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Biology & Political Science.
Foundational Issues of Political Biology

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June 2005

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**BIOLOGY & POLITICAL SCIENCE.
FOUNDATIONAL ISSUES OF POLITICAL BIOLOGY***

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* The present paper emerged in the context of an amiable and intense research exchange conducted over the past several years with professor Laurent Bibard in the welcoming setting provided by ESSEC. The result of prof. Bibard's work is to be found in this same series, under the title "Biologie et Politique: Essai de problématisation".

While both authors are persuaded by the centrality of the nexus biology-politics (the second one comprising also political economy), they remained each faithful to a different methodology, disciplinary focus and preferred theoretical language. Far from being an issue of mis-communication, it is the experience of both authors that such differences are an inexhaustible source of interdisciplinary insight, and a stimuli for reaching ever deeper levels of problematization. And also, in definitive, of personal intellectual growth.

I wish I thank Dr. Laurent Bibard, for his infinite availability to discussing theory, for the relentless challenge occasioned by his ideas and, not in the least, for his gentlemanly manner of handling practical issues. I thank him also for mediating my affiliation with ESSEC.

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Biology & Political Science. Foundational Issues of Political Biology

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Abstract

In their classic formulations, valid to this day, the issue of self-preservation is foundational for both political science and economics. In order to fixate this concept, the Modern theorists relied upon various assumptions about human nature.

Due to the advances of biology and evolutionary theory, we are today in the position of explicating these assumptions in the form of stable scientific certainties.

A foundational concept in biological theory is that of "fitness".

The paper indicates the relationship between the less determined concept of self-preservation and the more rigorous one of fitness. By that, it accomplishes two things: it gives more solidity to the foundation of political theory and political economy, by anchoring them in biology; it opens the path towards a unification between two social sciences and their immediate juxtaposed science, biology.

The emphasis of the paper is on political science, aiming to define, on the basis of the above argument, its proper object of study. The notion of fitness extraction is thus defined. A lateral exposition differentiates between political action, thus understood, and economic action, defined more generally as fitness transfer. The distinction is to be eventually furthered in a separate study.

Keywords : Biology, Evolution, Fitness, Foundational Theory, Foundations of Economics, Political Science

Résumé

Dans la formulation classique de la science politique et de la science économique, formulation qui reste valide jusqu'aujourd'hui, la préservation de soi ("self-preservation") est un concept fondamental. Pour le préciser, les théoriciens modernes se sont appuyés sur des hypothèses variées concernant la nature humaine.

En raison du progrès de la biologie et de la théorie évolutionniste, nous sommes aujourd'hui en mesure d'expliquer ces présupposés sous forme de certitudes scientifiques stables.

Un des concepts fondateurs dans la théorie biologique est celui de "fitness".

La recherche présentée ici indique la relation entre le concept moins déterminé de préservation de soi et celui plus rigoureux de "fitness". Par cela, elle accomplit deux tâches: elle donne plus de solidité aux fondements de la théorie politique et économique, en les ancrant dans la biologie; elle ouvre le chemin vers une unification de deux sciences sociales et de leur domaine immédiatement connexe, la biologie.

La recherche est centré sur la science politique, cherchant à définir, sur la base de l'argument résumé plus haut, son objet propre d'étude. La notion de "fitness extraction" est ainsi isolée. Un argument colatéral différencie entre les moyens de l'action politique et l'action économique, définissant la dernière comme "fitness transfer". La distinction sera éventuellement développée dans une prochaine étude.

Mots clés : Biologie, Évolution, Fitness, Fondations de l'économie, Science politique, Théories fondamentales

Biology & Political Science. Foundational Issues of Political Biology

Motto : Free your mind

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Introduction

Albeit interdisciplinary in its implications, the present essay is a work in theoretical biology and political philosophy. Meaning by that, that it's conceptual location is at a middle ground between empirical facticity and speculation. The methodological premise of the approach is two-folded: on the one hand, concepts ought to be sufficiently fixated in terms of precision and simplicity such as to allow for any definite conclusions; on the other hand, by way of generalization, they will be given wider abstract powers of intelligibilization. This strategy responds to an approach of the type "analysis of emergence". Human action is indeed "complicated", in the sense that its causation is multi-deterministic and involves numerous variables, while its manifestations take place at numerous levels. Nevertheless, this complexity is not arbitrary. And, in order for an intellectual effort to remain honest, the whys and hows of any particular approach to the said complexity ought to be spelled out explicitly. Which is to say, various epistemic simplifying decisions ought to be made specific. Would our knowledge of empirical facticity be richer, and the methods for modeling multi-looped causality be more developed, a paper like the present one would be of a pure theoretical kind. This not being the case, it is here that "philosophy" is summoned into place. By means of educated generalization, one tries to visualize a model of plausible relations and mechanisms, above the lack of factual knowledge. It is believed that, whether correct or not, the result will offer scope and breadth for future investigations: an "end point" of sorts, against which more specific and focused findings can be measured against - to its fortune or invalidation.

The purpose of the paper is to anchor political science to biology. As a consequence of this development, some promising pathways will be open for social theory and economic theory as well.

There remains undecidable the question as to whether this anchoring will merely provide a biological foundation for political science, or whether political science will become superfluous as an autonomous discipline, its major processes being explained, and its major mechanisms being described, by theoretical biology. In the first case, the relationship between political science and biology will be much like the one already established between chemistry and physics: at a fundamental level (atomic and sub-atomic), they become indistinguishable, but at a macro-level, for practical purposes, they preserve autonomy. In the second case, the relationship would be much like that between alchemy and chemistry, the first being absorbed and integrated into the second, after having discarded the ballast introduced by superfluous axioms and hypotheses. In the first case, political science, would become

a mere art, a technical know-how, just as chemistry is, since chemistry's real theoretical foundation is ultimately lying with atomic and quantum physics. In the second case, just like alchemy, political science would appear as a pseudo-science, in the non-pejorative and strict sense of the term: namely, a science whose fundamental premises are vitiated by unwarranted hypotheses, this, at its turn, falsifying much of the inferences and constructions thereby grounded. My essay merely exhibits this alternative, since I believe that the decision between one alternative or another would be theoretically unjustified as of now.

Considerations of Method

Among the various disciplines classified as, according to the taste, "social", human or behavioral sciences, political science is closest to biology. This statement may not appear as obvious from the beginning: for if it were, the discipline trying to bridge today between politics and life sciences, namely biopolitics, would not be so anemic. Even though it has been around for more than 20 years, biopolitics lags behind, without being able to jump on the tidal wave of evolutionary accounts of humanities, such as sociology did in the form of E. O. Wilson's sociobiology, psychology in the form of evolutionary psychology and related branches (behavioral ecology, etc.), and economics was even from its inception by Adam Smith and his "natural progress of opulence". It is not my purpose to discussing here the "status of the discipline", especially that such an undertaking would be plagued with *parti pris*, and, well, politics. I would nevertheless venture to saying that, if one acknowledges any validity to the above view, even if this is a partial or provisory agreement, the explanation lies with a certain inability of biopolitical practitioners to capture the appropriate level of conceptualization in an unambiguous way. What does it mean "appropriate"? I will proceed by way of two examples.

When E. O. Wilson wanted to propose a general, i.e. trans-species, theory of sociality (Wilson, E. O., 1975), he attempted at devising as simple and primitive definition of society as possible: a group of individuals belonging to the same species, engaged in some form of intercourse (cooperation) beyond mere reproductive activity. This is a definition good for insects, humans, or aliens. From such a basis, differential particularities between such societies, as well as between various societies belonging to the same species (Kung San! or French, red ants or common garden ants, etc.), can be systematized and explained. Equally and at the opposite end of complexity, mere reproduction does not qualify for society: orangutans don't form "societies", neither do bears. But this does not mean that reproduction does not remain the main purpose of the individuals involved: it means only that the same universal purpose of life, its own reproduction, takes a circumvented path, by the thorny problem of "common goods", such as group defense. In brief,

sociality = f(reproduction, public goods).

This, in my view, is the essential strength and, in a way, the beauty of simplicity comprised in Wilson's definition, because basic types of sociality can be thus described by means of a combinatorial analysis of reproductive strategies and collective goals, arbitrarily determined.

The second example. When Adam Smith founded economics (Smith, A., 1776), his focus was not individual subsistence, neither common goods, but

"opulence", "wealth". Meaning by that a supplement to raw, biological survival needs which humans are capable to satisfy, consequence of the division of labor and exchanges. But he was specific in indicating that this supplement is not a public good: not a first order public good (such as a road), neither a second order public good (such as trust or justice). In brief,

$$\text{wealth} = f(\text{specialized production, exchange}).$$

The subsequent description of the fine mechanism of the free market consisting of the allocation of capital based on demand and offer, and the spontaneous order it supports is the consequence of such conceptual sobriety. It is this which allowed him to establish that interventions in this mechanism come at a cost, i.e. they diminish "opulence", they generate general poverty, and in the end, endanger survival per se. Also, this relation between cost and benefits had become the cornerstone of the model of rational choice theory in economics and cognitive science.

The two examples may have given a taste of what "an appropriate level of conceptualization" means. In every instance, it is a matter of capturing the bewildering complexity of a range of phenomena at a zero-level, so to speak, at the level of a generative grammar, from whose unfolding, the variety of the phenomenal appearance of the things can be accounted for. In passing, I would mention that the tiring objection according to which such modeling "simplifies" is merely an invitation for abandoning all attempt at intelligibility and, as such, has no bearing for an attempt to producing precisely this, i.e. intelligibility.

Self-Preservation vs. Fitness

The purpose of this section is to bring together a number of very general concepts operative in political science under a same umbrella, namely the concept of "fitness", taken from biology. For the purpose of the unification worked through this essay, this is an important step.

One fundamental concept in biology is that of fitness. Considering that the only purpose one can assign life is its own replication, fitness is simply defined as the number of offsprings or reproductive success.

A similar concept in political science, and also at a foundational level, is self-preservation. As a matter of fact, the entire discipline of political science, as founded during the early modern time, when theorists were more interested in the issue of human nature than today, is a construction erected upon this concept and consisting of various derivations of it, via auxiliary hypothesis (such as the capacity for reason; Hobbes 1651/1996, Locke 1689/1990, Hume 1737/1992). In brief, self-preservation means the fundamental right, liberty and even duty of individuals to preserve their life.

In biology, due to its valuation-free intent, the preservation of life does not count per se, but only insofar as it can be measured by the number of offsprings. In political science, similarly due to its value-free content, what one does with his/her life is inconsequential: therefore, reproduction or not, self-preservation counts.

I propose that "fitness" is a more proper way of expressing the classical political science concept of "self-preservation" in biopolitical studies.

The justification vises four aspects.

Firstly, it would allow a smoother extension and/or generalization of pertinent theory from biology to political science, without redundant translation.

Secondly, the two concepts are commensurable epistemic constructs. "Fitness" captures the gene-eye view in biology, as expressed by the mid-level unit of individual. "Self-preservation", on the other hand, expresses the methodological individualism in social sciences. By the introduction of "fitness" as a primitive concept in political science, one obtains an epistemologically unitary continuum, from the gene level to the group level, suitable for describing phenomena of interest in an emergent fashion.

Thirdly, due to its already existing usage in biology, as a measure of reproductive success, and also due to the possibility of expressing "fitness" by means of expenditure of time (life span) and energy (metabolism), fitness may allow for quantitative analyses. For example, a politically relevant fitness differential can be the one between the famous Morocco sultan who fathered approximately 800 children and any of his subjects. Fitness differentials expressed in terms of reproductive success may correlate positively with, for example, a typology of political regimes (despotism, monarchies versus republics). Or, the amount of life time spent in one political system versus another for purchasing the same goods/services (say, France versus USA), may give us a quantitative indication of the fitness differential between the citizens of the two political systems.

Fourthly, in the case of humans, "fitness" allows us to understand a class of behavior which is oriented towards self-preservation, which is not aimed at reproduction, but which has its origin in the reproductive machinery. Mating, for example, and intra-gender mate competition, in all of its forms, many of them political in the strict sense of the term (such as dominance). Sexual access in humans remains a (subjective and inter-subjective) measure of fitness, without being necessarily conducive to replication. The separation between sexuality and reproduction that humans are capable of accounts for a large number of behavioral patterns which phylogenetically determined reproductive success, but which are used derivatively. Such psychological atavisms are an important social lubricant but also the source of gender-related politics and inter-gender warfare.

In what follows I will further refine the relation between the two concepts in order to indicate more precisely the quality of their juxtaposition.

By a gradual relaxation of their specific definitions, the relation between the two concepts becomes easier to characterize. Self-preservation is merely more encompassing than fitness, since its scope can cover other purposes than mere reproduction. Nevertheless, reproduction is the ultimate horizon upon which the life which is to be preserved is projected. Even though humans can define goals and purposes apart from reproduction, human behavior can be read as if it would be aimed at maximizing fitness in the sense of reproduction. It is likely that basic neural circuitry evolved for reproductive purposes inputs into medium-level psychological mechanisms related to motivation, reward hierarchy, mood, etc.: all of these important for the endophenotypical environment and, thus, for efficacy of action.

The operation is fully justifiable, since both concepts refer to a life-mechanism which is common and which reveals itself when the concepts are

explicated in behavioral terms. Self-preservation represents a set of strategies, from the most simple ones to the most elaborate ones, aimed at survival. Lying to a judge, betraying an alliance or cooperating with a friend, are all legal moves in the survival game, and the strategic choice between them depends on various contingencies. Obviously, the said behaviors are not qualitatively the same, but their juxtaposition aims at stressing the common denominator: their first purpose, is to preserve fitness. One possible goal of this fitness, is to produce offsprings. Whether the individual procreates or not, is not a point. In principle, a certain amount of fitness means a certain number of offsprings. Considering the cost per offspring a constant, individuals differ one from another by the number of cost-units their fitness is capable in principle to support.

On the other hand, fitness biologically understood, represents a set of strategies aimed at increasing reproductive success. The most obvious ones, are the forms of behavior related to sex: seducing mates by display behavior, buying him/her by giving away resources, or raping are, again, all legal moves in the reproductive game, in the sense that all are conducive to the goal. Again, obviously, the said behaviors are not qualitatively the same, but their juxtaposition aims at stressing the common denominator: their ultimate purpose, is to replicate. But this replication can be arrived at by strategies which are far removed from sex. In principle, a wide variety of means of achieving fitness can converge towards the purpose of replication. Whether they are directly oriented towards sex or by mediation, is not the point. In principle, a larger number of offsprings means a large amount of fitness measured across an index in which sexual variables proper are only one element. Considering the cost per offspring a constant, the number of offsprings an individual can produce is in principle a function of the total fitness of that individual.

In brief, and speaking loosely: self-preservation means a variety of strategies for individual survival and advancement which, theoretically, could be converted in reproductive success. Biological fitness means reproductive success which, theoretically, can be achieved by a variety of behavioral strategies. The difference which still remains between the biological concept and the political science concept is the following. Large "self-preservation fitness" can be converted, only in principle, as it was said, in reproduction, which is to say, in transmission of genetic material to a subsequent generation. On the other hand, large reproduction success is to be achieved by forms of fitness not necessarily aimed at sex. It is convenient to name self-preservation fitness "phenotypic fitness", and biological fitness proper "genotypic fitness". Phenotypic fitness can realize genetic fitness; genetic fitness is increased by phenotypic fitness. In trivial terms, the notion of "fitness" should always keep in view the question: fitted for what? Relative fitnesses thus can be defined for a variety of sub-tasks. But the task which is proper to life, is reproduction. Therefore, "fitness" means, in pure genotypic terms, fitted for reproduction or, in extended phenotypic terms, fitted as shown capable to produce conditions conducive to successful (in terms of number) reproduction; and this includes, in the case of humans, wealth, status, power to coerce, symbolic capital, etc.

In yet another sense, if a human pursues genotypic fitness, it would be good to secure more phenotypic fitness; if a human has a large amount of phenotypic fitness, this can be easily converted into genotypic fitness. Thus, phenotypic fitness is a more comprehensive concept, denoting potential genotypic fitness, to be actualized or not.

In the remainder of this section, I will try to bring under the concept of phenotypic fitness three other notions from the field of political theory: desire, power and finiteness.

The larger flexibility of the concept of "phenotypic fitness" is welcome when we come to build the field of phenomena which more properly belongs to political science. The subjective, existential extension of self-preservation is, in a definition which covers the history of the discipline from the British tradition inaugurated by Hobbes, via the entire discipline of economics, to the German tradition culminating with Hegel, the polymorphism of human desire. According to Hobbes, human existence is an endless chain of desire-after-desire-after-desire, which "ceaseth only in death". A conventional division met in humanities, ever since Aristotle's politics, is that between "needs" and "superfluities" (Smith's "opulence"). The concept of "desire" does not make such a distinction. Even though the boundary between "need" and "whim" can be objectively traced by reference to, say, basic metabolism, human psychology (that is the spring of behavior) does not know of such. Thus, it would be convenient to define "desire" without arbitrary or controversial biases.

In our present biological account, desires are nothing more than subjective expressions of objective phenotypic fitness. Independent of their a. content, b. relation to contingent determination, which is to say, independent of their historical structure, desires are means for achieving phenotypic fitness. Such a perspective is important in that it removes undecidable and valuative questions of "reasonableness", "appropriateness", "correctness", etc. Desires do express preferences or valuations of the subject, but nevertheless, they merely translate a perception of "what's to be done" in order to achieve phenotypic fitness.

"Desire" is a useful concept for quantifying human phenotypic performance, in the sense that it bridges between a subjective reality and its objective fulfillment. By that, it is more appropriate than its cognitivist counterpart, namely the concept of "goal". "Desire" carries with it more of the elusive tension of life than the somewhat indifferent "goal". For quantitative purposes, since human life span is bound by time, and human investment is bound by the metabolic energy which can theoretically be invested, phenotypic fitness can be approximated by estimating the amount of time and energy resources needed to spend in order to achieve a given "desire". Since time is quite a definite limiting factor, the relationship time-desire, which is to say time-phenotypic fitness may be crucial to the analysis of political systems, as suggested in an example above (amount of time expenditure - i.e., expressed in wages per hour of labor - needed to satisfy a desire in the, say, US political environment versus French political environment).

The third step in this attempt of anchoring political science to biology is the introduction of another favorite, albeit elusive, concept of political science, favored mostly by the political theory of French inspiration, namely that of "power". In the terms hereby proposed, the "power" of an individual is his/her capacity to satisfying his/her desires. Which is to say, the capacity of an individual to effectively implement strategies of action (behavior) aimed at leading to the satisfaction of his/her desires. By that, "power" becomes an index of an individual's capacity to perform and implement a program of phenotypic fitness of his/her decision. This notion is effective in understanding the distribution of power in a given political system between individuals and the "state", in relation to which power is more properly defined as monopoly of force.

A last qualitative concept can be brought to bear upon the present discussion, namely finiteness.

In political philosophy, finiteness is rather an implicit premise of the theory of self-preservation and its ramifications. Finiteness is the expression of the worldview peculiar to modern times which postulates the materiality of the human condition and the definitive character of death. It is a consequence of the postulate of the mortality of the soul that humans become concerned with arranging for as much happiness as possible, here and now: political and economic theory, aimed at the best organization of the earthly Polis, achieve precisely that. Self-preservation means survival, persistence of life, but also the maximization of whatever possibilities exist during this finite period of time that we call "our life". Therefore, the concern with self-preservation aims both at the present, and the future: but a future clearly and definitely closed by the moment of death. Whatever is to be achieved, must be achieved during this life, for there is no other. What follows, is the problem of the management of this finitude, and the problem of optimization of a quasi-infinite spectrum of possible action, with a view to those which are most satisfying. In brief, the problem of the economy of life. People calculate with their finiteness, such as to make choices, take decisions and act according to variables aimed at maximizing their happiness (and independent of the specific, particular definition content of this happiness). A large part of the political economy and the political philosophy produced during modernity aims precisely at specifying the structural conditions required for such a project. As a matter of fact, that which humans call "freedom" and the associated political theory (as synthesized in such documents as the American Declaration of Independence) aim precisely at that.

Therefore, self-preservation is to be understood as a project of maximizing finiteness. "Do the most of your life", would be an appropriate maxim to encapsulate the theory behind. In its turn, finiteness maximization is a function of the social, political environment. To put it differently, upon the quality of the political environment depends the degree of maximization of the finiteness of the individuals (or, expressed in conventional terms, their freedom and happiness).

Biology, on the other hand, allows us a. to refine and give an empirical content to the notion of finiteness; b. to understand it in the generic context of fitness. Finiteness, thus, is nothing else but the life span, the finite amount of time available to the members of any given species, and which is biologically determined. The theory of senescence aims at understanding which are the biological underpinnings of such predetermined life length.

Therefore, finiteness is the management of life span, of the time available to each individual.

Biology also instructs us upon the usage of life span, that is of the distribution of energy expenditure by individuals along the time available to them, according to the centrality of reproduction. In one classification (R. D. Alexander, 1987), the life effort of humans is distributed in a. somatic effort, meant at attaining as good a mating status as possible for any one individual; b. reproductive effort, meant at using the achieved mating position as well as possible; and nepotistic effort, meant to enhancing one fitness indirectly, by means offspring of offspring, kin or non-kin but genetically related individuals (genetic similarity via the greenbeard phenomenon).

Thus, fitness is to be understood as structurally different (and, obviously, perceived subjectively different by individuals) according to stages of finiteness. No longer a homogenous category, finiteness is to be differentiated according to biologically determined lines of force. Although always projected upon the

background of genotypic fitness, phenotypic fitness will be differently expressed during different stages. In different words, that which is conducive to increased genotypic fitness during adolescence, when mating positions are still to be consolidated (such as, for example, knowledge acquisition as means of accumulating symbolic capital) will not apply identically (if at all) during adult age or old age. The differentiation of finiteness according to biologically determined lines helps explain political phenomena proper, such as the distribution of ideological options (liberalism versus conservatism, centered upon the issue of social insurance provisions), as well as various patterns of behavior politically relevant (from delinquency patterns, to patterns of altruism and redistributive preferences).

Therefore, finiteness seen from a biological angle allows us to understand the dynamics of strategies successively adopted by individuals in view of achieving fitness, according to quite rigidly determined biological lines of force. Given the existentialist extension of the concept of finiteness, its biological anchoring also allows for a better understanding by the individuals themselves of the shifting character of their own self-perception, goal structure, quality of life satisfaction (topics usually defining the perceived "meaning" of one's existence).

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All these being said, I should stress that fitness remains a qualitative concept. In its construction, there enters a characterization of human nature, as well as some standard of optimality. The biological rooting of the concept merely provides it with a more correct characterization of human nature, as produced by biology. By that, the concept is not merely replacing, but it is also the legitimate successor of the classical "self-preservation" of political science, which was introduced with the same intention.

In its biological definition, fitness is the capacity of an organism to provide for its needs in view of reproduction. In its qualitative definition as applied to humans, fitness is the capacity of an individual to provide for its needs subjectively perceived as desires, wishes, hopes, etc. and expressed in the form of preferences - among which reproduction. Thus, there are two components of the qualitative concept of fitness. On the first hand, the fact of staying alive, the survival, the persistence of life. On the other hand, the potential for actualization at levels of fitness more optimal for the individual concerned: that which is called individual welfare. Therefore, the qualitative concept of fitness comprises the teleonomical capacity of humans, i.e. goal-orientedness and all it presupposes in terms of capacity of information processing and representation of possible desirable future states. There, we can define phenotypic fitness in terms of optimality of a vectorial progression towards a definable goal.

Any such vector is to be traced in a space. Fitness is expressed in an environment. Phenotypic fitness is the result of the rapport between fitness and environmental constraints.

The essential fact of concern to human and social sciences in general, is that the environment of an individual is essentially determined by other humans. Apart from the component of fitness which is to be assessed by relation to the natural environment, fitness is modulated by the inter-human interaction. The object of social sciences, framed in the most general sense, is thus the study of intra-species fitness.

In this respect, there can be said that social sciences study the variations in individual fitness due to intra-species causes: that which conventionally are identified as interpersonal relations, sociality, culture. Any number of individuals interacting, *produce a co-variation of their relative fitnesses*. The basic question thus to be addressed is: *how do individuals modify their relative fitness during social life ?*

The co-variation of individual fitness can be eventually incremental, as a result of some cooperative game, performed according to rules which can generate such increments. The science of economics, as originating with Adam Smith's "progression of opulence" studies one class of such games.

The other alternative, is that the co-variation of individual fitnesses produces increments to the fitness of one individual with a cost to the fitness of another individual.

In different words, any one individual can increase its fitness by exploiting the resources of its environment. This is a baseline notion, since natural selection operates precisely by selecting between variants with different capabilities of doing it. A Darwinian creature possess instruments (adaptations) for extracting resources from the environment in order to increase its fitness. Being a baseline notion, this must necessarily apply to the environment which other individuals represent.

It is hereby proposed that the increment of one's fitness by costs to the fitness of another be called "fitness extraction". And it is postulated that, since this element of fitness is the product of natural selection, fitness extraction is a Darwinian process and the structures underlying it are hardwired, which means to say, to a large extent automatic in their functioning and fixed in their structure. Therefore, they should be amenable to rather precise descriptions, both in functional and in structural terms.

If we shall call Darwinian fitness the collection of strategies evolved by natural selection to extract resources from the environment, than extraction of fitness from con-specifics, or the usage of con-specifics as resource, can be conveniently called Darwinian social fitness.

Darwinian social fitness makes the object of the behavior called politics.

Fitness Extraction

The usage of other forms of life for individual fitness is otherwise termed predacity. There is no moral or value connotation attached to the term. It refers to the general capacity of some organisms to use others as resource (mostly food), and as such, is just another description of the trophic chain in nature. Predacity, in the narrow sense of the term, is an inter-species phenomena. This biological function is the result of a matching (co-adaptation, co-evolution) of the specific fitness of the prey versus that of the predator. Since predacity results in death as food, predacity represents any action which has as a result the increase of fitness of self at a cost to the net fitness of another (at the limit, its extinction).

In this respect, and according to the previous section, fitness extraction is a form of intra-species predacity.

Inter-species predacity makes the object of biology proper (or ecology, since it stays at the basis of the food chains in nature). Equally, intra-specific competitive behavior in the strict sense of differential reproduction due to differential genotypic fitness, makes the object of biology.

Intra-species predacity makes the object of a special domain of biology, which studies the strategies and tactics for increasing one's fitness with a cost to a con-specific, as well as the organs, apparatuses, functions aimed at that.

This specialized branch of biology may be seen also as part of the object proper of biopolitical science. Thus, biopolitical science studies phenomena of intra-species predacity or fitness extraction at various level of complexity, as will be discussed in the following section.

This definition leaves outside of its domain non-predatory competitive behavior, which is to say, differential access to resources due to differential genotypic fitness. For example, between two individuals of the same species (say, two orangutans) searching resources in the same area (food or a mate). Even though the two specimens never interact one with another, the one which is best endowed genetically, by the very force of his endowment, will reduce the available resources for another less endowed. The same applies when the two specimens interact competitively directly, for example for sexual access. In spite of the fact that one of the individuals is better off and the other is worse off, their rapport is not predatory, since none of the individuals use as resource another individual. All such phenomena belong to the study of biology proper.

Not every rapport of relative fitness which ensues in better results for one individual, and worse results for another individual, qualifies as biopolitical. In order for a biopolitical process to occur, there ought exist a transfer of fitness from one individual to another, achieved by actions carried specifically to this purpose: a covariation between an increased fitness for one individual and a diminished fitness for another, relative to the baseline of their genetic endowment.

There exists a form of fitness transfer between individuals which is not strictly predatory. It has been called inclusive fitness (W. D. Hamilton, 1963, 1964) or altruism.

In its technical formulation, inclusive fitness refers to related individuals. Even though the transfers may be unequal, the fitness extraction reduces phenotypic fitness of the donor, but increases its genotypic fitness, due to the shared genes. Therefore, the phenotypic loss of fitness is restored by genetic advantage. Since kin recognition is rarely based on unequivocal tagging, it is likely that the mechanisms developed for fitness extraction participate in this form of inclusive fitness as well. Which is to say, kin fitness may be quasi-predatory.

A second form of fitness transfers occurs between non-related individuals. The terminology describing such interactions is rather confused. It would be convenient to extend the notion of 'inclusive fitness' also to this category of relations, since literary speaking, the two individuals include one another in their own definition of fitness. The term commonly used is reciprocal altruism. The idea of reciprocity is correct; but then since, technically speaking, altruism cannot be justified by genetic theory except for kinship, the term is misleading. For the purpose of this paper, I will use the term of fitness exchange for fitness transfers between non-related individuals. The interesting character of such relations is their reduced probability comparatively to predatory relations. At its turn, this diminished probability is due either to the deferred character of the fitness exchange, or to the different type (i.e., of relative value) of the exchanged items. Therefore, in order to occur, such fitness transfers ought to overcome a critical threshold of risk which is probably way above the average Darwinian equilibria. What these brief comments

amount to, is to raise the issue of their nature. There are three possibilities for the emergence of structures mediating fitness exchanges: either they are erected upon the genetic scaffolding of kin-based inclusive fitness, as precarious as this may be (see comments above); the second possibility, is that they are deferred mechanisms of fitness extraction, therefore based upon 'organs' of intra-species predacity; finally, the third possibility, is that they are mediated by specific structures (i.e., dedicated neural circuitry). The complexity of intertwined economies of fitness of two exchanging individuals, comprising elaborated systems of rules, checks and balances, etc. favor this last hypothesis, even though the decision is not important for the present essay. What matters, is that such upper levels of behavior mediating fitness exchanges are erected upon Darwinian foundations, and complexity is always vulnerable to crumble down upon the hardwired automatism of Darwinian fitness.

Such complex transfers do not make the object of biopolitical science proper. A different kind of theory may be needed for the description of such non-Darwinian games, allowing for reciprocal gain, growth and increased complexity, of which economic theory may be one case. Nevertheless, insofar as their reduction to predatory patterns is always a possibility, they are of particular interest for biopolitical science.

The extraction of fitness is that which makes the specific object of intra-species predacity and the narrow topic of biopolitical science. One such form of fitness extraction has made the object of conventional political science, namely the organized fitness extraction at the group level (see below).

Summing up. Biopolitical science, or political biology, is the study of intra-species predacity which means, of the mechanisms of fitness extraction aiming at increasing the level of fitness of one individual, with a cost to the net fitness of another individual. Conventional political science is one branch of biopolitical science as hereby defined, studying organized or systemic fitness extraction at the group level.

According to this delineation, politics is a form of behavior characterized by :

- enhancement of one's fitness (and not merely expression of one's greater fitness) with cost to another
- which amounts to an active extraction of fitness from another, beyond that which is available to self by itself
- (probably) by means of specialized organs: brain, neural structures, hardwired behavior, among which prominently, biosocial behavior
- which amounts to one individual becoming a resource, an instrument for the self-preservation of another, at a cost to his/her own (interactional topologies commonly described as utilization, exploitation, enslavement, manipulation, etc.)

The following section is dedicated to the explanation of this meaning of the political.

The Meaning of the Political

The advantage of the conceptualization hereby proposed is that it allows for the study of a continuum of phenomena, ranging from elementary life processes, to inter-individual interaction and up to the level of structured collectives of individuals.

We can thus describe 3 levels of biopolitical processes.

1. The biology/politics interface. The first level, concerns automatic mechanisms operating at the basic level of genetic replication. Fitness extraction is the result of the genetic economy of parenting, mating and kinship. Not merely metaphorically, this level can be described as "politics of life". Phenomena such as parent-offspring conflict (Trivers, 1974), inter-gender warfare (Buss, 1994), family inclusive fitness (W. D. Hamilton, 1963; 1964) are to be studied at this level.

At this level, the mechanics of gene shuffling is the principal process to be described and understood. Albeit such processes make the object of biological studies proper, and thus it is rather a "pre-political level", it is here that is shaped the basic grammar of political interactions.

2. Inter-individual politics. The second level, concerns the biopolitics of the non-kin inter-individual topology. It is the micro-level of political phenomena. Although genetically based (like all life processes), this level involves more complex behavior: therefore, more complicated neural circuitry mediating the political relation. Nevertheless, this circuitry is the result of phylogenetic evolution, therefore is automatic as well. We shall conveniently call this level of automatism social automatic behavior. Its outcome is a "zero-level politics", in the sense there it functions at the most basic level of any system of human interactions (but also because it generates zero-sum games).

This level is made of a variety of procedures aimed at testing, modifying and turning to one's own advantage the nexus of what conventional psychology terms "interpersonal relation". Relations such as (in the order of complexity): instrumentalization, exploitation, manipulation, persuasion, seduction belong to this level. The common denominator of such processes is given by two features: 1. creative, opportunistic usage of social automatisms (such as the dominance-submissions behavioral clues); 2. the lack of overt coercion. Albeit universal, a sub-domain of this level would study sex-linked inter-individual politics (gender politics). Two fundamental types of mechanism are used for the politics at this level, the second being appended on the first.

a. **Deception (dishonest signaling)**, understood as manipulation of the informational environment (information subtraction, distortion, mis-representation) and of the biosocial "buttons" of the receptor. Therefore, core processes for their functioning will comprise mind reading, emotional expression, facial behavior, advertising, parading and display, etc.

b. **Aggressive signaling**, understood as a class of processes which signify hostility (spite), with or without subsequent application of direct force. The substrate of the aggressive signaling is the representation of the other (as substitute of the physical other). Aggressive signaling consists of: b.1. emotional aggressive display; b.2. moralistic aggression; b.3. cognitive dissonance applied to the representation of the other.

Aggressive signaling is in fact based on the manipulation by the subject of the information relevant to other, which is to say, by a particular form of self-deception.

Biopolitical science, or political biology, would study such "classic" psychological processes on the basis of evolutionary theory and with an accent on fitness extraction. This is its first proper level, as the previous pre-political level is directly investigated by biological studies. A zero-level politics occurs within the thick space of interaction between any two individuals coming face to face. Fitness represents the invisible stake in these biologically modulated transactions, the advantage changing hands as the rapport of the biosocial competence of the individuals concerned dictates. Insofar as such interactions are based upon biosocial

automatic behavior, which is to say, it relies upon Darwinian zero-sum strategies, any combination of power between the individuals interacting is "political" in the very strict sense of the term, as defined in the previous section, namely as vying fitness extraction.

3. System politics. The third level of politics is the one which traditionally made the object of study for the conventional political science. It is the macro-level of political phenomena. Its defining character is the use of integrated force. Integrated force means not any type of physical violence, but violence disseminated systematically at the group level, and mediated by more or less complex schemes. The overall structure of integrated force is that which constitutes the machinery conventionally called "state". The expression of integrated force is the network of compulsory norms (laws) pervading the social group. The source of force is a particular combination of individuals in the group which preserve the monopoly over force, essentially denied to the rest of the group. Integrated force pervades all the structural levels of the group, down to reproduction (in the form of demographic policies, eugenic laws, reproduction laws, etc.) or, as it was proposed in the first section, genotypic fitness. But even more important, the integrated force constructs, by means of laws, an obligatory environment for the life of the individuals, establishing permissible pathways, which is to say, the legal moves, for the expression of the phenotypic fitness of the individuals. From marriage laws to the law of minimal wages, the modalities for affecting individual fitness are countless. Biopolitical science offers a unique perspective and conceptual instruments for examining such effects.

In the most general sense of the term, the object of integrated force is distribution of fitness. The various classic typologies of political regimes vise various aspects of integrated force: agent (few, such as in aristocracy, or many, such as in democracy), legitimacy of integrated force (monarchies or republics), or combination of both. In all such classification, a metaphysical concept of politics compels sub-classifications in 'good' or 'bad' political regimes (Plato, 1986; Aristotle, 1915, 1921).

According to the notion of integrated force realizing the distribution of fitness, I propose here a classification in three types of orders. The criterion of classification is the intensity and type of fitness extraction, that is, of intra-species predacity.

- 1. Tyranny** (individual or oligarchic despotism) : fitness distribution is massively polarized towards the end detaining the monopoly of force. Its major mechanism is practical enslavement of con-specifics (slavery meaning fitness just above the lethal level). All forms of political order presupposing such a polarization (such as classic, unconstitutional monarchy, various dictatorships, oligarchies, etc.) enter this category. Also, teleological orders, in which the fitness of individuals is subordinated to a transcendental goal (logocentric, ideological regimes). In this category, enter fundamentalist religious regimes, ideological regimes such as communism, fascism, etc. In their mature phase, they are indistinguishable from non-teleological tyrannies.
- 2. Redistributive orders** : fitness distributions follows in various degrees an egalitarian principle. Mechanisms of fitness extraction are justified rhetorically and given legal legitimacy. In this category enter orders as varied as tribal orders, democracies, welfare regimes. They are probably the most 'natural', in that they rely upon Darwinian mechanisms.

- 3. Spontaneous order regimes** : differentiate between intra-species competition and intra-species predacity. Fitness augmentation is encouraged by the first mechanism, and discouraged by the second. The only type of orders in which integrated force, instead of being a continuation of the mechanisms of intra-species predacity, opposes it (therefore, where the 'state' is no longer a 'natural' entity). These are orders whose fundamental mechanism is fitness exchange between non-related individuals. They know complexity and growth, and this is what makes overall fitness of individuals increase, in spite of free non-predatory competition. Instead of diminishing resources, they increase resources and make them cheaper. Liberal, libertarian, free market and minimal state regimes enter this category.

Zoon Politikon

That which evolutionary psychology or studies of culture informed by biology do not take into account is the very specific phenomenon described here as fitness extraction. Upwards a certain level of complexity, social creatures develop strategies for staying alive and reproduce with costs to another, which is to say, by extracting fitness from another. That which differentiates the biopolitical extraction of fitness from parasitism proper is, firstly, its intra-species character. Secondly, in order for the biopolitical mechanics to function, it takes a certain "contribution of the victim", so to speak, to its own fitness diminishment. But this participation ought to be understood as the result of a co-evolution. De-subjectivizing the terms, the "victim" pursues the same objectives as the winner. The "victim" just happens to be a loser in an arms race.

If this assessment is correct, then fitness extraction ought to be understood in the very strict sense as a specialization. Under certain conditions, fitness extraction will evolve as a feasible strategy of survival. Which means that politics, in the rigorous sense defined here, is an evolutionary product, made possible by certain factors. It is not clear whether politics follows with "necessity" from the evolutionary process. Most likely, not, if one considers the purely random character of evolution. It "just so happened" that a number of conditions have been gathered, and a number of biosocial triggers (anatomical structures, signals, responses, i.e. behavior) co-evolved, and the specialization paid off. Zoon politikon is, thus, any species which develops this specialization.

This characterization of the political phenomena allows us to give it a generalization and a rigor not known before. The two species currently described as "political" are the humans and the chimps. From the precedent section, it appears clear now that chimps are political at level 1 and level 2 of the concept of political. There are elements of the third level, in the sense that dominance coalitions exert quite impressively integrated violence. There lacks though, a degree of stability and effectiveness in order to achieve a systemic equilibrium beyond the shifting biosocial game. On the other hand, for a species such as dolphins, very little is known even about level 2. Meanwhile, all species are "political" at level 1, and that is why level 1 is to little specific in order to make the object of study for a special discipline besides biology.

Therefore, the question arises if it is possible to define a number of sufficient conditions for politics to emerge. In different words, what conditions should be fulfilled for a creature to be zoon politikon?

A possible list of such conditions would be:

- * a suitable unit (block) of genetic material , that is, an individual, capable of homeostatic regulation. A certain equilibrium of the homeostasis gives momentary phenotypic fitness and triggers appropriate corrective behavior by reference to some optimal (which can be the default setting of the homeostatic apparatus)
- * group life of such individuals (sociality)
- * genetic capability of inclusive fitness (such as weak tagging of genetic similarity/relatedness), in order to make fitness transfers possible in principle
- * structures (anatomical and psychological) specialized for biosocial automatism (such as clues of body anatomy triggering responses for submission, sexual attractions, etc.; emotions, etc.)
- * associative cortex, capable in principle to produce a limited range of behavioral strategies (possibly including cooperation)
- * a "cognitive quotient" or calculative power bellow a critical threshold above which cooperative games and a-political behavior (non-zero sum games) become predominant; insofar as such functions are prefrontal, an index of prefrontalization (PFC Index) could be conveniently devised in order to substantiate this "critical threshold"

Fitness extraction would be the result of plotting biosocial stimuli to behavioral output (for example, the plotting of altruistic signaling with resource seeking behavior, which is to say, a simulation). If common animals developed teeth and claws for inter-species predacity, the structures for fitness extraction represent the specific adaptation of political animals, which is to say, of animals specialized in intra-species predacity.

This possible list appear to represent sufficient conditions for the emergence of political behavior. Are they also necessary? Which is to say, should any evolutionary process produce by necessity such a structure? In the light of basic evolutionary theory, it does not seem at all obvious. It is rather conceivable that the evolution of the fitness extraction specialization was the result of adaptive pressures on the lineage linking chimpanzees and humans, and which still need to be theoretically conjectured.

Politics and Behavioral Analysis. Five Axioms

If fitness extraction is indeed a functional specialization, then it should be integrated as a fundamental variable in human behavior analysis per se and its role in the economy of behavior should always be assessed. Trivially expressed, all human behavior is political but not only so. Also, it depends, to what extent.

For this purpose, in assessing analytical correctness of any human process, a set of axioms seem to need be satisfied.

1. The behavior of humans is consistent. The level where consistency appears (and can be determined) is the level of Darwinian fitness.

2. Upper level behavior is possible (i.e., ethically consistent behavior). But it should exhibit consistency with the Darwinian level. (This axiom basically says that an organism will not adopt non-conservative behavior without a benefit, even if this benefit is deferred to a different level of behavioral complexity or at a latter time).

3. Upper level behavior presupposes a capacity for cost-benefit analysis greater than the one produced by automatic homeostatic estimation of fitness (see previous section). In humans, usually this is done via the training of prefrontal neural structures. In general, it can be said that the generation of "more than Darwinian behavior" presuppose operations such as probabilistic reasoning, multi-factor analysis, abstraction of rules and procedural thinking, comparison of possible ontologies and, (perhaps foremost, long-term planning, i.e. fitness management over extended time, as the modern political philosophers guessed; Hobbes 1651/1996, Locke 1689/1990, Hume 1737/1992).

4. Any external factor which increases the cost attached to upper level behavior (such as force, including integrated force, i.e. laws) will deflect behavior with higher plausibility in the direction of simple Darwinian consistency

5. Apparent inconsistency in behavior depend on combinations of rules at different levels of complexity and they should be regarded as strategic calculations between alternative behavior carried by the subject.

Extending the above comment to analyzes of large scale human processes such as culture and, in general, group life, there appears that the major lack of such studies is their total oblivion of politics. If fitness extraction is indeed a fundamental specialization in the human species, the patterns described without due regard to it are simply mythological and not realistic. This may explain the tension between the "naturist" versus "nurturist" approaches and, more generally, the contemporary inadequacy of social and human sciences which did not integrate evolutionary theory.

Conclusion and Programmatic Development

On the basis of such a characterization, now we can define politics as being:

Politics = f(sociality, fitness extraction)

By replacing here Wilson's definition of sociality:

Politics = f(reproduction, common goods, fitness extraction)

Also, if we replace fitness extraction with a function of deception and force (direct or integrated), we get the simplified formula :

Politics = f(reproduction, common goods, deception, force)

The interpretation of the formula is quite straightforward. It basically described politics as a biological process, and lists the main factors modeling the process.

By way of further development, the present theoretical account should benefit from the following:

1. A complete synopsis of the Darwinian levels of automatic social behavior: at the physical level (anatomical, chemical-hormonal), at the psychological level (the fight-flight turntable in particular, emotions in general) and at the socio-cognitive level (such as the fundamental attribution error, deception & mind reading, moralistic

aggression). The automatic social behavior is probably the immersed part of the iceberg called politics.

2. An accurate description of the functional units needed for upper level behavior. These may be: a rule generator, a utility calculator, an ethical expert (analyzer), a virtualizer. They should be able to produce types of behavior circumventing the political. Their global functioning should provide something of the sort of an "index of PFC-ization".

3. A model of the interaction between the two above. The end product should be non-political behavior, i.e. the production of models for fitness exchanges/transfers which do not rely on zero sum strategies. The models should be realistic from a Darwinian point of view, which means, they should be able to produce a prediction as to the degree of flexibility of Darwinian behavior.

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