



Summer 1979

The Steady State: A Combined Review & Commentary, Manage the Commons, by G. Hardin and J. Baden, Eds., Beyond Growth: Essays on Alternative Futures, by W. Burch and F. H. Bormann, Eds., Toward a Steady State Economy, by H. Daly, Ed., Exploring New Ethic

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Recommended Citation

Paul B. Sears, *The Steady State: A Combined Review & Commentary, Manage the Commons, by G. Hardin and J. Baden, Eds., Beyond Growth: Essays on Alternative Futures, by W. Burch and F. H. Bormann, Eds., Toward a Steady State Economy, by H. Daly, Ed., Exploring New Ethic*, 19 Nat. Resources J. 753 (1979).

Available at: <https://digitalrepository.unm.edu/nrj/vol19/iss3/19>

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BOOK REVIEWS

THE STEADY STATE:

A COMBINED REVIEW AND COMMENTARY

MANAGING THE COMMONS. G. Hardin & J. Baden, Eds. San Francisco: Freeman. 1977. Pp. 294. \$6.95, s.c.

BEYOND GROWTH: ESSAYS ON ALTERNATIVE FUTURES. W. B. Burch & F. H. Bormann, Eds. New Haven: Yale University Press. 1975. Pp. 228. \$3.00, s.c.

TOWARD A STEADY STATE ECONOMY. H. Daly, Ed. San Francisco: Freeman. 1973. Pp. 332. \$6.00.

EXPLORING NEW ETHICS FOR SURVIVAL: THE VOYAGE OF THE SPACESHIP BEAGLE. By G. Hardin. New York: Viking Press. 1972. Pp. 273.

Belief in perpetual motion dies hard. So does the notion that more and more people can continue, world without end, to survive, let alone enjoy increasing satisfactions on a planet whose size is fixed and whose resources are finite.

In its starkest form the problem can be shown as a fraction— E/P —where E represents the total environment and P the population that shares it. Obviously as P increases there is less E for each individual. P can be shown as a number, but E is not so simple, being made up of many factors such as sunlight, atmosphere, soil, water, living organisms, and space. We may continue to multiply a series of factors indefinitely, but when one of them becomes zero their product becomes null. Without any one of the six factors just listed human life would cease and P would vanish.

American environmental concern began as a fear of resource depletion, culminating in the reign of Roosevelt I. During the disastrous decade of the 1930s it expanded to recognize the danger of disruption of natural processes that affect the economy of soil and water. By 1950 the issue of population pressure was emphatically raised, with frequent reminders that no conservation measures could be effective without control of human numbers. Ten years later, industrial pollution was recognized as a menace as well as a waste and nuisance that had long been tolerated.

In 1968, Garrett Hardin entitled his presidential address to the Pacific Division of the American Association for the Advancement of Science "The Tragedy of the Commons." Elaborating on an 1833 paper by William Forster Lloyd, the essential theme was that old folk-wisdom "Everybody's business is nobody's business," or, when a resource is open to all, all will suffer eventually because of the temptation for each to take more than his fair share. Largely ignored by the press and, consequently, the general public, this address was published in *SCIENCE*.

Four years later, Hardin published *EXPLORING NEW ETHICS FOR SURVIVAL: THE VOYAGE OF THE SPACESHIP BEAGLE*, using the genre of science fiction. Reminiscent of Bacon and his "idols," he handles without gloves such shibboleths as Progress Unlimited, Whatever is Possible is Right, and pursues in terrier fashion the ethics related to waste, population, and pollution. Recognizing no alternative to controls (by mutual consent if possible) and a *consistent* use of science, he risks the wrath of Robert Burns' "rigid righteous" by insisting that ethics must be situational, i.e., shaped by context. Those who appreciate sound information seasoned with entertainment will find plenty of both, including an exploration of the possibilities of sex determination combined with polyandry.

The three symposia cited contain a total of fifty-one chapters by forty-five contributors, only five of whom appear in more than one volume. Yet, like observers in various locations training accurate instruments upon a common target, they come up with remarkably consistent reports. Daly, after announcing his purpose to present a single, coherent point of view, that of a steady state economy based upon both physical and ethical first principles, concludes that we must revise absolutely our economic thinking to conform with reality.

Dean Mergen of the Yale School of Forestry, in a foreword to the volume edited by Burch and Bormann, explains that it is an attempt to deal in a scholarly manner with the concept of an equilibrium state society. The editors, in turn, speaking of the need to respect genuine reality, remind us that there are things which humans cannot do and things which they must do if they are to survive as a group, society, or species.

The richness and variety assembled by Hardin and Baden represent an energetic pursuit of the theme of Hardin's original paper on "The Tragedy of the Commons." Mathematical demonstrations are included for those who might require double-stitching. Beyond proof of the ultimate need for a steady state is the important recognition that human cultures survive or perish by virtue of the sanctions that validate them. And as to the need for new sanctions in our present society, "it is later than you think."

There is an interesting parallel between the history of medicine and the record of what has variously been called the conservation of natural resources, environmentalism, or applied ecology. Trouble has notoriously higher visibility than its absence. The ancients knew a great deal about disease, too little about health. What the physicians who bled Charles II and George Washington to death chiefly lacked was an understanding of the normal healthy human body and the

physical and biological world in which it must live. Ironically enough Charles, in his sponsorship of the Royal Society, had a role in the subsequent accumulation of such understanding calling as it did for effort in many fields, notably physics, chemistry, anatomy, physiology, and microbiology. To deal effectively with what is wrong, we must have a sound notion of what is, or should be, right.

Actually, the attempt to visualize a healthy human society is not new. It goes back as far as utopian literature and doubtless beyond to the songs and tales expressing the hopes and dreams of those who uttered them. Now modern science has brought an increasing sense not only of the possibilities, but of the restrictions that must be met and respected. Too little noted has been the judgment of John Stuart Mill (1806-1873) that mankind must come eventually into equilibrium within itself and with the environment, if it is to survive.

Reviewer's note: Recurrent in the literature cited is mention of the costly lack of communication among disciplines, notably between ecology and economics. My article "The Steady State—Physical Law and Moral Choice" (Phi Beta Kappa KEY REPORTER, January 1959) was the result of a conversation with a physical chemist who, on hearing my explanation of the trend toward ecological balance in biological communities, exclaimed "You are talking about a steady state!" And so I was—an open steady state so far as the flow of solar energy is concerned, but closed in respect to the recycling of materials.

There is a device known as the Gross National Product, or GNP, intended as a measure of the total value of goods and services during a given period. Regarded as a barometer of economic health, it differs from that physical instrument in that it must continue to rise indefinitely as assurance that all is well. Conveniently for those whose faith reposes in it, the GNP does not allow for depreciation, depletion, or irreversible consumption of energy and materials. Perhaps the most trenchant criticism of our current economy involves its dependence upon increasing flow of finite resources in disregard of maintaining the stock of them.

This review was undertaken in the hope that it might bring to the attention of readers who make, interpret, and administer laws, some of the concerns of scientists about a viable future. Perhaps in this way it may help to lower the costly barriers of discourse among disciplines.

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