interesting to note that nearly all those essayists who advocate positive measures have studied or taught in the United States at one time or another. Since even the most advanced ideas projected in this book are about a decade behind American theory and practice, we can assume that by the time they are instituted in Britain, America will have advanced beyond them to new concepts and practices, so that the technology gap will still be there and perhaps be even wider by then.

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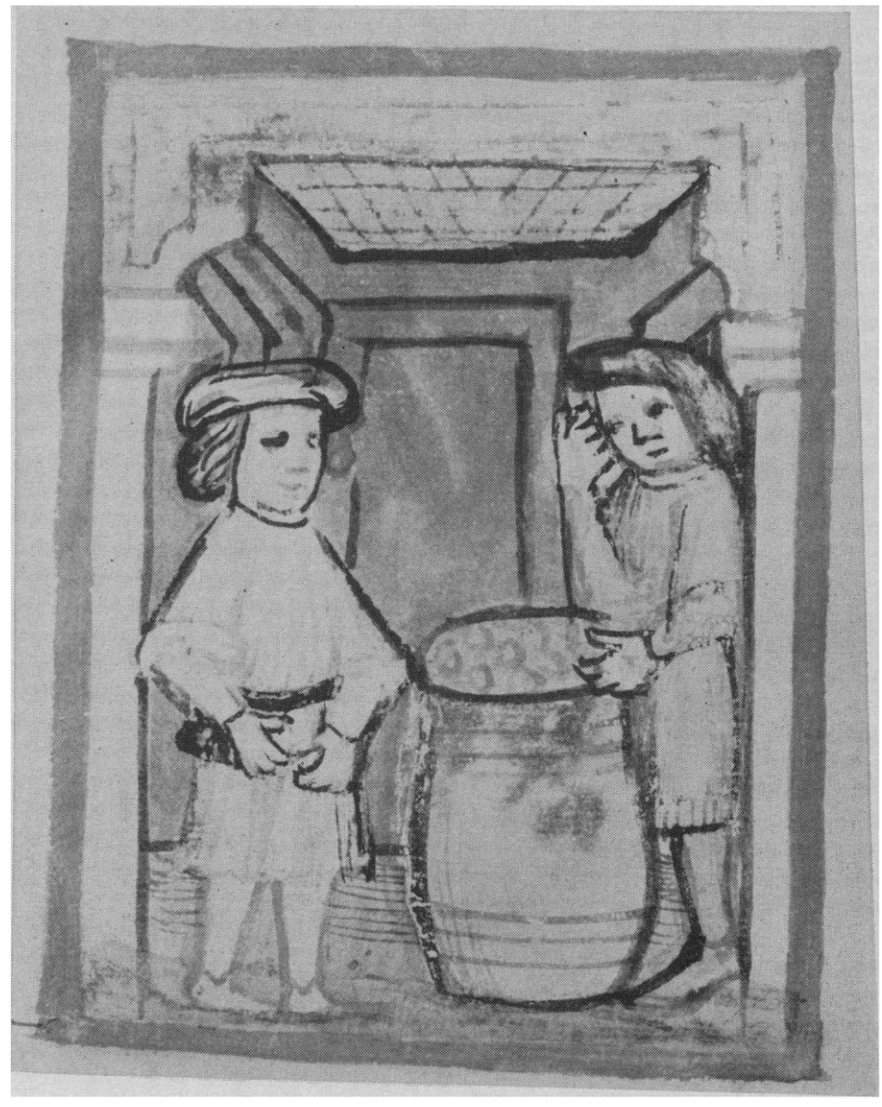
Reform and Opposition

Drug Adulteration. Detection and Control in Nineteenth-Century Britain. ERNST W. STIEB, with the collaboration of Glenn Sonnedecker. University of Wisconsin Press, Madison, 1966. 351 pp., illus. $7.50.

Drug adulteration is difficult to define, detect, and control. Its definition and detection are dependent upon the state of scientific knowledge and instrumentation of an era. Its control necessitates effective regulatory laws plus extensive changes in social thought and institutions. Because of these complexities, the muckraker or reformer may point to the evils of drug adulteration and yet fail to remedy the situation he deplores. This was the case with the celebrated Frederick Accum, whose *Treatise on Adulterations* (1820) is often cited as a landmark in the campaign for pure foods and drugs. Accum's fight against adulteration in England was renewed in the 1850's by a triumvirate consisting of Arthur Hill Hassall, Thomas Wakley, and John Postgate. Hassall, "the greatest single figure in the English movement for pure foods and drugs," was a skilled microscopist specializing in the microscopic structure of foods, drugs, and their adulterants; Wakley was the crusading editor of *Lancet*; and Postgate, a member of the medical profession, was instrumental in bringing the adulteration question before Parliament. The agitation of these three resulted in the food Adulteration Act of 1860 and opened the way for the more effective and inclusive legislation enacted in the 1870's and 1890's.

Reformers and legislation are but one facet of the problem of drug adulteration in 19th-century England. The state of the chemical and pharmaceutical sciences was of crucial importance, and the authors rightly devote one-third of their book to the new theories, analytical techniques, and instruments that were eventually made available for the detection of adulteration. These innovations in science and technology had to be disseminated among the pharmacists and public drug analysts before they could become effective at the consumer level. Further complications arise when one realizes that all of this ultimately centers upon individual pharmacists who were protective of their professional prerogatives and anxious to maintain a profitable business.

Even this short summary indicates that many separate strands must be woven into the narrative if we are to see the problem of the detection and control of drug adulteration in its historical setting. Stieb and Sonnedecker have been successful in presenting a clear account of the diverse events and influences relevant to their topic; they fail, however, when they attempt to explain why the battle against drug adulteration lasted for over three-quarters of a century. Throughout the book they assume that the English government was motivated by a pronounced laissez-faire attitude toward trade and commerce and that it was this attitude that hampered any move toward state intervention and state control. Their reliance upon the myth of an all-pervasive laissez-faire doctrine as an explanatory mechanism reveals that they are not acquainted with major studies



An early test of the purity of a drug. In this illustration from a medieval manuscript the man on the right is holding a sample of roll sulfur to his ear to detect the crackling sound that will be produced, if the sample is pure, as a result of the warmth of his hand. [Reproduced in *Drug Adulteration*, from the original in the Bayerische Staatsbibliothek, Munich]

of Victorian history produced in the past 20 years. State intervention in the economic life of 19th-century Great Britain is now recognized as a dominant theme in Victorian history. The era that was once regarded as the heyday of individualism is currently being explored for the origins of the modern British welfare state.

The legislative acts controlling the purity of foods and drugs should have been studied as an example of the growth of state control in Victorian England. Had this been done, the authors would have been forced to search more carefully for the sources of opposition to the enactment and prosecution of regulatory legislation instead of relying upon the convenient, but now-discredited, doctrine of laissez faire as a catchall explanation.

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Taking Arms Against a Sea of Troubles

The Control of Environment. Lectures delivered at the second Nobel Conference, St. Peter, Minnesota, January 1966. JOHN D. ROSLANSKY, Ed. North-Holland, Amsterdam, 1967. 124 pp. $5.

Environmental Quality in a Growing Economy. Essays from the sixth RFF Forum, Washington, D.C., March 1966. HENRY JARRETT, Ed. Published for Resources for the Future. Johns Hopkins Press, Baltimore, 1966. 189 pp. $5.

Interactions of Man and His Environment. Proceedings of the Northwestern University Conference, Evanston, Illinois, January 1965. BURGESS E. JENNINGS and JOHN E. MURPHY, Eds. Plenum Press, New York, 1966. 180 pp., illus. $9.50.

Mankind's basic problem with environment is to wrest enough from the natural resources for survival. Successful solutions lead to increasing comfort and future security—and to an increasing number and variety of new problems. For each individual the environment poses specific problems; for mankind the term becomes broad enough to include everything on earth. Thus the subject of environment is multidisciplinary in the extreme.

Each of the books reviewed here is the record of a symposium with participants from a variety of disciplines. One volume is concerned with global and long-range strategy for the continuation of mankind's successful occupancy of this planet, and includes social philosophy at a high level. Another centers on the American economy, although in the diversity of disciplines and the range of ideas presented it has many points, and indeed two contributors, in common with the first. The third is more specifically oriented to technological problems and solutions.

The lectures in *The Control of Environment* reveal the range of factors involved and the complexity of the issues, and also some uneasiness about the theme of the conference, suggesting that man works with environment and responds to it in ways which are not adequately described by the word "control." Orville L. Freeman views with alarm the expansion of population and particularly its tendency to concentrate in urban areas, and proposes that in the United States people and industry, including big industry, should be dispersed throughout the countryside. Roger Revelle similarly speaks first of population growth, then looks to the oceans as sources of protein for the malnourished people throughout the world and of various other benefits and amenities.

Kenneth E. Boulding takes a critical look at goals and values, questioning the assumption of most economists that continually increasing production and consumption of goods are desirable. He likens the earth to a spaceship that may "close in on us" within a generation or two, so that recycling will become more and more essential:

> We are already producing irreversible changes in the atmosphere which are causing alarm among meteorologists. It is clear also that we know very little about what we are really doing, that we do not understand the earth at all well, and that the earth sciences, even the physical sciences, are shockingly backward. It may be, of course, that for the present generation or two this is simply a problem of economics. We have to manipulate the system so that pollution is not rewarded. It is a problem, however, which may easily go beyond economics. . . . Our present technology is suicidal. We will certainly run out of ores and fossil fuels in historic time, and we may run out of pollutable reservoirs before we run out of mines. The growth of affluence, that is, may be sharply limited by the growth of effluence.

Although recognizing adaptability as an asset to survival, René Dubos sees danger in man's immense ability to adapt to the changes he is making in his environment and to survive under the new conditions for many years, because some pathologic effects of environmental pollution may not become evident until decades later. He welcomes the trend in social philosophy toward making the producers of pollutants directly responsible for the control of pollution. Another danger to which he points is that increasing population and complexity of social structure will impoverish life by imposing regimentation and monotony, unless deliberate effort is made to create and maintain as many diversified environments as possible. Carl T. Rowan pursues this theme; he regards regimented conformity as a curse that no society can long survive, and the fight against such restraints, and against the gendarmes of the status quo, as the "ordeal of liberty."

The role of energy in the history of mankind is summarized by Glenn T. Seaborg. To the big overall question of whether we have enough energy resources on earth to support its growing population at a level where almost everyone will be well fed, well clothed, and well housed, Seaborg's answer is cautiously optimistic.

In *Environmental Quality in a Growing Economy* six topics are dealt with, each in a pair of essays. Boulding again rocks the boat, this time loaded with economists, by alleging that economists generally have failed to come to grips with the ultimate consequences of the transition to the closed "spaceship Earth" from the open "cowboy economy" of the past and present, which he associates with reckless, exploitative, romantic, and violent behavior, planned obsolescence, and the GNP. Harold Barnett focuses on the more proximate future, and sees that in the human ecological system both population and activity are growing bigger whereas space-time is growing smaller; also, with the increased pace of ecological change there is less willingness to bear it. He doubts that the laissez-faire or self-regulating market system is adequate to the problems of environmental management, and he is skeptical of benefit-cost measurement and analysis. Particularly suspect is our skill in estimating future benefits in a changing world. As an alternative, Barnett is impressed by a recent innovation in public administration: the consensus doctrine of the Great Society.

The second pair of essays is concerned with the relations of environment