

"If You're So Rich..." The Economic Approach to Epistemology

Alexander Tabarrok, *George Mason University*

The benefits of reading Nicholas Rescher's *Cognitive Economy: The Economic Dimensions of the Theory of Knowledge* (Pittsburgh: The University of Pittsburgh Press, 1989) outweigh the costs. It takes little time to read; it is clearly written; and many of Rescher's ideas are interesting and novel. Thus reading it is a rational economic decision. This may seem like an odd way of discussing a book, but it fits squarely with Rescher's thesis: Knowledge acquisition "is a human activity which, like any other, requires the expenditures of effort and energy in a way that endows the enterprise with an unavoidable economic dimension. Economic factors shape and condition our cognitive proceedings in so fundamental a way that they demand explicit attention" (150).

1. Descriptive vs. Prescriptive Epistemology

There are essentially two approaches to the theory of knowledge. The first conceives of epistemology as primarily *prescriptive* or *normative*. Epistemology does not begin by looking at how we actually know, but instead tells us how we ought to know. It does not begin by assuming the existence of actual knowledge, but instead places all of our knowledge in "scare quotes" until a norm of justification can be found a priori and a process of global justification can be carried out. Only after such a global justification is carried out can we make use of scientific discoveries about what actual knowledge "looks" like. Thus the normative approach is, overtly or covertly, connected with methodological skepticism.

Unfortunately, the historical trend seems to be that once methodological skepticism is granted and all of our knowledge is suspended in scare quotes, we appear to be bereft of resources with which to disquote our knowledge. Thus methodological skepticism tends to give rise to substantive skepticism and the slide down the slippery slope to solipsism. Indeed, Descartes, who is usually considered the father of this approach to epistemology, was capable of climbing back up the slippery slope only by arguing that complete methodological skepticism involved a performative contradiction: the famous "Cogito" argument.¹

The prescriptivist approach to epistemology is connected to a particular model of the nature of philosophy and its relationship to the sciences, culture, and practice. In this view, epistemology issues judgments which determine the knowledge status of other disciplines. Philosophy is seen as a sort of hanging judge, requiring the sciences etc. to queue up to face judgment under philosophically legislated norms of method. Those sciences which measure up to these demarcation criteria are judged to be True, those that are not are forever banished to the realm of scare quotes.

As an alternative to a primarily prescriptive approach to epistemology, various pragmatists, naturalists, evolutionary epistemologists, and phenomenologists have advocated an approach to knowledge that is primarily descriptive. This approach assumes

(overtly or covertly) that the problem of knowledge is not whether we have it or not, but rather what the knowledge that we do have is like. Knowledge, on this account, is a natural phenomenon. By and large, we have it. The task of epistemology is not to elaborate a set of tests or criteria to identify knowledge; rather, these tests and criteria are created by the inquirers themselves within the context of enquiry and are embodied tacitly in the process of enquiry itself.

Of course on this account epistemology's task is not purely descriptive, especially if "pure" description means simply "gazing" on knowledge without any presuppositions or theoretical constructs. Nor is it descriptive as opposed to practical. Indeed, the ultimate aim of epistemology is not contemplative but practical. Like medicine, which articulates and codifies norms of health which are implicit in actual healthy bodies, epistemology seeks to articulate and then to codify norms of rationality which are immanent in actual knowledge. These norms can then be used to pursue knowledge in a more self-conscious and effective manner. But it always should be kept in mind that these tools of art are based upon and complete the work of nature. They thus depend upon the prior existence and intelligibility of natural knowledge. On this model, philosophy is not the hanging judge of the sciences, but rather a midwife for knowledge.

One of the chief benefits of the descriptive approach is that it is open to being informed by the discoveries of the social and natural sciences. Each new discovery is an opportunity for further reflection on and understanding of the nature of knowledge. Whereas the prescriptive epistemologist must suspend all scientific knowledge in scare quotes until the task of epistemology has been completed, the descriptive epistemologist can accept the discoveries of the sciences as *prima facie* paradigm cases of genuine knowledge. Given this attitude, it is possible to go cheerfully about weaving the discoveries of psychology, neuroscience, evolutionary biology - and even the dismal science of economics - into the fabric of a theory of knowledge. Rescher's *Cognitive Economy* is just such a work.

2. Economics and Finite Knowers

Economic reasoning is very general and can be applied with profit to many different phenomena. Although this was recognized early on in the history of economics, only in the last thirty years has this generality been exploited.² The methods of economics are now used to study politics, crime, law, altruism, the family, and many other phenomena.³ The essential facts which make economics applicable in all these areas are the existence of goals, scarce means and choice. Economics applies where it is meaningful to speak of choosing scarce means in order to achieve goals.⁴ To apply economics to epistemology we must begin, therefore, by asking: What are our epistemic goals? What means do we have of achieving them? And given that these means are scarce, how can we apply them so that our goals are best achieved? In other words, we want to compare the costs and benefits of knowledge acquisition using rational criteria, so that net returns are maximized.

The first half of chapter one introduces the basic components of Rescher's arguments: benefits, costs, and rationality. The cost of knowledge acquisition is the time, effort, and

resources which must be foregone in other endeavors. The benefits of knowledge are both practical and cognitive. Knowledge gives us a greater control over nature, which allows us to better achieve our ends. But it also brings purely cognitive or psychological benefits: "The basic human urge to make sense of things is a characteristic aspect of our make-up - we cannot live a satisfactory life in an environment we do not understand . . . cognitive disorientation is actually stressful and distressing" (8). Rationality is about acting efficiently; it is the process of maximizing net benefits (benefits-costs). Or, as Rescher writes, "Rational inquiry is a matter of epistemic optimization" (13).

3. Skepticism

Given Rescher's economic framework, skepticism is irrational. Typically, skepticism arises from judging the finite knowledge of human beings by standards which are appropriate only to gods, standards such as absolute, non-revisable, non-contextual Truth; absolute certainty; diaphanous clarity; total articulation, etc. When human knowing does not measure up to these standards, the standards are not simply revised to bring them in line with human capacities. Instead, knowledge and certainty, clarity and articulation are declared impossible for human beings.

As Rescher puts it, skepticism is a form of risk aversion. The skeptic will accept nothing which is not "ironclad."⁵ Since little knowledge of interest is "ironclad," the skeptic accepts next to nothing. This, however, is foolish for two reasons. First, it results from the application of inappropriate standards to human knowing. Second, once knowledge is discussed in the context of finite human actors pursuing their ends, skepticism, in counseling risk aversion, ignores the fact that knowledge has benefits, whether psychological or practical. As H.H. Price puts it "Safety first is not a good motto, however tempting it may be to some philosophers. The end we seek to achieve is to acquire as many correct beliefs as possible on as many subjects as possible."⁶ To this inevitably means that cognitive risks must be taken. Skepticism ultimately fails because it proposes that we act uneconomically. It proposes that we minimize risk instead of balancing costs and benefits to achieve maximum total return. But, as Rescher puts it, if "accident avoidance were all that mattered, we could take our mechanical technology back to the stone age, and our cognitive technology as well"⁷ (24).

This argument, however, as Rescher recognizes, is not likely to convince a skeptic. But this is hardly a cause for surprise, for the argument is meant only to convince those who will reasonably weigh the benefits and the costs of accepting the argument as true.

4. Scientific Communities

Chapter two of *Cognitive Economy*, "The Economics of Trust and Cooperation," argues that it is in the self-interest of individuals involved in a cognitive enterprise to band together to form a community. While I believe this to be true, Rescher's arguments are not sufficient to establish this conclusion. He presents the following "interaction matrix" to illustrate the benefits of cooperation.

	You trust me	You do not trust me
I trust you	2/2	4/1
I do not trust you	1/4	3/3

The numbers are preference rankings, 1 being the highest and 4 the lowest. The ideal situation for me and the worst for you is if you trust me, but I do not trust you. Therefore, I rank this situation as 1 and you rank it as 4 (the lower left corner of the interaction matrix). Rescher argues that the final outcome must be symmetric since incentives are the same for both sides. He therefore eliminates the upper right and the lower left corners. It is then ("obviously") better for both individuals to trust each other because 2/2 is better than 3/3.

Unfortunately there is nothing obvious about this result. This game is known to economists and other social scientists as the "prisoner' dilemma."⁸ It is a dilemma because the rational strategy for you and I as individuals leads to a situation that we as a community would find irrational. To see this, assume that I will trust you. What then is your best strategy? Since 1 is preferred to 2, you will choose not to trust me if you believe that I will trust you. Now assume that I will not trust you. What then is your best strategy? If I am not going to trust you, then you are better off not trusting me (3 is preferred to 4). No matter what you assume about my actions, your best strategy is not to trust me. This is also my best strategy since the game is symmetric. Our individual rationality thus leads us into a socially irrational situation.⁹

Economists and other social scientists have written a great deal about this problem and how it is solved. The Hobbesian solution is for you and I to contract with a third party to punish either of us if we depart from the cooperative outcome (trust, trust). By increasing the cost of not trusting, the punisher makes it in both of our self-interests to cooperate. If we substitute theft for trust in the interaction matrix, we can see that government enforcement of property rights and provision of jails are one way that we have gotten out of the theft dilemma.

Another possible approach is the evolutionary, or "tit for tat" solution. If you and I play the game repeatedly then we may eventually learn to cooperate. Deviating from the rational solution may cost a little bit on the first turn, but if I can signal to you that I am willing to cooperate and you respond, then we can both be better off in the long run. If one of us should then choose to deviate from the cooperative solution, he can be punished by not being trusted on the next round (hence "tit for tat").¹⁰

Another problem with Rescher's approach to these and similar questions is that he seems to have adopted the idea (popular among many economists) that "What is, is efficient." Communities are beneficial, but their creation, like everything else, involves costs. Communities, for instance, impose costs on those who do not cooperate, even when trust and cooperation may not be beneficial. Distrust, for instance, can create a competitive atmosphere which drives people to work harder and faster in pursuit of their goals. A brief review of James Watson's *The Double Helix* should disabuse anyone of the notions that the scientific community is always one of trust and cooperation, and that cooperation is always beneficial. Intellectual communities can also breed conformity. They are most

beneficial when doing what Kuhn calls "normal science," but in the face of paradigm shifters, innovators who break the rules, communities may retard progress. Obviously the benefits of communities outweigh the occasional costs they impose upon innovators, but we should recognize that these costs exist, for by being aware of them we may find ways of minimizing them yet further.¹¹

5. Simplicity and Induction

Two of the most interesting chapters of *Cognitive Economy* are on scientific methodology, the problem of induction, and their relationship to economics. One of the most persistent errors in philosophy is to take methodological rules of thumb to imply something about reality. Why, for instance, is a simple and general theory to be preferred to a complex and specific one? "Realists" try to defend this preference by arguing that the fact that simple and general theories predict well can be explained only if the world is in fact governed by simple and general laws.

Unfortunately, once proponents of the principle of simplicity and generality claim that it is realistically grounded, the principle becomes open to empirical refutation. For instance, the overthrow of Bohr's model of the atom for quantum physics, or of Newton's theories for Einstein's, is taken as evidence that simple and general theories cannot be supported on empirical grounds. Therefore, one can reason, there is no rationale for preferring such theories.¹²

Rescher puts induction and our preference for simple and general theories on a firm epistemological basis, grounding them not in the way the world is, but in the economic nature of a finite knower's rationality. Regardless of "how complex or untidy the world may turn out to be," the commitment to simplicity "remains a methodological desideratum" (93) simply because the finitude of rationality requires that we resolve cognitive problems "in the most economic way compatible with an adequate use of the information" (88). There is no ontological claim being made when we prefer simple theories to complex ones. The only claim made is about the optimal method of acting in the face of scarcity.

The same argument justifies our use of induction. Induction always involves moving from limited information to general conclusions not "strictly" supportable on the grounds of that information. Should that fact disturb us? Do we need to underwrite induction with metaphysical argument? Not at all. Because of their infinite intellects, gods have no need of induction and may look down upon the procedure. Man, however, because of his finite intellect, must always begin with limited information and extend his conclusions beyond it. From a God's eye point of view, induction may make us uncomfortable, but perhaps then we should simply change our point of view. If we condemn induction from a God's eye point of view, we will be cognitively bereft. But if we abandon the standards of the gods and accept the risk of being occasionally wrong and having to revise our generalizations, then the possibility of - and the motivation for - discovering truth increases immensely. Rescher makes this point well:

Induction is a method of question resolution in the face of imperfect information. It is a resource for use by finite intelligences, a process that yields not the best possible answers (in some rarefied sense of this term) but the best available answers, the best that we can realistically manage to secure in the difficult conditions in which we do and must conduct our epistemic labors. (87)

But although Rescher has gone a long way toward grounding epistemological principles in the nature of finite knowers rather than on metaphysical considerations, he does not go far enough, eventually trying to ground them in an evolutionary tale:

To be sure, this methodological/procedural tale is not the whole story. There is also, in the final analysis, a substantive aspect to the matter of induction's justification. Our intellectual tastes (for simplicity, elegance, etc. as we naturally construe these ideas) are, like our physical tastes (palatability), the products of evolutionary pressure to prioritize those things that work - that prove effective and are thus survival conducive . . . The question of the seemingly pre-established harmony coordinating of these two theoretically disparate factors of convenience and effectiveness is ultimately resolved on the basis of evolutionary considerations in the order of rational selection. (102, 107).

There are several problems with these passages. Rescher is arguing that those theories we think of as simple, convenient, and elegant turn out also to be effective because evolution selected brains which found effective theories to be simple, convenient, and elegant as well.¹³ To unpack this argument and see its faults, we have to define very carefully what is meant by a simple theory.¹⁴ Our ordinary understanding of "simple" makes it a close synonym for "easy," but I shall draw a sharp distinction between these two terms. An easy theory is one that an ordinary person can understand with little mental exertion. Some things that make a theory easy are its amenability to being expressed visually, or with only a few variables, or with low-level mathematics.¹⁵ A simple theory, by contrast, is (1) the easiest theory to understand which is also (2) *in accordance with the known evidence*. It is therefore no contradiction to say that quantum mechanics is a simple theory which is not easy to understand. A theory that is easy to interpret is not the same thing as a theory which is good at interpreting experience.

With this distinction in mind we can re-examine Rescher's argument. Does there exist a "pre-established harmony" between "convenience and effectiveness" which needs to be explained? I am assuming that by "effectiveness" Rescher means something like a theory's connecting, or "clicking," or "meshing" with the real world. The second condition of a simple theory - that it be in accordance with all known evidence - indicates that all simple theories must be effective, because if they are not effective, then we do not consider them to be simple theories at all. The fact then that simplicity and effectiveness are in harmony is on this reading tautological. A simple theory is always "effective" in dealing with the evidence.

But perhaps the harmony that Rescher is talking about is between easiness and effectiveness. If so, then this is clearly wrong. Newton's mechanics is much easier to

understand than Einstein's. Therefore, if our ideas of ease have been optimized with the environment, why isn't Newton's theory true? We would all have to be much better at stochastic calculus, finite element analysis, and topology to think that effective theories are also easy theories to understand.

We can concretize this argument through a foray into Martian epistemology. Suppose that we someday meet intelligent Martians, and that their idea of what is simple is somewhat different from our own. Due to the wiring of their nervous systems they are able to solve in a few seconds mathematical problems which take human super-computers months. Suppose that both humans and Martians were to originate theories explaining phenomenon X. There are three possibilities vis-a-vis the Martian theory: either it explains more data than ours; it explains less; or it explains (roughly) the same amount. If the last is the case, then there is no reason for either side to adopt the theory of the other. Let us say, however, that their theory explains considerably more than our own. Rationality would then require that we abandon our own theory and adopt theirs (or to significantly alter our own theory, which amounts to the same thing). Moreover, we must now judge their theory to be the simplest. But in virtue of what? Because of its advanced mathematics, their theory is not the easiest to understand. But presumably our own "simplest" theory was not the easiest to understand either, so this is no reason not to label their theory the simplest. And no matter how difficult to understand their theory might be, there is a potential infinity of even more difficult theories. Presumably, then, the Martian theory must be judged simplest not in terms of its ease, but in terms of its adequacy to the known evidence.

This discussion introduces another reason for economically rational beings to adopt simple theories, one which Rescher does not mention. Holding the variable of adequacy to evidence constant, we can see that there is a fundamental asymmetry between complex and easy theories - "complex" being used as the antonym for easy. While there is at most a handful of equally easy theories that explain all the available evidence, there is an infinite number of complex theories which do the job. By a complex theory, I mean one that is harder to understand (because it has more variables - or epicycles - for example) but explains the same amount of evidence. Given this potential infinity of theories of differing difficulties but equal adequacy to the evidence, the choice of easiness as a criterion of theory choice is sound. That is, given the finitude of our cognitive resources, this route minimizes cognitive costs, even though from the perspective of a rarefied epistemology such a criterion may appear arbitrary.

A final note on this issue. At the margin there is an economic tradeoff between easiness and adequacy to all known evidence. The simplest theory therefore has a fuzzy penumbra around it such that it would be legitimate not to abandon an old theory in favor of a new, more difficult theory, which explains only a little bit more of evidence. This coheres well with the above analysis of easiness as a criterion for theory choice. Since there is an infinite number of more complex theories, it is also likely that there is a large number of more complex theories which explain slightly more evidence. Given this we are right to be suspicious of such theories and to prefer instead the simpler theory which explains a bit less of the evidence. To put it in other terms, any basis of preference among

more difficult theories which explain a little bit more of the evidence is arbitrary, since we can expect that there is a great number of such theories.

In summary, we will always prefer a simple theory to a more complex one. We need not and cannot justify this on the basis of metaphysical considerations, whether these be direct or indirect, via evolutionary arguments. Simplicity is justified on economic considerations, which are in turn grounded in the finitude and active nature of consciousness.

6. Areas for Further Research

Thus far in discussing theory choice I have passed by the question: Who is doing the choosing? Whose benefits and whose costs are at issue? Yet if we are to apply economic insights to theory choice we must have a definite set of individual choosers in mind, people for whom the issue of costs and benefits is meaningful.

In the preceding discussion, I have had in mind a specific set of individuals, an elite of scientists at the cutting edges of their fields. For these people it makes sense to say that a complex theory which explains more evidence is to be preferred to an easier theory. The goal of such individuals is pure understanding and explanation, and if this comes at the price of complexity, so be it. But other individuals face different costs and benefits and must modify their decisions accordingly. A teacher, for example, will be willing to give up explanatory power in return for simplicity. Furthermore, the willingness to make such a tradeoff will depend on the teachers' audience. Moreover, applied scientists and engineers face similar questions when faced with differing practical contexts. An individual's choice of theory cannot be divorced from his or her goals.

Even for the pure scientist, it is unlikely to be rational to work with only a single theoretical framework, even if it is the simplest available. On the cost side there is always the possibility that new evidence will raise the value of previously inferior theories. A risk-averse individual does not put all of his eggs in one basket. On the benefit side, theories can be complements as well as substitutes. For instance, learning a second language often helps one to understand the subtleties of one's native tongue, and some ideas are easier to express in one language than in another. The same is true of scientific theories. Contra Thomas Kuhn, who argues that "the scientist does not preserve the Gestalt subject's freedom to switch back and forth between ways of seeing,"¹⁶ a good scientist can develop the ability to move between different theoretical frameworks as the context requires. Learning neo-classical economics, for instance, no more requires that one forget Austrian economics than learning German requires that one forget English. The issue of theory choice is not, then, a matter of choosing the one right theory, but rather of developing a facility for employing different theories appropriately in different contexts.

An economic approach to theory choice also throws new light on Kuhn's "paradigm shifts." A common feature of paradigm shifts is that seemingly small confirmations of a new paradigm will result in the widespread abandonment of the old paradigm, especially among the younger generation of scientists.¹⁷ New theories, in short, are often adopted

long before all the evidence is in. Many readers - Kuhn, however, not among them - have concluded from this that science is an essentially irrational activity, governed by fads, fashions, and mood swings rather than by hard facts. Kuhn himself likens a paradigm shift to a religious conversion or a Gestalt switch.

While we need not doubt that people experience paradigm shifts in this way, an economic approach suggests a different interpretation. It is interesting to note that similar arguments have been used to argue that the stock market is irrational. Economists, however, have argued compellingly that the stock market is efficient and rational,¹⁸ and I shall argue on similar grounds that the scientific "market" is rational as well, i.e. that massive paradigm shifts based upon little evidence are not irrational.

A paradigm may be likened to a stock. The current price of a stock is determined not by its present dividends, but by its expected future dividends. Hence the well-known economic phenomenon that a small increase in the dividend of a stock, can have huge effect on the stock's price. Stock prices can swing wildly on seemingly small pieces of information, if those pieces of information raise expectations of permanent change. The case of paradigm shifts is directly analogous. A paradigm is accepted not because of its current evidence, but because of the expectation of future confirmations. A paradigm is adopted today not because it answers yesterday's questions, but because it is expected to answer tomorrow's - not because of what it did explain, but because of what it will explain.¹⁹ Thus a single experiment, even if it provides only weak evidence in favor of a new paradigm, can result in mass conversions if the experiment is believed to indicate a permanent change. In short, the rationality of science, like the rationality of the market, is not "positivistic." That is: it does not base belief and action solely upon the data *presently given* (posited), but upon *expectations* of what is to come. Paradigm shifts with little supporting evidence do not, therefore, indicate any irrationality of the scientific marketplace. Rather, they indicate the economic rationality and entrepreneurial spirit of scientists questing for new truths.

Ludwig von Mises once noted that economics is called the dismal science because its realist, bottom-line approach is forever throwing cold water upon the utopian dreams of would-be reformers, those who would attempt the "rational" reconstruction of society according to some plan of their devising. Rescher has begun the important task of throwing some cold water into the field of epistemology. The economic approach to epistemology turns our attention away from utopian questions about Truth and Justification to the bottom line questions of benefit and cost. What are the benefits of this procedure of enquiry compared to its alternatives? What are the costs? How can we achieve as much truth as possible, given our finite intellectual resources? Perhaps these questions are mundane, even dismal, but I suspect that asking them will be a profitable enquiry.

Alexander Tabarrok, Department of Economics, George Mason University, Fairfax, VA, 22030-4444, would like to thank Tyler Cowen, two anonymous readers for helpful comments. The usual disclaimer applies.

Notes

1. For an account of Descartes's *Cogito* as a performative contradiction, see Jaako Hintikka, "Cogito, Ergo Sum: Inference or Performance?" in Willis Doney, ed., *Descartes: A Collection of Critical Essays* (Notre Dame: University of Notre Dame Press, 1968). For a more recent discussion of this issue, see Margaret Dauler Wilson, *Descartes* (London: Routledge & Kegan Paul, 1982).
2. Naussau Senior was one of the first economists to argue for the general applicability of economic reasoning. More recently Ludwig von Mises argued in *Human Action* (New Haven: Yale University Press, 1949) that economics is simply the best developed part of a completely general science of human action which he calls praxeology.
3. Economist Gary Becker has been a key figure behind the new economic imperialism. See *The Economic Approach to Human Behavior* (Chicago: University of Chicago Press, 1976) and *A Treatise on the Family*, 2nd ed. (Cambridge: Harvard University Press, 1991). For applications to politics, see Gwartney and Wagner, eds., *Public Choice and Constitutional Economics* (Greenwich, Conn.: JAI Press, 1988). On law, see Richard A. Posner, *Economic Analysis of Law*, 3rd ed. (Boston: Little- Brown, 1986).
4. Choice and goals must be interpreted broadly, since economics can apply to the actions of animals other than humans. See, for example, Kagel et al, "Experimental Studies of Consumer Demand Behavior using Laboratory Animals," *Economic Inquiry* 13 (1975): 22-38.
5. Rescher notes by way of contrast that radical Popperians such as Feyerabend are cognitive risk lovers, willing to gullibly accept just about anything (17).
6. Quoted in Rescher (21).
7. Rescher is categorizing epistemological theories on the basis of their approach to risk. Much the same thing has been done with ethical theories. In particular, Rawls's difference principle will not be unanimously accepted behind the veil of ignorance unless individuals are extremely risk averse. (See R.E. Howe and J.E. Roemer, "Rawlsian Justice as the Core of a Game," *American Economic Review* 71 [1981]: 880-895.) Introspection, causal empiricism, and experimental evidence suggest that this level of risk aversion is not the case. See N. Frolich, J.A. Oppenheimer and C.L. Eavery, "Laboratory Results on Rawls's Distributive Justice," *British Journal of Political Science* 17 (1987): 1-21. Dennis Mueller, in *Public Choice 2* (Cambridge: Cambridge University Press, 1989), ch. 21, summarizes this literature.
8. Rescher refers to the prisoner's dilemma as such in his notes, but nowhere does he recognize the paradoxical nature of the problem.

9. Note that the phrase "socially irrational" is not meant to suggest that society as such has preferences or rationality. It refers only to the fact that the outcome to which our individual rationality leads us is worse, from the point of view of each of us, than the outcome we would have achieved had we both acted "irrationally."

10. Robert Axelrod, in *The Evolution of Cooperation* (New York: Basic Books, 1984), explores in detail the tit for tat solution and its relevance to real world institutions. He also discusses the results of an extensive computer tournament which pitted prisoner's dilemma strategies against one another. Tit for tat is a very robust strategy. It performs very well in a great variety of environments.

11. As a minor step in this direction I suggest that we abolish a pet peeve of mine: single-blind refereeing. At present many journals have a single-blind system: the referee knows who the author is, but the author does not know the referee. Under a single-blind system referees may dismiss the work of an unknown author who departs from traditional analysis. And referees are also likely to be lenient to well-known authors, regardless of the quality of their present work. Under a double-blind system referees would have a greater incentive to review all work more carefully.

12. The nature of this debate is well brought out in Arthur Fine, *The Shaky Game: Einstein, Realism and the Quantum Theory* (Chicago: University of Chicago Press, 1986), though I do not subscribe to his solution.

13. One early sign that Rescher's argument may be awry comes in his use of the phrase "rational selection." The correct phrase is "natural selection." Although there is always a temptation to believe that evolution is necessarily a progressive and perfecting force, this must be resisted.

14. The other attributes Rescher mentions - convenience and elegance - can be defined in a manner similar to that of simplicity. The argument therefore applies to all of these attributes.

15. Note that some of these - such as visualizability - are specific to certain kinds of living things, while others - such as few variables - are more generally applicable.

16. Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1970), 85.

17. The fact that a new theory is most readily adopted by the younger generation of scientists has a clear economic explanation. The older generation has developed human capital in the old theory; they know how to use it, what tools it requires, what predictions it makes, etc. The opportunity cost of changing is therefore higher for them.

18. The Spring 1990 issue of the *Journal of Economic Perspectives* has a readable symposium on fads, fashions, and "bubbles" in the stock markets.

19. Past success is, of course, a relevant factor for gauging future performance. But this is not always the case, for the emergence of novelty is an undeniable fact; new inventions may revolutionize a market just as new phenomena and new theoretical insights may revolutionize science. And the essence of novelty is precisely that it cannot be predicted, nor can it be calculated in advance in terms of known probability ratios.

moral and political "crisis," which has its source in the atomization of the individual, a severing of psychologically necessary communal ties which is unnatural and unhealthy. The growth of materialism and the decline of religious belief, they claim, have caused the alienation of the modern individual from society. Secondly, they blame liberalism for these developments and specifically target liberal political thought. The antiliberals see ideas as primary causal forces, and this assumption is central to their critique of liberalism: "That the modern 'crisis' has intellectual origins is crucial for all antiliberals . . . Some important spiritual truth, well known to preliberal societies, was repressed as lost. Social amnesia, with catastrophic consequences, was philosophically induced" (6-7). It is not simply that antiliberals place great weight upon, or overestimate, the power of ideas, though Holmes suggests that they do. What is of interest here is that they look to the preliberal past for ideas and modes of social interaction which they juxtapose with those of liberal societies. The third phase of the antiliberal argument follows with apparent clarity: "If the repressed truth can be retrieved, modern society will not only be diagnosed, it will also be miraculously or heroically cured"(7). This general outline, Holmes says, places a work in the antiliberal tradition.

The Antiliberals

Holmes divides antiliberals into two general types. Some accept unequal status and violence as political norms, and others tend to shy away from the more illiberal implications of their views.

Antiliberals hostile to Enlightenment universalism can be grouped into hardliners and softliners. The former are ruthless, the latter are lax. Hard antiliberals damn liberalism from a wholly nonliberal point of view and dare to draw the shocking political consequences. Soft antiliberals malign liberalism verbally, but when faced with practical choices, reveal a fondness for liberal protections and freedoms (88).

Maistre, Schmitt and Strauss are hard antiliberals, and the remainder Holmes discusses are soft. One attribute hard and soft antiliberals share is a longing for communal solidarity. They hold a highly cohesive community essential, either for social order, individual well-being, or both, and reject liberal individualism as destructive, dangerous and unnatural.

Maistre contends that liberals have a naive understanding of the individual; there is no abstract individual or human nature upon which political theory can be founded. We rely on tradition because there is no such thing as a human being apart from inherited norms. The social nature of individuals is based in part on human psychology. People have an emotional need for community with others that drives all human beings into groups. Psychological gratification, however, is clearly not sufficient to morally oblige us to form or preserve communities. (Burke and Hume hold that such an obligation arises from a tacit contract to secure benefits from reciprocal cooperation under a framework of conventional rules, but this is a liberal view.) Maistre's argument is theologically grounded; God made human beings to live in society, and the Divine will is the source of