fish, even adult smart ones, are sometimes attracted to substances that prove toxic to them.

In the description of the "Scientific Method" we find the statement that "Fact after fact is piled up until the weight of the accumulated facts renders the conclusion indisputable." Nevertheless, we must ask *who* can assemble "facts" about beach and ocean ecology, corporate greed versus responsibility, political expediency versus heroism, sea lions, migrating whales, tourists, oil platforms, global energy use, the crust of the earth, the feelings of Californians, and other incompletely documented phenomena, and come up with "indisputable" conclusions? Value judgments and opinions are called for, too; there is no need to conceal them. The Steinharts might be surprised to learn that their main conclusions can be accepted by their readers, including this reviewer, without the accompanying certification of infallibility.

I think the reason the book is flawed in the manner described above is that the Steinharts were too close to the Santa Barbara mess to preserve total detachment. John Steinhart was a staff assistant for the government's scientific advisory panel and experienced, along with his colleagues, the full brunt of the vicious attacks and irrational charges made by some of the understandably panicked Californians. True, the governmental, industrial, and academic experts were not guilty of the incompetence, venality, and callousness ascribed to them; but they were at times pretty poor psychologists. For example, the Steinharts point out the dangers of secrecy, but then attempt to justify the total privacy of the advisory panel deliberations. Surely an extra session open to representatives of public organizations, even for one day, would have helped to prevent some of the hysteria that the Steinharts deplore, without ruining the "intensely private" rapport of the scientists on the panel. Presenting reporters with a "400-item bibliography," which they had neither the time nor the expertise to read, is a poor technique for keeping the public informed. The Steinharts also defend the oil industry's financing of the University of Southern California's study of the ecological effects of the oil, on the grounds that the participating scientists were honest and their conclusions were sound. Yes, but again the morality of the matter was at least open to question, and from a public relations standpoint—especially during a crisis—it was very unwise. The authors might have appreciated these things more readily if they had been farther from the action.

A few additional defects could easily be corrected in a subsequent edition. The lack of decent references is mystifying and "unscientific." *Blowout* averages less than than three specific reference citations per chapter, and there are yet fewer footnotes. There is not even an entry for the Plymouth Laboratory's landmark report on the *Torrey Canyon* disaster, previously the most important book on the effects of oil spills. Moreover, the text abounds with short quotations and paraphrases, many of them unattributed to a verifiable source. The maps are useful, but I needed a diagram of an oil drilling rig. I also would have liked the customary short biography of the authors. On the credit side, the quotations that the authors use to introduce their chapters are superb and brilliantly appropriate.

The Steinharts have done a great service by grappling openly and well with the *real* problem of Santa Barbara. Pollution is an inevitable consequence of our life-style—it does not suffice to blame the "wicked" industrialists and "corrupt" public officials for every disaster. Indeed, the people who do this, so thoroughly exposed by the Steinharts, call to mind Orwell's characterization of some British intellectuals of the left during the Second World War: "There is little in them except the irresponsible carping of people who have never been and never expect to be in a position of power." How much easier, in the face of the frustrating complexity and powerlessness of modern life, to criticize the polluters as if they were others than to face squarely the terrible dilemmas of the environment and to accept a share, however small, of the responsibility. Skillfully using Santa Barbara as a case study, the Steinharts have shown, in depth and with unusual clarity, how the transfer of blame is an inevitable corollary of what Hardin has called "the tragedy of the commons." Despite faults that might sink a lesser book, *Blowout* is now the best specific treatise on the subject of oil spills, and, in general, a work whose balance between sane analysis and a legitimate feeling for the problems of man will earn it a high place in the literature of crisis.

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Primitive Affluence

Stone Age Economics. MARSHALL SAHLINS. Aldine-Atherton, Chicago, 1972. xiv, 348 pp., illus. $8.95.

This volume is a major contribution to economic anthropology. Sahlins's argument, original and important, deserves summarizing. First, he argues, Paleolithic cultures, while poor in goods, are affluent in that their members are not frustrated by unfulfilled wants (that is, their means do exceed their ends). That hunters and gatherers do not barely survive is evidenced by their satisfaction with the products of a short (two- to four-hour) workday. Their affluence consists in their not producing as much as they could and in their indifference to freely offered additional goods (which would hamper their mobility). Neolithic societies also show underutilization of resources, especially of labor, again evidenced by a short (four- to six-hour) workday (and that not every day).

Sahlins then argues that kinship and chieftaincy are the structures in both Paleolithic and Neolithic cultures that generate effort, output, and movement of goods in excess of the limited desires of the domestic group. That the wants of Paleolithic and Neolithic peoples are limited is expressed in "Chayanov's rule": "the greater the relative working capacity of the household the less its members work" (p. 87). The rule is tested against reports on time worked by working members of families arranged according to the ratio of total family members to working members. The narrower the extent and degree of kinship or political organization, the closer is observed behavior to the norm of Chayanov's rule. Sahlins thus arrives at what we may call Sahlins's first rule:

> Domestic control becomes an impediment to development of the productive means. . . . Kinship, chieftainship, even the ritual order, whatever else they may be, appear in primitive societies as economic forces. The grand strategy of economic intensification enlists social structures beyond the family and cultural superstructures beyond the productive practice. In the event, the final material product . . . is above the domestic propensity [p. 102].

Sahlins's second rule (of primitive exchange), which accounts for the effectiveness of kinship and chiefly pressures in inducing additional output, is:

> A material transaction is usually a momentary episode in a continuous social relation . . . the connection between

material flows and social relations is reciprocal. A specific social relation may constrain a given movement of goods, but a specific transaction . . . suggests a particular social relation [pp. 186–87]

so that "if friends make gifts, gifts make friends." The first and second rules are then applied to an analysis of forms of reciprocity from "general" ("putatively altruistic," p. 193) through "balanced" ("striking of equivalence," p. 220) to "negative" ("something for nothing with impunity," p. 195). Generalized reciprocity sustains the interdependence of the group (whether domestic or political) by laying a diffuse obligation on recipients (p. 194). It also serves "as a starting mechanism of rank distinction and . . . as a mediator of relations between persons of different communities" (p. 219).

Balanced reciprocity, which might strike us as being identical with market exchange, is seen rather as "the classic vehicle of peace and alliance contracts, substance-as-symbol of the transformation from separate to harmonious interests" (p. 220). The equivalence, while often (not always) having utilitarian consequences, is more important as a renunciation of self-interest and hostility between groups otherwise subject to no higher authority.

From this interpretation of reciprocal exchange there follows a schema to account for the short-run stability of rates of exchange between goods in balanced reciprocity and the longer-run variability in these rates (in response to what Sahlins calls "supply and demand"). It is not competition among bidders for the increasingly scarce good (or better offers by suppliers of the increasingly plentiful good) that is the market mechanism that changes prices but the need in intergroup transactions to be generous to avoid "a translation from trading goods to trading blows" (p. 302); and such untoward events, argues Sahlins, are likely to occur if one of the trading partners comes to feel that the other is putting considerably less effort into providing gifts than he himself is. Generosity—which is to say, fear of the consequences of perceived stinginess—creates "equilibrium" without the competition of alternative sources of supply and without alternative outlets for the supplier.

The entire argument is buttressed (not, as Sahlins recognizes, proven) by evidence from a wide variety of cultures, and the evidence is in turn explained by his rules, postulates, and corollaries.

Sahlins's book is in spirit (and substance) representative of the substantive as opposed to the formalist school in economic anthropology. (The formalists hold that economic theory provides good explanations of economic activity everywhere, the substantivists that one should tell it like it is—but then this reviewer is a substantivist.) Sahlins's ingenious schema "equating supply and demand" does not constitute evidence that production in Stone Age economies responds to relative costs and productivities of inputs. In economic theory the "laws of supply and demand" are rubrics for feedback mechanisms which lead to a general equilibrium of all prices and quantities, of all inputs as well as all outputs. As Sahlins uses "supply"—and as do many anthropologists—the term refers to some quantity which happens to be around. It does not, as it does in economic theory, refer to the processes of costing and choosing alternative outputs by which the quantity around is determined, but appears to be independent of price.

Sahlins's phrasings and references may arouse the ire of, or at least put off, non-Marxist readers, and this would be unfortunate. His Marxism appears to be totally unnecessary to his argument: I have, I think correctly, summarized his argument without his Marxism ("superstructures" in the passage quoted above could as easily have been "structures," "institutions," or even "substructures"). The book provides numerous similar phrasings and several extended references to Marx, all of which appear to be deletable without loss. (Why are citations of Marx, or Marshall, necessary to social sciences? *Science* publishes reports on moon rocks and Mars pictures without mentioning Brahe or Kepler.)

Actually, Sahlins's arguments are not Marxist but 20th-century and operational. For instance, he has an appealingly straightforward interpretation of the much disputed *hau* (Ranapiri) passage in Mauss's *The Gift*. In the passage A gives B a gift, B gives that gift to C, C gives a reciprocal gift to B, and B feels obligated to give that reciprocal gift to A because it is the *hau* of A's original gift. Sahlins argues that the *hau* of an article (or jungle) in Maoriland is neither "unconscious necessity" (Lévi-Strauss) nor magic (Johansen) but simply "return on," "product of," or even, one could add, "consequence of" (pp. 149–62). It is curious that Sahlins goes on to say that when Mauss asks "What is there in the thing that makes the beneficiary reciprocate?" and Marx asks "What is in these things [a quarter of corn and X hundredweight of iron], so obviously different, that yet is equal?" the two "share the supreme merit . . . of taking exchange as it is historically presented" (pp. 180–81). Sahlins's interpretation is certainly taking exchange as it is historically presented, but Mauss's and Marx's concepts of something "in the things" are unhistorical and metaphysical.

Last, one notes the absence of any mention of Pearson's "The Economy Has No Surplus" (in K. Polanyi, C. M. Arensberg, and H. W. Pearson, Eds., *Trade and Market in the Early Empires*, Free Press, 1957), which presented Sahlins's first rule about "economic intensification" in a book which Sahlins cites elsewhere. Why? Because Pearson's phrasing of the same point was anti-Marxist?

No matter, *Stone Age Economics*, while not a survey of the economic anthropology, is as of now the most sophisticated, extensive presentation of, and argument in and about, the field.

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Amphibians and Reptiles of California.

(Continued on page 408)