R. Beitz and Theodore Herman, *Peace and War* (San Francisco: Freeman, 1973); and Peter A. Corning, "An Evolutionary Paradigm for the Study of Human Aggression," in Martin Nettleship *et alia (eds.), War: Its Causes and Correlates* (papers presented at the Ninth International Congress of Anthropological and Ethological Sciences; August, 1973; in press).

64 J. B. Calhoun, "Population Density and Social Pathology," *Scientific American, Vol.* CCVI (February, 1962), pp. 139-146.

65 Stuart Bremer, J. David Singer, and Urs Luterbacher, "The Population Density and War Proneness of European Nations, 1816-1965," *Comparative Political Studies, Vol.* VI (1973), pp. 329-348; but *cf.* Susan Welch and Alan Booth, "Crowding as a Factor in Political Aggression: Theoretical Aspects and an Analysis of Some Cross National Data" *Social Science Information,* Vol. XIII, Nos. 4 & 5 (1974), pp. 151-162; and *cf.* Jonathan L. Freedman, *Crowding and Behavior* (San Francisco: W. **H.** Freeman, 1975).

66 Omer R. Galle, Walter R. Cove, and J. McPherson, "Population Density and Pathology," *Science,* Vol. CLXXVI (April 7, 1972), pp. 23-30.

67 Ian Vine, "Social Spacing in Animals and Man," *Social Science Information,* Vol. XII, No. 5 (1973), pp. 7-50; and Robert **H.** MacArthur, *Geographical Ecology: Patterns in the Distribution of Species* (New York: Harper and Row, 1972), especially chapter 2, "The Machinery of Competition and Predation."

take much more seriously the biology of population density in relation to political behavior.

Beyond these relatively explicit examples, there is the more general question how biological theory can contribute to political theory-and I hasten to add, vice versa, in the light of the very considerable popularity that has been bestowed upon certain rather simplistic (if appraised as contributions to what they purport to be: writing on political economy) political fables that have been contributed by eminent biologists.[68] But our own biological metaphors are at least equally unrealistic and inappropriate. To take the most prolific popularization of what purports to be a biological model of political life, one finds repeated reference to how "systems" can "persist" under the effects of both internal and environmental stress;[70] and the image of the coping system that undoubtedly comes to mind for social science readers of that literature is a vertebrate, probably mammalian and possibly (for many readers) anthropomorphic. Any such image is a gross distortion in the direction of overcomplexity of what empirical knowledge we have about political structure and functions. As the late Morley Roberts was careful to point out, in what seems to have been the first book on biopolitical behavior almost forty years ago,[71] the type of biological "organism" that best models political life is probably the colonial protozoa; and although I have argued elsewhere[72] in favor of the Portuguese Man-of-War as the most appropriate biomodel for our nationally organized professional group, I am quite prepared to settle for any kind of jellyfish.

In the present essay I follow a trail well blazed by several wor-

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[68] Robert Ardrey, *The Territorial Imperative: A Personal Inquiry into the Animal Origins of Property and Nations* (New York: Atheneum, 1966).

[69] Garrett Hardin, "The Tragedy of the Commons," *Science, Vol.* CLXII, No. 3859 (December, 13, 1968), pp. 1243-1248; but see political scientist Beryl L. Crowe's "The Tragedy of the Commons Revisited," *Science,* Vol. CLXVI, No. 3909 (November 28, 1969), pp. 1103-1107. *Cf.* Garett Hardin, *Exploring New Ethics for Survival: The Voyage of the Spaceship BEAGLE* (Baltimore: Penguin, 1972).

[70] David Easton, *A Framework for Political Analysis* (New York: Prentice-Hall, 1965), especially, e.g., p. 114, fourth paragraph; and also his *A Systems Analysis of Political Life* (New York: Wiley, 1965).

[71] Morley Roberts, *Bio-Politics; An Essay in the Physiology and Pathology and Politics of the Social and Somatic Organism* (London: J. M. Dent and Sons, 1938), especially chapter 2 at pp. 19-20.

[72] See my "Politics as a Life Science," *op. cit.* ftn. 21, *supra,* at ftn. 36.

thy predecessors,[73] but there are also a few first-rate though more specialized demonstrations of how biological theory can add to the power of political analysis. These include Manfred Wenner's presentation of ecological interaction theory, as a model for interpreting human political relationships;[74] Henry Beck's elegant discussion of what control means in a political system based upon biological models;[75] and Elliot White's brilliant attack upon the environmentalist bias of modern political science, together with his explication of the interaction paradigm that is now virtually universal in modern biological thinking.[76] Although I have argued for much more, there would be great gains for the political science of the next decade even if only our theory of political life were to be brought, as these latter three political scientists have exemplified, into closer correspondence with life as it is understood by biologists (instead of remaining as it is reflected in the thinking of other social scientists). Once we understand better what biologists view as life, perhaps we can then do a better job of relating life to politics.

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73 Lynton K. Caldwell, "Biopolitics: Science, Ethics, and Public Policy," *Yale Review,* Vol. LIV (1964), pp. 1-16; Peter A. Corning, "The Biological Bases of Behavior and Some Implications for Political Science," *World Politics,* Vol. XXIII (1971), pp. 321-370; Roger D. Masters, "Political Behavior as a Biological Phenomenon," *Social Science Information, Vol.* XIV (1975; in press); Albert Somit, "Review Article: Biopolitics," *British Journal of Political Science,* Vol. II (1972), pp. 209-238; and David C. Schwartz, "Toward a More Relevant and Rigorous Political Science," *Journal of Politics,* Vol. *XXXVI* (1974), pp. 103-137.

74 Manfred Wenner, "Symbiosis and Politics: Notes toward the Use of Biological Models in Political Science" [IPSA 1970].

75 Henry Back, "Minimal Requirements for a Biobehavioral Paradigm," *Behavioral Science,* Vol. *XVI* (1971), pp. 442-455.

76 Elliott White, "Genetic Diversity and Political Life: Toward a Population-Interaction Paradigm," *Journal of Politics,* Vol. XXIV (1972), pp. 1203-1242.