

SCARCITY, SELF-INTEREST, SPONTANEOUS ORDER^{*}

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Working Paper 224
November 1981

^{*}For presentation at the annual meeting of the American Association for the Advancement of Science, Washington D.C., January 1982.

I. TWO IMPERIALISMS

This is a tale of two imperialistic intellectual disciplines, economics and evolutionary biology. Economics and evolutionary biology as aggressors are currently invading, from different directions, the intellectual domains of the "soft" social studies -- sociology, political science, anthropology, and the rest. What makes the soft social studies vulnerable to invasion is their failure as disciplines. Each has been assigned or has claimed jurisdiction over an enormously rich intellectual resource, over a significant portion or aspect of human social behavior, but none has been able to come up with an integrated theoretical interpretation of its subject. Hence they all remain in the natural-history stage of scientific progress. The intellectual achievements of the soft social studies, though genuine, are unsystematic accumulations of observations, relieved at fortunate moments by insightful but low-level empirical generalizations. Economics and evolutionary biology, in contrast, can be likened to organized armies of ideas, each tightly disciplined by its structured analytical system. It is this integral unity that gives the invaders their intellectual power, however genuine or non-genuine their ultimate universalistic claims may be.

The imperialistic pretensions of evolutionary biology to integrate the social sciences under the banner of "sociobiology" are of course notorious. Imperialist biology is, in effect, trying to swallow up the social studies from below. For the sociobiologists, the conventional social sciences are no more than disorganized attempts to get at the deeper, genetically-founded behavior of the human species.

A couple of quotes from the high priest of sociobiology, E.O. Wilson, capture the flavor of this line of attack:

For every discipline in its early stages of development there exists an antidiscipline....With the word anti-discipline I wish to emphasize the special adversary relation that exists initially between the studies of adjacent levels of organization....[B]iology has now moved close enough to the social sciences to become their antidiscipline....Many scholars judge this core [of social theory] to be the deep structure of human nature, an essentially biological phenomenon. [Wilson (1977), p. 127.]

There is a strong tendency to think of our own species as entirely plastic and hence all but equipotent in the design of its social institutions. However, this conception will not stand close scrutiny....[H]uman social behavior occupies only a small envelope in the space of realized social arrangements....For example, certain general traits are shared with most other Old World primates....It is virtually inconceivable that primates, including human beings, could be socialized into the radically different repertoires of insects, fish, birds, or antelopes; or that the reverse could be accomplished. [Ibid., pp. 131-132.]

More specifically, Wilson quotes with approval:

If [a] new Adam and Eve could survive and breed -- still in total isolation from any cultural influences -- then eventually they would produce a society which would have laws about property, rules about incest and marriage, customs of taboo and avoidance, methods of settling disputes with a minimum of bloodshed, beliefs about the supernatural and practices relating to it, a system of social status and methods of indicating it, initiation ceremonies for young men, courtship practices including the adornment of females, systems of symbolic body adornment generally, certain activities and associations set aside for men from which women were excluded, gambling of some kind, a tool- and weapon-making industry, myths and legends, dancing, adultery, and various doses of homicide, suicide, homosexuality, schizophrenia, psychosis and neuroses, and various practitioners to take advantage of or cure these, depending on how they are viewed. [Fox (1971)].

This is of course only assertion, but it does not lack support. I shall merely mention here the biological interpretations offered by various

authors for characteristic aspects of human social behavior such as incest avoidance, male philandering, adolescent rebelliousness, the balance between dominance and territoriality as social organizing principles, and the aggressive instinct.¹

Less publicized but no less important is the imperialist invasion from economics. Where biology threatens to swallow all the social sciences from below, economics, itself a social science, is extending its sway horizontally into the domains traditionally reserved for its sister disciplines. The hallmark of this invasion is the application of the postulate of rational self-interested behavior not just to market trading but to all social interactions. In particular, political science has already been heavily colonized by economists (and by political scientists employing economic techniques), as evidenced in the work of Downs (1957) and Buchanan and Tullock (1962) on collective choice and voting, of Boulding (1962) and Schelling (1960) on conflict and defense, and of Niskanen (1971) and Stigler (1971) on bureaucracy and regulation, to mention just a very few topics and contributors. And economists have also crossed traditional boundaries to produce important results in the domains of sociology, anthropology, and so forth: for example, Ehrlich (1973) on crime, Becker (1981) on marriage and the family, and Posner (1980) on the sources and evolution of primitive and modern law.

What will happen as these two invading imperialisms collide in the course of swallowing up their prey? As the comic-strip character Pogo said: "We have met the enemy, and he is us!" More specifically, and this is my key theme, despite some obvious differences the fundamental approaches and the essential analytical structures of economics and evolutionary biology are really the same. The two invasions are, ultimately, one.

II. COMMON THEMES

I could defend this assertion in a formal way, by displaying the fundamental similarity of the equations describing equilibrium and processes of change in economics and in evolutionary biology. But this would be inappropriate here.² Instead, I shall illustrate some of the parallels (and divergences) between the two approaches by discussing several common themes central to each: to wit, the three themes of scarcity, self-interest, and spontaneous order.

A. Scarcity

For the economist, recognizing the fact of scarcity is the beginning of wisdom in private choices and in public affairs. That competition for resources follows from scarcity is equally obvious. In the biological realm it is scarcity that leads to what Darwin called the "Struggle for Existence" (the title of Chapter 3 of the Origin of Species) and consequently to "Natural Selection, or the Survival of the Fittest" (the title of Chapter 4). There is one important difference, however, between the biologists and economists on scarcity. In modern textbook economics we attribute scarcity mainly to the non-satiability of human wants rather than to sheer population pressure on resources. In our favored quarters of the globe humans do not for the most part have to struggle for mere existence, for reproductive survival (as the sociobiologists put it). Darwin's thinking followed that of the earlier economist Malthus, whose gloomier view seemed far from unreasonable before the successes of the Industrial Revolution. Whether or not the human species will ultimately escape from Malthusian biological pressure is a question I cannot pursue here.

B. Self-interest

That economics postulates self-interested behavior hardly bears emphasizing (indeed the point has been oversold). Adam Smith, as usual, said it best:

We are not ready to suspect any person of being defective in selfishness. [Moral Sentiments, E.G. West, ed., 1969, p. 446].

And of course there are his famous lines:

It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest. [Wealth of Nations, Modern Library edition, p. 14].

In fairness to the Scottish moralist, Adam Smith certainly recognized that humans can behave unselfishly; he asserted only that the scope of such unselfishness could not be very broad. To quote again:

In civilized society, [man] stands at all times in need of the co-operation and assistance of great multitudes, while his whole life is scarce sufficient to gain the friendship of a few persons. [Ibid.]

As for biology, only for a few of the higher animal species could it be said that self-interest was a motive for behavior. Nevertheless, Darwin insisted, selection of self-benefiting variations must be the consequence of the struggle for existence.

The foregoing remarks lead me to say a few words on the protest lately made by some naturalists, against the utilitarian doctrine that every detail of structure has been produced for the good of its possessor....If it could be proved that any part of the structure of any one species had been formed for the exclusive good of another species, it would annihilate my theory. Natural selection will never produce in a being any structure more injurious than beneficial to that being, for natural selection acts solely by and for the good of each. [Origin of Species, Modern Library edition, pp. 146, 148, 149].

What then shall we make of the evidences of cooperation all around us?

In the realm of Nature, alongside competition red in tooth and claw we observe parental care, loyalty to the pack, and interspecific symbioses in infinite variety. In man's artificially adapted world, we see the straightforwardly selfish behavior emphasized by Adam Smith, but we see also mutual aid -- which in some instances approaches heights of suicidal selflessness attained in Nature only by the social insects. How it is that natural and man-created forces might have contributed to this end I shall discuss more specifically shortly.

The undoubted fact of non-self-interested behavior had led modern economics to retreat into a formally unassailable but empirically empty theoretical position. Our textbooks today attribute to each individual what is, from the viewpoint of the pure logic of the theory, a given yet arbitrary set of "tastes." Do we see an individual helping others? Then, we say, he is only satisfying his self-interested "taste" for charity! This is, to say the least, intellectually unsatisfying.

The evolutionary biologists, however, are in the process of filling this gap. Specifically, they are providing an economic explanation of unselfishness. The key point is the distinction between the survival of the individual and of the survival of the genes he carries. I will quote from Dawkins' remarkable book:

...our genes have survived, in some cases for millions of years, in a highly competitive world. This entitles us to expect certain qualities in our genes. I shall argue that a predominant quality to be expected in a successful gene is ruthless selfishness....However, as we shall see, there are special circumstances in which a gene can achieve its own selfish goals best by fostering a limited form of altruism at the level of individual animals.
[Dawkins (1976), p. 2].

More generally, a main program of sociobiology has been to demonstrate that our drives and instincts generally (what the economist demeaningly

calls "tastes") have been selected in the interest of reproductive survival. What "tastes sweet" [Barash (1979)] to us is what has proved useful for survival over evolutionary time. For the legitimacy of this sociobiological position as economics, let me quote Adam Smith once again:

Thus self-preservation, and the propagation of the species, are the great ends which nature seems to have proposed in the formation of all animals. Mankind are endowed with a desire to those ends, and an aversion to the contrary.... But though we are...endowed with a very strong desire to those ends, it has not been entrusted to the slow and uncertain determinations of our reason, to find out the proper means of bringing them about. Nature has directed us to the greater part of these by original and immediate instincts. Hunger, thirst, the passion which unites the two sexes, the love of pleasure, and the dread of pain, prompt us to apply those means for their own sakes....
[Moral Sentiments, p. 110].

Few would deny that certain universals or near-universals of life, like the hunger and sex drives, are explainable in terms of reproductive survival. But can contribution to "fitness" explain desires for Guccities, for piano lessons, for mountain-climbing expeditions? Or, to stick closer to reproductive basics, can we explain abortion, infanticide, homosexuality, or monastic celibacy as promoting reproductive survival? Well, not all puzzles can be solved overnight. Not to be entirely evasive, I will be saying more shortly about one enormous difficulty already alluded to: the extent of cooperation and unselfish behavior among humans.

C. Spontaneous Order

There has been a long-standing debate among historians of thought as to which economist, Malthus or Adam Smith, had the greater influence upon Darwin's thinking. From Malthus, of course, Darwin was led to the line of thought: multiplication of populations/scarcity/struggle for existence. The key idea Darwin derived from Adam Smith was somewhat subtler: that

struggle and striving need not imply chaos, but rather resolve themselves in spontaneous order or even (more arguably) in a kind of harmony.³ To appreciate the significance of this point for Darwin, recall that the "argument from design" was and is one of the most convincing supports of religious belief generally and of creationism in particular. When we encounter a well-designed watch, does this not imply a watchmaker? And is not the realm of life infinitely more complex and intricately organized than any watch? But Adam Smith showed that something as complicated as the 18th century economy and as successful (we ought not overlook this point) could emerge spontaneously, from self-interested competitive striving. This was just what Darwin needed. Order, adaptation of organisms to their environment, need not after all imply a designer with a universal plan. I will quote here from the concluding paragraph of The Origin:

It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse: a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. [Origin of Species, pp. 373-374].

Darwin's argument has by now been irrevocably woven into every educated person's heritage of ideas. But its Smithian precursor -- applying as it does specifically to the spontaneous evolution of human culture -- seems psychologically much harder to accept, and has still only

been partially learned:

But if in those simpler instances we have overcome the belief that, wherever we find an order or a regular structure which serves a human purpose, there must also have been a mind which deliberately created it, the reluctance to recognize the existence of such spontaneous orders is still with us in many other fields. We still cling to a division, deeply embedded in Western thought since classical antiquity, between things that owe their order to "nature" and those that owe it to "convention." It still seems strange and unbelievable to many people that an order may arise neither wholly independently of human action nor as the intended result of such action, but as the unforeseen effect of conduct that men have adopted with no such end in mind. Yet much of what we call culture is just such a spontaneously grown order, which arose neither altogether independently of human action nor by design, but by a process that stands somewhere between these two possibilities, which were long considered as exclusive alternatives.

[T]he structure of modern society has attained a degree of complexity which far exceeds that which it is possible to achieve by deliberate organization. Even the rules that made the growth of this complex order possible were not designed on anticipation of that result; but those peoples who happened to adopt suitable rules developed a complex civilization which prevailed over others. [Hayek (1964)].

So the "argument from design" fails on the macro level. More recently in economics, we have begun even to appreciate that the economists' standard postulate of rationality -- design on the micro or decision-making level -- is not a necessary part of economic models. The marvelous morphological and behavioral adaptation of birds to the conditions of flight does not require any forethoughted planning. Similarly, the marvelous adaptation of successful business enterprises to consumer needs can (at least in substantial degree) be explained as due merely to favorable selection of successful random or accidental commercial choices! [Alchian (1950), Enke (1951), Winter (1964)]. Once again Adam Smith had already staked out the territory, and gone even further to apply this selectional argument to the human make-up itself. It is precisely because of the fallibility of human

reason, he argued, that we have implanted within us definite "tastes" -- what he called "original and immediate instincts" (Moral Sentiments, p. 110). From the biological point of view, rationality is merely one of the possible evolutionary strategies for competing in the struggle for existence. We professors undoubtedly tend to over-rate it. After all, if rationality is that useful why is it that only one rational species has ever evolved? (If that many.)

Let me now address the debatable issue of whether competition or struggle can lead to something like harmony. We can start with Adam Smith's famous "invisible hand" quotation:

[E]very individual necessarily labours to render the annual revenue of the society as great as he can....He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it....[H]e is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. [Wealth of Nations, p. 423].

But Adam Smith and his followers also recognized that whatever claim to harmonious order the laissez-faire economy possesses is dependent upon an effective system of property and law.

Commerce and manufactures can seldom flourish long in any state which does not enjoy a regular administration of justice, in which the people do not feel themselves secure in the possession of their property, in which the faith of contracts is not supported by law....[Wealth of Nations, p. 862].

Adam Smith's system consisted of working out the implications of: "If you give me that, your right to which I recognize, I will give you this."

Matters stand on quite a different footing to the extent that some individuals are instead in a position to say: "I want that which you possess, I do not recognize your right to it, and I will therefore seize it."

But in Nature there is no property, no right, no law, no justice. The distinction has accordingly been drawn [Ghiselin (1978)] between the

"political economy" of Adam Smith and the "natural economy" of Darwin. In each case there is system, there is order in the sense of predictable laws of development. But the natural economy displays much less actual harmony in the sense of mutually beneficial interdependence.⁴ That we do nevertheless see some evidences of harmony in Nature is a surprising fact, that I have promised to comment on shortly.

What I want to emphasize here, however, is that the "imperialist" expansion of modern economics has been precisely from the Smithian core idea of political economy toward the Darwinian generalization represented by human natural economy. The institutions of political economy -- law, justice, property -- are fragile and imperfect. That humanity has not totally emerged from the Hobbesean "state of nature" is evident in the intercourse among nations, which lies outside the scope of effective law. And even where law does exist, imperialist economics postulates that a self-interested individual will strike some profit-maximizing compromise between lawful and unlawful means of acquiring resources -- between production and exchange on the one hand versus theft, fraud, and extortion on the other. What is a little more subtle, apart from violating the law there are ways of taking advantage of imperfections of law. Or, probably even more important, there are profitable opportunities for revising the law in one's favor. This latter form of theft, fraud, and extortion is of course a central theme of what we call "politics". Despite the conflict-laden potential of natural economy, however, not sheer chaos but rather a complex and shifting yet analyzable spontaneous order results. It is this spontaneous order in social affairs that is being studied by imperialist biology and imperialist economics.

III. SPONTANEOUS COOPERATION AND ITS LIMITS

I had promised to say something more on cooperation, the central theme of all the social sciences.⁵

Let me start with the way biologists have approached this problem. First, a terminological point. Instead of the misleading motivational word "altruism" employed in biological jargon, I shall use the motivationally neutral and operational term "helping." The primary biological issue is: under what circumstances is it profitable, in terms of reproductive survival, for one organism to help another? A secondary question, which I can say very little about here, concerns the actual evolutionary route for establishing such a pattern of helping as an equilibrium solution.

Sociobiologists recognize several categories of helping.⁶

A. Incidental helping: This occurs when one organism aids another as a mere by-product of pursuing its own survival. A bird who takes wing upon being spotted by a predator thereby warns the whole flock. Two remarks here: (1) What is incidental or accidental helping on one level may of course, on a deeper level, not be a chance result at all. The flocking behavior of birds may have evolved precisely to make this form of warning effective. (2) In addition to such mutual-benefit interaction, there is also more one-sided "helping" -- as when deer unwillingly provide food for wolves, or humans for mosquitoes.

B. Kinship helping: Since reproductive survival is the name of the game, it is not difficult to see that the interests of their genes often dictate that parents help their offspring. Or, to generalize this, dictate that individuals (to some degree) make sacrifices on behalf of relatives. An important recent development in biological theory [Hamilton (1964)] has

been to quantify the economics of kinship helping. Since, for example, two siblings A and B are only 50% related (in the simplest case), A would help B only when the gain to B is twice the cost to A. More generally, the theorem says: for kinship helping to be evolutionarily profitable, the degree of relatedness must exceed the cost/benefit ratio.

C. Reciprocal helping: Here we have the type of cooperation most analogous to market exchange, for example, the mutual aid of the bees and flowers, or the grooming/food interaction of cleaner fish and their clients. An even more obvious example is the male-female procreational interaction. Yet, in natural economy, these mutualistic arrangements are not supported by external enforcement (law). Consequently, we are not surprised to see cheats and mimics emerge: carnivorous plants that trap would-be pollinators, pseudo-cleaner fish that bite would-be clients, philandering husbands and already-pregnant brides.

Of course, cheats and mimics also parasitize reciprocal exchange in human affairs, because of the inevitable imperfections of our enforcement system. As it happens, biologists and economists have independently observed strikingly similar sets of solutions for avoiding or controlling cheats and mimics, for allowing the survival of patterns of cooperation in the absence of law or with imperfect law. The solutions include: (a) family business partnerships (to take advantage of kinship, reducing incentive to cheat); (b) repeat business -- the faithful cleaner fish develops a permanent clientele of satisfied customers; (c) division of labor -- increasing the degree of mutual dependence, as in the social insects, makes cheating of partners less profitable; and (d) reward-punishment commitment -- if a member of the cooperating team can guarantee to confer sufficient reward for good behavior, or punishment for bad behavior,

it may not pay to cheat. "Irrational" emotions like love or rage (Adam Smith's "original and immediate instincts") may persist precisely because they assure others that the reward or punishment necessary to support some forms of reciprocal helping will in fact be conferred.

D. Group-benefit helping: Conceivably, a pattern of helping might be viable even in the absence of reciprocation, if the helper's social group gains thereby. The evolutionary problem here is that non-helping fellow-group members, "free riders" in economic terminology, gain even more. Nevertheless, biological theorists have come up with models in which such helping can indeed represent an evolutionary equilibrium. The "group selection" necessary to achieve this result may have been peculiarly potent in the clan and tribal competition prominent in the evolutionary history of the human species. Consequently, a basis is possibly provided for what some have regarded as the inexplicably powerful "social instincts" of mankind -- as evidenced by our willingness to cooperate in the provision of public goods, to obey the "social contract" beyond the degree warranted by self-interest, and to display on occasion the suicidal selflessness otherwise observed only in the social insects.

IV. CONCLUSION

I will conclude very briefly. Economic and sociobiological models are alike, on the most fundamental level, in showing how spontaneous order emerges from self-interested behavior in the presence of scarcity. The shared central model of economics and sociobiology is a kind of master pattern into which the phenomena studied by all of the social sciences have been, and are being fitted.

FOOTNOTES

¹Wilson (1975), Barash (1977 and 1979), Tiger and Fox (1971), Dawkins (1976) and Alexander (1979),

²I have provided the beginnings of such a comparison in Hirshleifer (1977).

³On this see Schweber (1978).

⁴Following a Marxist line, the biologist and polymath Gould (1980, p. 68) has gotten this curiously backward -- suggesting that the "invisible hand" operates more harmonistically in the natural rather than the human political economy!

⁵I have discussed this question more extensively in Hirshleifer (1978).

⁶Good discussions appear in Trivers (1971), West Eberhard (1975).

REFERENCES

- Alchian, A.A., "Uncertainty, evolution and economic theory," J. Polit. Econ., v. 58 (1950).
- Alexander, R., Darwinism and Human Affairs (1979).
- Barash, D., Sociobiology and Behavior (1977).
- _____, The Whisperings Within (1979).
- Becker, G.S., A Treatise on the Family (1981).
- Boulding, K.E., Conflict and Defense (1962)
- Buchanan, J.M. and Tullock, G., The Calculus of Consent (1962).
- Dawkins, R., The Selfish Gene (1976).
- Downs, A., An Economic Theory of Democracy (1957).
- Ehrlich, I., "Participation in illegitimate activities," J. Polit. Econ., v. 81 (May/June 1973).
- Enke, S., "On maximizing profits: A distinction between Chamberlin and Robinson," Am. Econ. Rev., v. 41 (1951).
- Fox, R., "The cultural animal," in J.F. Eisenberg and W.S. Dillon, eds., Man and Beast: Comparative Social Behavior (1971).
- Ghiselin, M.T., "The economy of the body," Amer. Econ. Rev., v. 68 (May 1978).
- Gould, S., The Panda's Thumb (1980).
- Hamilton, W.D., "The genetical evolution of social behavior, I.", J. Theor. Biol., v. 7 (1964).
- Hayek, F.A., "Kinds of order in society," The New Individualist Review, v. 3 (1964).
- Hirshleifer, J., "Economics from a biological viewpoint," J. of Law & Econ., v. 20 (April 1977).

- _____, "Natural economy versus political economy," J. of Social & Biol. Structures, v. 1 (1978).
- Niskanen, W.A., Bureaucracy and Representative Government (1971).
- Posner, R.A., "A theory of primitive society, with special reference to primitive law," J. of Law & Econ., v. 23 (April 1980).
- Schelling, T.C., The Strategy of Conflict (1960).
- Schweber, S.S., "The genesis of natural selection -- 1838: Some further insights," BioScience, v. 28 (May 1978).
- Stigler, G.J., "The theory of economic regulation," Bell Journal of Econ. & Mgt. Science, v. 2 (Spring 1971).
- Tiger, L., and Fox, R., The Imperial Animal (1971).
- Trivers, R.L., "The evolution of reciprocal altruism," Q. Rev. Biol., v. 46 (1971).
- West Eberhard, M.J., "The evolution of social behavior by kin selection," Q. Rev. Bio., v. 50 (1975).
- Wilson, E.O., Sociobiology (1975).
- _____, "Biology and the social sciences," Daedalus (Fall 1977).
- Winter, S.G., "Economic 'natural selection' and the theory of the firm," Yale Econ. Essays, v. 4 (1964).