Individuals and Aggregates

Micromotives and Macrobehavior. THOMAS C. SCHELLING. Norton, New York, 1978. 252 pp. Cloth, $12.95; paper, $3.95. Fels Lectures on Public Policy Analysis.

"Economic man" may be self-centered, but economists are the soul of altruism. Already they have given freely of their intellectual capital to rehabilitate portions of political science, and now Thomas Schelling provides an economist's vision of some matters of concern to sociology. This generosity is to be welcomed, at least provisionally: economists have an impressive array of conceptual tools, and extending their domain of use is an exciting prospect.

Schelling's social modeling, like neoclassical economics, distinguishes between a micro or individual level and a macro or group level. It is the micro-based models that occupy most of the book and all of this review. Though not all new, they are significant and of broad interest. I shall begin by giving some flavor of how the models can provide social insight and then consider in what sense the result is sociology.

"Vicarious problem-solving" is the first of two key conceptual tools Schelling brings to his task. This technique "underlies most of microeconomics" and it also underlies much of this book.

> If we know what problem a person is trying to solve, and if we think he actually can solve it, and if we can solve it too, we can anticipate what our subject will do by putting ourself in his place and solving his problem as we think he sees it [p. 18].

Thus the first step is to posit some plausible motives for the individual; these are the "micromotives" of the book's title. The next step, an even more important one, is to tie these micromotives to "macrobehavior," that is, group phenomena.

> What this book is about is a kind of analysis that . . . explores the relation between the behavior characteristics of the *individuals* who comprise some social aggregate, and the characteristics of the *aggregate* [p. 13, emphasis in original].

A topical example is the 1979 gasoline panic. The macrophenomenon is round-the-block lines of cars at 6:30 a.m. at gas stations that don't open until 7:00. Regarding macrobehavior as a simple summation, one might guess that people like to start the day in a gas line. Some vicarious problem-solving, however, yields a more plausible micromotive: each person tries to arrive a little earlier than most of the others. If enough people are determined to beat the average, the average will get earlier and earlier, in a "self-displacing prophecy" (p. 118). The key point here is the interaction: each individual is reacting to the expected behavior of the group, but the group *is* the individuals. Thus the average arrival time is a "statistical consequence of the behavior [it] induces" (p. 78).

This is a book on such models and how to create them, more than on detailed social content, and its organization reflects this. Discussion of early-morning queuing is followed not by a treatment of social behavior in the queue but by a list of other self-displacing prophecies and, more generally, of situations in which there are interacting expectations that may be self-fulfilling, self-negating, self-correcting, or self-confirming. Such an approach makes sense because "it enhances one's appreciation of a model, and often the use one can make of it, to be aware of applications outside one's own field" (p. 90).

To achieve this interdisciplinary scope, one must find and focus on a single key aspect shared by a variety of superficially different situations. One set of such examples includes seminars, lecture courses, and pick-up volleyball games. Schelling betrays little interest in detailing these situations separately. What fascinates him is that attendance at seminars, applause after the last lecture, and participation in the game all have the same interdependency structure: they are all "critical-mass" phenomena. You don't attend, applaud, or come to play volleyball unless enough others do it; but, of course, *you* are one of those "others" to all the others. We are not asked to consider whether lasting friendships form at the volleyball game or whether a pecking order emerges in the seminar, topics of some standing in sociology. Rather, it is Schelling's delight that "in a single day, I can encounter half a dozen occurrences that remind me of that volleyball game" (p. 92). He can and he proves it. For this book is more than a handbook of models; it is a tour de force of keen social-process insights into everyday phenomena. It is aggregated Goffman. One can just see Schelling move through his day: seminar at noon, a critical-mass phenomenon; afternoon class applauds guest speaker, critical mass again; when he leaves the building, there are those volleyball players; crossing Harvard Square, he waits for a critical mass of fellow pedestrians to defy the red light, intimidating the oncoming cars. On the way home he must buy a ticket:

> I stay in line if everybody is standing politely in line, but if people begin to surge toward the ticket window I am alert to be—though never among the first—not among the last [p. 93].

An observant eye and an agile mind are clearly at work here. At the very least we gain a kind of speculative insight into some social phenomena. To evaluate this mode of thinking and put the work in some perspective, it is useful to ask what aspects of society it fails to deal with and whether it produces good theory within its proper domain. One criticism sure to be directed at this work will be that its individual actors, apparently as unorganized as so many molecules of a gas, cannot reveal anything about institutions and traditions, the study of which is crucial to an understanding of society.

Three kinds of response can be made to such a charge. First, perhaps what is under study is not society but a social psychologists's "individual in society," characterized by attitudes and reacting to social influence. But these aspects are reflected in the micromotives alone. By showing how such micromotives interact, Schelling brings us back up toward the societal level. As a second response, therefore, we may grant that Schelling's models will give us insight into society if, as he claims, his individuals and their interaction are complex enough to yield unsuspected, distinctively societal phenomena, or, to put it colloquially, if the societal whole is more than the sum of its individual parts. A third prospect is that by looking at the conclusions of social-process models we can more clearly discern the limitations of uncoordinated individual action. One might take such analysis to imply a functional explanation of why institutions and traditions arise, though it leaves the study of particular institutions and traditions to those sociologists and anthropologists who are already at work on them. The second and third points will now be elaborated.

The second argument involves the sophistication of Schelling's aggregation models. It is useful to compare them to a simpler unenlightening kind of aggregating, mere summation. For example, a nation's church attendance for some year is the sum of individual attendance. One might try similarly to sum personality traits into national character, as when one speaks of authoritarian government as a product of an authoritarian populace.

Schelling's individuals, however, are not just added up but participate in interactive social processes. Each can make decisions that affect the decisions of others. It is this interactive nature of individual choice that leads to phenomena that are distinctively societal. Recall the critical-mass situation in which the same distribution of micromotives can lead to either of two sharply different macrophenomena: either widespread or minimal participation. It follows that the societal outcome is not a direct simple reflection of the individuals.

Even greater structural richness can be introduced into the models by allowing individuals to differ. You may require more participants than I do before you will consider a seminar or volleyball game worthwhile. How such tastes are distributed among potential participants will determine the number and nature of possible equilibria (pp. 102–110). In "sorting and mixing" situations, people differ in race, sex, age, and other variables as well as in their willingness to reside among, talk to, and send their children to school with various distributions of others (pp. 135–191). Adding in this possibility of individual differences enhances the variety of hypothetical configurations of microproperties from which to derive important and unsuspected macroconsequences. Perhaps the most dramatic and currently relevant of these is the fact that a rather "tolerant" bunch of people can very easily and quickly end up racing to segregate themselves (pp. 147–165).

This concludes my attempt to show that Schelling confronts genuinely societal phenomena, not just simple summations of individual behavior. I now turn to his views of institutions and traditions.

Schelling's view of social institutions, like much of neoclassical economics, hinges on the notion of equilibrium. When a social system is in equilibrium, no single individual is inclined to change behavior. But a given equilibrium may be undesirable in that some other outcome may be preferred by all the participants if only they could engineer a coordinated simultaneous change. Such an equilibrium is said to be Pareto nonoptimal. A well-known example occurs in the "tragedy of the commons," in which a shared resource, specifically a grazing area, is so overused by individual maximizers that the resource is destroyed and no one gets anything. Each individual may see that the grazing area will die but no one can save it simply by withholding only his or her own cows. Group action is needed and Schelling sees that his interacting individuals are unlikely to coordinate. The model does not explain *how* an institution will arise, but it does suggest that this situation is ripe for one. Here is Schelling's comment:

> A good part of social organization . . . consists of institutional arrangements to overcome these divergences between perceived individual interest and some larger collective bargain. [The collective bargain above is for everyone to graze fewer cows so the pasture survives.] Some of it is market-oriented—ownership, contracts . . . and a variety of communications and information systems. Some have to do with government—taxes to cover public services. . . . More selective groupings—the union, the club, the neighborhood—can organize incentive systems or regulations to try to help people do what individually they wouldn't but collectively they may wish to do. Our morals can substitute for markets and regulations in getting us sometimes to do from conscience the things that in the long run we might elect to do only if assured of reciprocation [pp. 127–128].

To be sure, some institutional arrangements do help meet a collective need, but others do not, and many a clear need goes unmet. As examples, one may ask what social need is met by the political apparatus of genocide, or conversely what institution has made a dent in the incidence of child-beating. Such examples undermine the predictive value of this treatment of the genesis of institutions.

Many of these collective solutions to undesirable equilibria require some form of enforcement. The resulting bureaucracy is itself the basis of a new social process, though Schelling does not examine it. On the other hand, he seems particularly delighted when no enforcement is necessary: "though planning is often associated with control, the crucial element is often coordination" (p. 121). Such is the case with daylight saving time, for example, and to a great extent with traffic lights, cases that are suggestive of a notion of tradition. Also tradition-like, in the sense of not requiring enforcement, is the case of actions that become symbols.

> If men think that prostitutes are the only women who smoke in public and if women know it and especially if prostitutes know it, women may—or there was a time when they would—confine their smoking to indoors [p. 117].

Here a self-fulfilling prophecy underlies a behavior convention.

Thus, with creativity, social-process models can be used to address institutional and traditional phenomena, though I leave it to sociologists and anthropologists to judge how effectively. It is clear in any case that Schelling's work is a substantial contribution on some aspects of how society works. The book has two great interdependent strengths: an extensive array of ingenious social-process models, tied to a dazzling range of everyday phenomena. Together these models and applications should facilitate a rich cross-fertilization of ideas; already they provide an account of many surprising and significant relations between micromotives and macrobehavior.

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Astronomy and Other Subjects

Broca's Brain. Reflections on the Romance of Science. CARL SAGAN. Random House, New York, 1979. xiv, 328 pp., illus. $10.95.

Arms folded, casually attired, smiling as if on the Johnny Carson show, he stands in front of a Mars-like landscape and NASA spacecraft, his name superimposed in bold letters: **CARL SAGAN**. The publishers of *Book Digest* magazine knew well how to compose their cover. Two months prior to the publication of *Broca's Brain*, sections from it already were appearing there and elsewhere. Such is the impact of Sagan.

Astronomer, exobiologist, Pulitzer prize winner, raconteur, entrepreneur, Sagan has become probably the world's most famous physical scientist. Although his contributions to research have been numerous and significant, his forte lies in bridging disparate disciplines, in extracting crucial ideas, and in explaining it all to nonscientists; indeed he has an almost unique skill at persuading nonscientists that such matters are not only worth knowing but also are knowable.

The subtitle of the book, "Reflections on the Romance of Science," encapsulates its blend of accepted fact with personal conjecture. In Sagan's world the