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Book Reviews

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BOOK REVIEWS

REGIMES FOR THE OCEAN, OUTER SPACE, AND WEATHER. By Seyom Brown, Nina W. Cornell, Larry L. Fabian, and Edith Brown Weiss. Washington, D.C.: The Brookings Institution, 1977. Pp. 249. $9.95.

Throughout history man has consistently exploited the earth's natural resources, believing them to be of a limitless nature. Modern scientific research has revealed, however, the stark reality that if such traditional practices continue, our planet's wealth shall be rapidly exhausted. Only recently has there been an increasing concern over the management of the earth's oceans and atmosphere, accompanied by the slow realization that such a monumental task is incapable of being undertaken by a single nation—even one as technologically advanced as the United States.

This study is an investigation into the problem of resource scarcity, a discussion of the alternatives for resource regulation, and a plea to the international community to join forces—economic, political and educational—in an attempt to establish desperately needed ecological safeguards. The authors have chosen to specifically deal with three "realms" that are global in scope and have remained outside the jurisdiction of any country—the ocean, outer space, and the weather and climate systems. The increase of economic and political activity in these areas poses many policy questions.

The writers have investigated what criteria should be used to determine how the realms are used, how and by whom should the rules for their use be formulated, and who should have authority to implement the rules and by what processes. In each instance, a major consideration is the effect that such policies will have on American foreign policy. As the authors emphasize, the problem of managing the earth's resources has become important to the general public for three reasons: (1) scientific and technological developments have made it possible to exploit previously inaccessible portions of the earth's common resources; (2) some of the previously accessible regions and resources of these realms are being exploited more intensively, changing conditions of abundance to conditions of scarcity, and in some cases severely depleting or despoiling the resources; and (3) govern-

ments and special interests are increasingly demanding a voice in the use of these realms because of the resources located in them.

The traditional international regime for the ocean, outer space, and weather has been that of open access and free use. In this type of regime, the realm is considered common property, not available to any one person for use as private property. Users of the resources are not accountable to the international community, and in fact are only accountable to their own nation state. In actuality, the resource consumers are only acting to maximize their own direct goals. The realms were once conducive to this type of regime since their very nature prohibited them from being divided into multiple political jurisdictions, and their great size gave little reason to limit their use. However, some resources, previously considered limitless, have become relatively scarce, and, in certain instances, dangerously subject to depletion since no viable attempt was ever made to regulate their use. Increased scarcity, as well as enlargement of the sector of potential users due to technological advances has inflated the value of the resources, thereby causing serious conflict among potential consumers. In essence, the practicality and legitimacy of open access and free use has been drastically undermined.

The immediate response of the international community to the growing problems of scarcity, in the face of escalated competition, has been an attempt to increase national responsibility for the maintainance of these realms. It is thought that national governments are best suited to ensure that users of the non-land areas comply with broad public interest, both domestic and international. However, encouraging nations to assume a more independent and nationalistic role might only prolong and greatly hinder the development of an interdependent community of nation states—in the authors' opinion, a necessary step toward solving the problem of negligent resource consumption.

This last alternative regime, international management, would feature regional and global cooperation, and institutions designed to promote both the interests of their immediate constituents as well as the interest of the entire international community. An extreme application of this alternative would involve altering the concept of the non-land realms as belonging to no one into one in which ownership of such realms would be vested in the international community. Accordingly, certain supranational institutions would have the power to make and enforce rules superior to national policies for use of non-land areas. National and multinational authorities of limited member-

ship would assume the role of custodians, exercising temporary grants of management power.

The authors have effectively dealt with each realm, noting its particular policy goals and conflicts. Nonetheless, despite concerns which must be examined as they relate directly to the individual realm, there are strong underlying considerations which govern the use of *all* resources. More specifically, tangible problems which world consumers must resolve include: (1) the fact that non-land realms are largely indivisible; (2) the realization that resources of the non-land realms are increasingly scarce; (3) the norms of open access and free use, the traditional approach to using the non-land common areas, are incompatible with the resource scarcities and must give way to some form of allocative regime; (4) for most of the resources at issue, efforts by countries to unilaterally appropriate portions are bound to generate international conflict and are unlikely to be sustained without coercion; (5) internationally negotiated assignments of jurisdiction are in many cases likely to prove unstable and require frequent renegotiation; (6) the growing conflicts over rights to the resources of the ocean, outer space, and the weather and climate systems, plus the essential indivisibility of these realms, and the volatility of the technologies affecting their use add up to a requirement for substantial international management.

The preceding outline of problems confronting modern nation states points directly to the necessity for substantial international management of non-land realms. Effective international management requires that there be networks of political and legal accountability in each of these realms. In effect, users of the ocean, outer space and the weather climate system should answer for their actions to the international community, which, in turn, should have the authority to define and apply accountability obligations, binding on all consumers of these common resources. Although international management presents a feasible solution to the problem of resource control, this alternative, advanced by the authors, is most problematical, due to the difficulty of effectuating such a program. *Regimes* is overly idealistic in its approach to the potential difficulties involved. For example, education of the public regarding the effects of negligent resource use and user accountability is stressed. However, the problems that confront a modern nation asked to sacrifice individual power over resource commodities are deeply rooted in social, political, and economic concerns, all of which are not adequately confronted by the authors.

Although the role which the United States should play in the establishment of international management is discussed at length, a comparative analysis of other technologically-oriented world powers would have provided a sounder evaluation of the prospects for international management. However, the authors do present a general assessment of the material costs and benefits that the United States will have to balance. Specifically, American policy would have to consider net economic gains for the entire international community, possibly involving net economic costs for the United States in the short run. In fact, most of the proposals would ensure an overall decline in the United States share of the total benefits from use of the world's non-land realms relative to the share available to other countries. The choice the United States has to make is whether it should incur relatively small, short term economic costs in order to promote economically and ecologically efficient policies or whether the considerations of national and special interest economic returns should rule its policy with the risk of unknown and unlimited international ramifications.

Regimes for the Ocean, Outer Space, and Weather is a valuable study in that it makes the reader aware of the dire consequences which are likely to result if modern man fails to exercise discretion and unite international forces against this crucial problem. This study realistically urges that traditional practices of negligent consumption of world resources act in diametric opposition to fundamental ecological concerns.

*Stacey Forin**

HORIZONTAL DIVESTITURE: HIGHLIGHTS OF A CONFERENCE ON WHETHER OIL COMPANIES SHOULD BE PROHIBITED FROM OWNING NONPETROLEUM ENERGY RESOURCES. Edited by W. S. Moore. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1977. Pp. 62. $2.75.

This book is a timely contribution to the energy debate arising from the increased public awareness of the world's rapidly diminishing petroleum reserves and the concomitant increase in fuel prices. Its immediate address is to the question of horizontal divestiture by the oil

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companies of their nonpetroleum energy subsidiaries in the light of considerations of competition and economic efficiency.

W. S. Moore, the editor, presents the highlights of the four principal papers and introductions to and comments on these papers by nine other experts. The group of thirteen participants offer a fairly balanced representation of viewpoints of faculty members of university economics departments and schools of business administration and management, the legal profession, the business community, and present and former administrators of the Federal Trade Commission.

The very brief introduction emphasizes that the contributions to the conference were extensively edited for the book, and hence the latter is only an introduction to the major issues in the discussion of public policy toward horizontal divestiture. The book is comprised of two parts: (1) two papers and comments thereon dealing with the competitive aspects of the divestiture issue; and (2) a second set of two papers and comments on the economic efficiency aspects of divestiture. This book provides a valuable introduction to the spectrum of opinions on horizontal divestiture but is too brief to supply the basis for adequately informed policy choices. The four papers are well written and cogently argued. Although the discussion is primarily about competition and economic efficiency, the political and social aspects of the problem often assert themselves.

Professor Walter Adams, the author of the first paper, forthrightly urges horizontal divestiture, basing his case on concentration ratios (shares of the 4, 8, and 20 largest companies in total American crude oil production), independent and joint bidding in federal offshore oil lease sales, joint ventures in oil pipelines, selected international joint ventures of oil companies, and the diversification of the twenty-five largest oil companies into other branches of the energy industry (gas, oil, shale, coal, uranium, and tar sands). Adams argues with some logic, evident passion, and occasional comments that manifest his orientation: the problem is political as well as economic, and ideological, or normative, views of the economic system enter his argument. For example, he criticizes the oil companies for diversifying in both energy and non-energy fields (mentioning Ringling Brothers, Marcor, and the New York Knickerbockers). He seems to suggest that once a firm has chosen a particular field, like petroleum, it must forever remain in that field, even if there are substantial risks that oil will soon be supplanted by other energy sources. However, Adams' statistical tables lend themselves to inferences other than those he chooses to identify. For instance, joint bidding for federal offshore oil

leases may be essential to the smaller companies in view of the great risks involved with oil prospecting and development. A super-giant firm such as Exxon with vast amounts of risk capital could afford to make eighty independent bids and no joint bids during 1970-72, but as Adams' Table 5 shows, the firms that were relatively small compared to Exxon were the ones that entered into many joint bids. Presumably they could not afford to jeopardize their financial integrity by gambling on costly independent bids. Professor Richard Manke's alternative view on competitive aspects of joint ventures merits consideration. His illustration of the $600 million successful bid by a consortium that included Exxon and the Union Pacific Railroad for petroleum rights to part of the Destin anticline, a bid that was twice as high as that of the nearest competitor, with the subsequent drilling of about fourteen dry holes and abandonment of the whole program, points up the risk that a single independent bidder would have faced. A loss of this magnitude would represent on the order of more than ten percent of the 1974 assets of each of 19 of the 25 largest petroleum companies, and for some of them the loss would exceed half their assets.

Professor Jesse W. Markham, contributor of the second paper on competitive aspects, reasons that joint bidding furthers competition by enabling the smaller firms to participate in ventures that they could not prudently undertake on their own. Markham's approach seems more objective and pragmatic than Adams'; he points out that the average American industry has a four-firm concentration ratio of forty-three percent or higher. In the oil industry this ratio is eight to seventeen percentage points below the forty-three percent (twenty-six percent in crude oil production and thirty-three percent in refining). The four-firm concentration is further diluted to 18.4% when the industry is redefined to include gas, coal, and uranium. Moreover, since imports of crude oil and refined products by the United States account for a very substantial share of United States domestic consumption, Markham indicates that the concentration ratios he cited would be further reduced, thereby implying a concomitant reduction of such market control as Adams alleges. Markham further points out that even the strong advocates of the Interfuel Competition Act recognize that no persuasive case can be made for the Act on *economic* grounds, such as excessive market power, excessive rate of profit, and the related degree of concentrated ownership as judged by ratios prevailing in other industries and as monitored by the Antitrust Division of the Justice Department and the Federal Trade Commission. The case for divestiture rests on an opportunistic political motivation that seeks a scapegoat for the hike in oil

prices brought about by the October War in the Middle East; our antitrust laws cannot apply to OPEC.

The second part of the book discusses whether horizontal divestiture is supported by considerations of economic efficiency. Professor David J. Teece points out in his article that oil companies have expanded the output of their coal subsidiaries at a rate well above the average of the coal industry as a whole. He argues that horizontal integration in the energy industry provides an effective way of choosing among alternative energy sources on the basis of true cost and profitability. A firm that offers alternate forms of energy will promote the source that offers the best profit possibilities. A multi-energy firm can spread its management, research, investment, and marketing capabilities over all its divisions, and by the interfacing of its divisions the firm as a whole should gain a synergistic benefit as regards costs and profits.

Gary L. Swenson, a banker, argues in the last article that horizontal integration within the energy industry should promote expansion of non-oil sources through a transfer of capital from the oil industry to the other energy sources while at the same time preserving oil and natural gas for "higher" end-uses. The commentators on the Swenson and Teece articles generally favor such expansion to meet future needs.

Despite its short length, this book offers an excellent introduction to the debate over horizontal divestiture, but the latter is only one aspect of the greater problem of promoting consumer well-being. Economic growth and efficiency require greater incentives for research, technological advance, capital formation, and individual personal effort. Consideration should be given to ways of providing these incentives while still preserving an essential level of competition. National policy should confront in longer term perspective such matters as double taxation of corporate earnings, more realistic depreciation allowances, indexation of taxes on income and capital gains to correct for the spurious gains induced by inflation, the enormous and increasing volume of government bureaucratic intervention in production and distribution, and related matters that will determine our socio-economic future and quality of life. A discussion of such scope would require a large and continuing national debate, hopefully based on objective analyses and not on ideological slogans and utopian appeals.

In the context of the more limited debate on horizontal divestiture, one should recognize that "bigness" may be a threat to competition not only in business enterprise, but also in labor organization, and in

government. There are trade-offs in competition versus economies of large-scale production, "free" enterprise versus government intervention, the degree of personal interest and motivation versus egalitarian income policies enforced by government. Account should be taken of the experience of other national economies—Japan, the U.S.S.R., East European countries, West Germany, and others—in these vital matters. In those economies that have gone the furthest along the route of nationalization of production and egalitarian income policies, one can now discern efforts to reprivatize in substance if not in name the business firm and to motivate it through the use of a free market and to reward managers and employees in proportion to their efforts. The United States may well benefit from the experience of these other countries and thus hopefully avoid pitfalls that shortsighted political opportunism could lead us into.

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FREEDOM IN CONSTITUTIONAL CONTRACT: PERSPECTIVES OF A POLITICAL ECONOMIST. By James M. Buchanan. College Station, Texas: Texas A & M University Press, 1977, Pp. 311. $13.50.

In *Freedom in Constitutional Contract,* Buchanan presents his analysis of specific questions relating to contractrarian theory. He evaluates the specific questions from an economist's perspective and argues that individual freedom is only insured by constitutional, contractual, or conceptual agreement. The discussion of each separate question is intended to support or justify the choice of a contractrarian basis for society.

The book contains twenty chapters. Eighteen of these chapters are revisions of papers which have been previously published or presented by the author at various conferences. Buchanan, unlike Rawls who similarly relied on past articles in writing *A Theory of Justice,* has not adequately integrated the papers into a cohesive unit. Buchanan states that "each essay represents an effort to clarify particular aspects of what I hope is an integrated and internally consistent position." (Pp. ix). On finishing the book, however, one has the feeling that he has read twenty separate essays and not an integrated work.

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The arguments in the different chapters do not ostensibly belong to a larger argument or, if they do, the overall argument is not well developed. The chapters seem to be "shots in the dark" motivated by Buchanan's specific curiosities and not by a desire to state a comprehensive position regarding constitutional contractrarianism. The multiplicity of topics in the book is properly reflected in the sub-title "Perspectives (as opposed to The Perspective) of a Political Economist." The sub-title also points out that the perspectives presented are those of a single economist. No attempt is made to develop contrary economic opinions for the sake of argument. It seems that the book places all of this economist's articles in one place in hopes that readers will find in them some semblance of unity.

The twenty chapters are grouped into five major parts. Each part has its own heading which identifies what the essays have in common. Part I is entitled "Anarchy, Law and the Invisible Hand." The first chapter in Part I, "A Contractrarian Perspective on Anarchy," begins with a summary statement of the difference between Buchanan's ideal anarchist society and his practical society of contractrarian foundation. He immediately assumes as self-evident that individuals can never voluntarily regulate their behavior in such a way as to permit anarchy, and presumes that constitutional rules must be formulated by individuals pursuing their own rational self-interest and not imposed on individuals by the authority of the state.

In stating these premises, Buchanan has already presupposed the argument he wants to make. He wants to argue that an individual would choose to live in a society with contractually based laws and not in idealized anarchy. A main criticism that Buchanan levels at the libertarian anarchist is that the anarchist offers no suggestion for dismantling the existing political structure except that of revolution. Yet Buchanan himself later encourages a "constitutional revolution" when the social institutions and laws no longer reflect the consensus of the individuals. The reader is often, as he is here, left to reconcile similarly divergent and imprecise assertions.

In Chapter 4, Buchanan criticizes Robert Nozick's *Anarchy, State, and Utopia* by showing that the entitlement criterion for justice allows many possible just "end state" results. This is not a damaging criticism. This is true of Rawls' efficiency criterion as well. Even if the set of "end states" resulting from the processes of acquisition is in fact open-ended, that open-endedness is due to the limitless permutations of uncoerced agreements and is not in conflict with Buchanan's contractrarianism.

Buchanan criticizes Rawls for going beyond, and Nozick for ignoring, the *process* of normative choice. He finds it necessary to separate the process for choosing rules from the content of the rules themselves. He does not, however, give a convincing argument as to why a discussion of content is inappropriate in the evaluation of conceptualized societies.

The next five chapters are united under the Part II heading of "The Structure of Social Contract." Game theory is used in the chapter entitled "Before Public Choice" to discuss the effects of initial distribution on the poor man's interest in obeying the law. The chapter concludes: "We seem to be left with the question posed at the outset: How do rights reemerge and come to command respect?" (Pp. 93). Frequently in this book, game theory is used to discuss interesting digressions while the major questions presented remain unexamined.

Chapters 7 and 8 express, through different means, Buchanan's conviction that the sociopolitical structure and system of legal rights must maintain a certain stability and not "remake" itself in the face of political trends or social exigencies. Buchanan evaluates a Supreme Court decision from an economist's standpoint and concludes that the precedent of existing rights is valuable in that it encourages voluntarily negotiated settlements and therefore optimally efficient resolutions of disputes with minimal state intervention. He then looks at the university setting as a social collectivity and examines the position of the student revolutionary who dissents from agreed social policy. Buchanan finds that antagonistic dissent is inconsistent with the revolutionary's interest in "developing and in maintaining an institutional structure within which all of us, and others, can exercise the freedom to differ in basic values and to behave differently in accord with those values." (Pp. 117).

The concluding chapter of Part II discusses how contractrarian theory is used and abused. It is abused when contractrarian precepts are fully equated with efficiency. The fact that rules are agreed on does not ensure their efficiency. Furthermore, the test of efficiency may only be applied to the reform of economic and not political and legal institutions. Buchanan sees these potential abuses as limits on the valuable explanatory-evaluative use of contractrarianism.

The third part of the book, "The Enforcement Dilemma," begins with an essay entitled "Ethical Rules, Expected Values, and Large Numbers." Buchanan states that "my purpose here is to contribute something to the analysis of ethical choice." (Pp. 167). He deduces from vectors and matrices which assign probabilities to an individual's

choice of private or universal maxims that the normative choice a moral agent makes is influenced by the size of the group of individuals making similar choices. For example, free-rider egoism can only exist where the size of society is sufficiently large that the moral agent's choice has no effect on whether others also choose ethical egoist principles. Buchanan concludes that increasingly fewer citizens in any large society will choose to act on generalized ethical principles. The main criticism to which Buchanan leaves himself open is that since he began by presuming a rule deontological basis of ethical choice, his conclusion is limited. An *act* deontological perspective of ethical choice, for example, would disarm Buchanan's hypothesis that large sample numbers influence individual normative choice.

The remaining chapters in Part III attempt to show that the rationality of pragmatic normative choice prevents the modern man from seeing the necessity of strategic cooperative choice. Buchanan argues that strategic choice favorably influences the behavior of others in averting a drift toward anarchy: "My own efforts have been directed toward the prospects that general attitudes might be shifted so that all persons and groups come to recognize the mutual advantages to be secured from a renewed consensual agreement on rights and from effective enforcement of these rights." (Pp. 210). Specifically, he views a reassessment of our constitutional values as a precondition for continued freedom in America.

"Economic Applications" are left for Part IV. The relevance of Pareto optimality to the selection of self-imposed rules is discussed in Chapter 15. Buchanan concludes that an optimal position cannot be identified except in a situation of actual choice: "If members of the group do not explicitly choose among final positions in the appropriately defined welfare space, the hypothesis that some members of the group can be made better off by a change remains empty." (Pp. 233). The economist's role is, therefore, not to decide which distribution is optimal, but rather to suggest policy changes to which all group members can agree.

The final Part is titled "Prospects." The two essays examine what the future holds for our present day society. In Buchanan's own words, "we attempt to map one 'democratic' road to revolution." (Pp. 275). This revolution calls for a collective choice of rules by all members of society—a "constitution of society." Failure to agree on rules, Buchanan claims, will promote increasingly inefficient results which are neither intended nor desired. He is optimistic in his diagnosis that improvement is possible: "All, or substantially all, persons and groups

in the United States of 1978 should be able to reach agreement on a carefully designed and properly orchestrated set of legal-institutional arrangements which could then replace those that are in existence and in disarray." (Pp. 297).

In conclusion, the individual chapters of the book are generally clear and concise. Chapter introductions and conclusions are invaluable in that they lay out what the author intends to show and what he believes he has shown. The argument, however, is often not strong enough to support the conclusions Buchanan wants to draw. The readability of the book is adversely affected by the "patchwork" organizational structure. The chapters may be read in any order. In general, the work also suffers from Buchanan's relative unfamiliarity with ethics, law, and moral psychology.

The book will not be without some interest to those fully acquainted with the continuing interchange of ideas surrounding modern social contract theory. Although it is unfair to expect a work equal in stature to *A Theory of Justice,* one cannot help but be somewhat disappointed that Buchanan has not developed more fully a coherent economist's perspective.

*James G. Glazebrook**

HOW INDUSTRIAL SOCIETIES USE ENERGY: A COMPARATIVE ANALYSIS. By Joel Darmstadter, Joy Dunkerley, and Jack Alterman. Baltimore: Johns Hopkins University Press, 1977. Pp. 207.

Energy consumption and how it can be reduced has become a burning issue among responsible politicians throughout the world. The authors of this study compare patterns of energy consumption among nine wealthy, industrialized nations: Canada, France, Italy, Japan, the Netherlands, Sweden, the United Kingdom, the United States, and West Germany, in an effort to provide both the methodology and the statistics upon which future study and political commentary can be based.

The basic numerical findings are revealed in the first section of the book. They are broken down by sectors of the economy in the second section: household-commercial, transport, and industrial respectively.

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The third section shows how the structures and energy-intensities of the countries' activities plus differences in the final products affect the statistics; the results are summarized and interpreted in the fourth and final section.

Following an introductory chapter the authors clearly outline with the help of graphs and charts their method of analysis and its limitations. Most of the statistics are taken from the year 1972, which shows operations under favorable economic conditions but makes no allowance for the price rises or the recession following the Arab oil embargo of 1974. The basic units of measure used were the amounts of energy consumed *per capita* and the amount of energy used in comparison to income generated. No non-commercial fuels such as wood or charcoal could be included in the statistics, nor could resold waste energy or the "district" heating systems common in Sweden. Hydroelectricity proved very difficult to measure because of the uncertain amount of water consumed in its production.

The third chapter gives across-the-board results and country portraits. Basically, the European countries and Japan produce a comparable level of economic output to that of the United States but use two-thirds the energy. North American consumption was higher in every sector but the disparity was especially marked in the area of transport. Canada, not the United States, was the largest relative consumer; France was the smallest.

Chapter four contains an in-depth look at the household-commercial sector of the economies, which includes all non-transport purchases of fuel by individuals, government facilities, stores, and offices. The consumption is divided into household, commercial, and agricultural categories, then subdivided into space conditioning (heating and cooling) and all other uses. These results were scrutinized to determine which were due to existing and relatively non-changeable conditions and which showed differing habits of usage. After heating practices of the countries were corrected for climate, the United States emerged as the highest consumer by an average of forty percent. Air conditioning, which was used significantly only in the United States, accounted for very little of our excess consumption because of the relatively small amounts involved.

Less than one-half (about eighteen percent of the difference in consumption between the United States and its neighbors in space conditioning was due to different standards of comfort or "heating habits". This difference in consumption resulted from the United States having more and larger single-family homes and its lower densi-

ty of population. American insulation and heating systems used less energy on the average than those of the other countries involved. In addition, United States consumers used more hot water and appliances than consumers in the other countries tested. The usage in this section showed an especially high sensitivity to price; the United States and Canada, for example, the two largest consumers, had by far the lowest prices.

The chapter ended with specific recommendations as to how energy could be saved. Non-heating of unused spaces and lowering the average temperature of homes in the winter were among the changes presumed easiest to make.

Chapter five deals with the controversial transport sector of the economy. Transportation was divided into passenger, both public and private, and freight transport. These were analyzed to determine whether differences in energy consumption were due to the share of miles in different forms of transport, the *amount* of travel relative to output, or the energy consumed per passenger mile. Again, the statistics indicate that the United States consumes more transportation energy than any other country. Much of this excess consumption results from the fact that North Americans travel from two to three times as much as their Japanese and European counterparts. This is in part because of the huge difference in the size of the areas; the United States being 1.3 times as large as the whole of Europe. In Europe and Japan public transportation is cheaper and better developed than its American counterpart and is used much more extensively. Smaller spaces and high urban densities as well as large government infusions of capital also contribute to the success of public transportation in those countries. American cars were bigger users of energy, but the study cited an increase in the size of European cars relative to them and an increase in *per capita* ownership in Europe as two factors which should help narrow the difference. In the freight transport sector, Americans moved more goods from place to place. The larger land mass here, however, allowed the United States to use the less energy-intensive means of rail and ship to do so. This chapter also concluded with specific recommendations for energy savings. Taxing gasoline at a higher rate and government subsidy of mass transport were among the changes suggested.

Industry, the topic of chapter six, is a leading source of energy demand in all the countries studied. The spread between the North American and the other countries' usages is smallest here; North American industry using about twenty percent more energy than the

other countries studied. Industry was looked at first to determine the relative heaviness of the structures, then separate industries: steel and iron, chemical, and petroleum were scrutinized to evaluate the countries' intensities for each. Transformation losses in energy production were also perused. The authors tried to separate the excesses which were changeable from those that were not. North American production differences were found to be due to high energy intensities within each industry, not to any heavy overall industry mix. Low energy prices seemed to account for a desire to substitute more energy for the labor foreign manufacturers might require. The specific recommendations at the end of the chapter included a movement away from open-air fuel furnaces in steelmaking, a price hike for energy, and longer continuous operating hours.

Chapter seven presents an input-output analysis of the countries' overall energy usages. The chapter attempts to measure the value of the energy put into comparable units of finished products and divides the difference into the part attributed to the product mix and that which is unaccounted for except through the other analyses. The United States used forty-three percent more energy for the average final product. Half of that excess was due to the greater sophistication of the result, the rest being attributable to the transportation and production factors discussed earlier.

Chapter eight attempts to reconcile the higher American purchases of direct energy relative to their incomes. The average household consumption was broken down into heating, appliances, gasoline, *etc.* We purchase many more automobiles and durable consumer goods than the other populations studied. Other countries' budgets are devoted more to food, education, public transportation, and related low-energy usages. Gasoline purchases, which are exceedingly energy-intensive, accounted for much of the difference.

The book ends with summary and interpretation in chapter nine. The results were categorized as to those usages which are immediately changeable versus those which could be lowered, if at all, only over the longer term. Although the authors stress that they intend the book to be used for its facts instead of its commentary, the salient result is that economies with higher fuel costs use less energy relatively. Fuel costs reflected government policy, history, and the amount of dependence on imports. Higher United States consumption was explained as due only partially to what could be termed waste; large land mass coupled with lower density of population and larger houses as well as the historic building of industry around low energy costs.

The book's method of analysis, which combines a sectoral with an input-output study of energy usage, is especially useful. The findings could well be reinterpreted in light of the recent price hikes in fuel which, according to its contents, should lower the usage disparities between North America and the other areas.

The book was written by economists; they support every finding with statistics while citing unknowns and shortcomings with frequency. It could be read and cited as one of the most authoritative works in its field.

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