

## REVIEWS

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CONSERVATION IN THE PRODUCTION OF PETROLEUM: A STUDY IN INDUSTRIAL CONTROL. Petroleum Monograph Series, Volume 2. By Erich W. Zimmermann. New Haven: Yale University Press, 1957. Pp. xxii, 417. \$6.00.

IN an age dedicated to the annihilation of time through the rapid movement of mass in space, energy supply is a subject of fundamental importance. In our time "energy supply" means petroleum oil and natural gas. And to meet the national demand for these products we in America have created, and continue to build, the domestic petroleum industry. Mr. Zimmermann's book is surely the most comprehensive single work now available on the conservation of these important resources.<sup>1</sup>

Our oil industry has served us well. We enjoy ample volumes of petroleum products at prices which, in spite of increasing taxation, have increased no more over the years than have the general commodity indices. The successful prosecution of World Wars I and II (and the strength of our current national defense) can be attributed, in large part, to the industry's ability to provide oil, the largest wartime commodity, whenever and wherever needed.<sup>2</sup> The industry is characterized by intensive use of technology, easy entry for new enterprises, high and continually improved product quality, high wages, low prices, ordinary returns on investment, and a few units which constitute "big business."<sup>3</sup> On the foreign scene oil companies are our largest investors and oil company employees form our most numerous group of "good will ambassadors."

Though it may seem paradoxical to those responsible for the industry's good record, the size and importance of the oil industry engender a continual review of industry practices in the public forums. Such inquiry has focussed on the general question of whether certain existing oil industry institutions best serve the public interest. In particular, the following aspects of the industry are under review:

1. The income tax consequences of the industry's continual liquidation of its assets—the proper level of "depletion."
2. The ability of domestic production to compete with foreign-produced crude oils—"the import problem."
3. The standards for control of well production rates—whether consideration of market demand in proration is in the public interest.

Evaluation of the various proposals which have been advanced as desirable changes in the industry requires orientation in regard to some complicat-

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1. Mr. Zimmermann is also the author of *ZIMMERMANN, WORLD RESOURCES AND INDUSTRIES* (rev. ed. 1951), a monumental work on resources.

2. See *FREY & IDE, A HISTORY OF THE PETROLEUM ADMINISTRATION FOR WAR, 1941-1945* (1948).

3. See *WHITNEY, ANTITRUST POLICIES: AMERICAN EXPERIENCE IN TWENTY INDUSTRIES* (1958).

ing factors. First, institutions must be moulded not only to provide a long-term supply of petroleum products to consumers at reasonable prices, but also to satisfy the needs of national defense. Today's international situation makes it most apparent that "freedom" in any market is a function of the strength of the armed forces which protect it. Economic analysis must therefore take account of military requirements, the primacy of which can be overlooked only if we are to disregard the will to remain free. Second, the time standard implicit in any "public policy" judgment of industry performance must be clarified. One justification for government interference in the market economy is the assumption that through political institutions we can make decisions based on "long term" considerations—decisions which are impossible within the framework of business institutions themselves. On the other hand, experience indicates that business institutions can better handle day-to-day ("short term") problems. Accordingly, public control of business should consistently take a long-term approach.

This analysis perhaps explains why recent commentators have agreed that bigness in business is not per se against the public interest.<sup>4</sup> To a certain extent, the larger the enterprise, the longer-term point of view it may take in its internal operations. General Dynamics Corporation's development of the Atlas missile without Federal support is a recent example of this function of big business. Moreover, as the performance of the large oil companies in World War II demonstrated, the ability to mobilize and expand to meet wartime needs may also be a concomitant of size. Here again, the seriousness of defense considerations may signal a shift in the optimum balance we should seek between the maximization of price competition through small business and the furtherance of other public needs through the development programs of large companies.

A final factor which must influence evaluation of proposed oil industry changes is the possibility of future shortages of energy sources. Most long-term energy supply-demand surveys indicate a future demand, especially for fossil fuels, of such magnitude as to raise the question of whether adequate supplies can be developed.<sup>5</sup> Consequently, public control of the oil industry should operate not only to conserve existing oil and gas, but also to stimulate the search for new sources of supply and more effective means of exploiting existing resources.

It is with these general facts in mind that the nature and development of the various conservation statutes under which petroleum production is con-

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4. Compare *ibid.* with STOCKING & WATKINS, *MONOPOLY AND FREE ENTERPRISE* (1951). See also LILIENTHAL, *BIG BUSINESS: A NEW ERA* (1953).

5. See 1 INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY, *PROCEEDINGS—THE WORLD'S REQUIREMENTS FOR ENERGY: THE ROLE OF NUCLEAR ENERGY* 3-102 (U.N. Pub. Sales No. 1956.IX.1); PUTNAM, *ENERGY IN THE FUTURE* (1955); 1 U.S. PRESIDENT'S MATERIALS POLICY COMMISSION, *RESOURCES FOR FREEDOM* 103-30 (1952); 3 *id.* Compare AYRES & SCARLOTT, *ENERGY SOURCES—THE WEALTH OF THE WORLD* (1952), with NETSCHERT, *THE FUTURE SUPPLY OF OIL AND GAS* (1958), and DEWHURST, *AMERICA'S NEEDS AND RESOURCES: A NEW SURVEY* 762-67 (1955).

trolled by public agencies in some states must be considered. Petroleum is a fugacious material and may be subterraneously drained off and produced through adjacent wells located on another's property. In deciding who owns such drained production, courts have established the rule of capture—that the oil belongs to the person through whose well it is produced. This doctrine, rewarding the "firstest with the mostest," encouraged the drilling of a maximum number of wells and the producing of every well at its maximum rate. As might have been anticipated, however, producing oil under these conditions resulted in physical waste on the surface (*e.g.*, gas flaring) and in underground reservoirs (low recovery of the oil in place), as well as in economic waste (*e.g.*, distress marketing of crude oil). Furthermore, the "rule of capture" did not often provide a satisfactory solution to the problems raised by the fact that recoveries from one owner's property may be reduced by wasteful practices elsewhere in the same reservoir. Judicial treatment of this "correlative rights" issue relegated the parties to self help (*e.g.*, drill more and produce more). Meanwhile, in the legislatures, an overall solution to the problems of waste prevention and the protection of "correlative rights"—which the judiciary by its very nature could not produce—was being worked out in the form of conservation statutes to be administered by public commissions. Today most, but not all, of the oil-producing states have empowered some public body to enforce petroleum-conservation programs, which although varying greatly, generally provide for control of the number and location of wells to be drilled, methods of drilling, completing and producing wells, and quantity of production. The latter control, better known as proration, regulates the level of production (allowables) as well as its division among well owners (ratability). Proration level standards have been developed from the engineering viewpoint (MER—maximum efficient rate of production without loss of ultimate recovery) and from the market standpoint (no production in excess of market demand).

Jurisprudentially, American lawyers can be proud of the conservation statutes. Both the statutes and the decisions which have interpreted them constitute a body of law built on day-by-day accretions growing out of the experience of the parties involved. Thus, our conservation programs represent "common law"—albeit in the public law field—and not rigid systems imposed from above.

The conservation statutes have been upheld by the courts as a constitutional exercise of state police power<sup>6</sup> and have received the continuous approval of the legislatures of the states affected. Even so, for the adumbrated reasons, state conservation programs are often criticized. Disregarding those critics whose unreasoning assumptions make discussion inefficacious,<sup>7</sup> criticisms re-

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6. See Hardwicke, *Market Demand as a Factor in the Conservation of Oil*, SW. LEGAL FOUND. 1ST INST. ON OIL & GAS LAW & TAX 149 (1949).

7. In which category the reviewer would place the voice which recently asked for no further extension of the Interstate Oil Compact, even though the Compact has been under investigation by the Justice Department for several years and the Department has concluded the Compact is beneficial. See U.S. DEP'T OF JUSTICE, THIRD ANN. REP. OF THE

main which may be classified by the degree of change espoused. On one hand are the proffered solutions to such recurring problems as the gas-cap well, the undrilled small tract, well spacing, and proration between wells in a given reservoir. Practically all commentators have some recommendations of this nature. New solutions to these problems are being worked out and put into effect continually in the operation of the conservation program. This is the growth of the "law." On the other hand, some of the critics recommend more sweeping changes. Usually their criticisms are developed from an economic viewpoint and aim to insure a free market in crude oil by abolishing certain existing proration practices or by centralizing public control of the market. In particular, they are concerned with the market demand standard for proration. The most thorough analyses of this type are the studies of Watkins, Kemnitzer, and Rostow.<sup>8</sup> Watkins and Kemnitzer would do away with market demand proration (the system in effect today in Oklahoma) and would substitute either nothing at all or, possibly, proration based solely on engineering standards (the present system in Mississippi). Rostow would substitute a program of compulsory unitization—undivided joint ownership of each reservoir by the operators exploiting it—plus federal control of drilling and well operations.

In evaluating existing conservation statutes or proposed changes thereto, one must first ask whether oil requires conservation and, if so, whether the price stabilization aspects of proration are of such detriment as to justify a change in the present system. Any final statement concerning the adequacy of supply would seem an impossibility. Supply must be thought of as a dynamic concept, incapable of definition solely in terms of the number of years present demand can be met by our "proved" oil reserves. Even in these terms opinion is divided. Thus, the president of the Humble Oil & Refining Company recently stated that supply was adequate while the Chase Manhattan Bank questions its adequacy.<sup>9</sup> The complications involved become clear when it is realized that any solution requires estimates not only of the supply of petroleum, but also of the supply of competitive fuels, future market prices of all fuels, and future demand for energy of all types. We are faced today with the paradox of an immediate excess of crude oil supply while long term energy supply and demand studies show that shortages will exist within twenty years.

On the issue of price stabilization, opinion is also divided. One school of thought holds that proration reduces the supply of oil otherwise available to the market, thereby increasing prices. The counter arguments are based on engineering analyses which disclose that without market demand proration production rates between different well owners become inequitable and waste occurs, thereby reducing supply, and on statistics demonstrating that, with

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ATT'Y GEN. PURSUANT TO SECTION 2 OF THE JOINT RESOLUTION OF JULY 28, 1955, CONSENTING TO AN INTERSTATE COMPACT TO CONSERVE OIL AND GAS 7 (1958).

8. WATKINS, *OIL: STABILIZATION OR CONSERVATION* (1937); KEMNITZER, *REBIRTH OF MONOPOLY* (1938); ROSTOW, *A NATIONAL POLICY FOR THE OIL INDUSTRY* (1948).

9. *U.S. Oil Ten Years Ahead*, 26 *PETROLEUM PRESS SERV.* 8-10 (1959).

proration, the industry continues to produce an adequate volume at reasonable prices.

In developing the nature of conservation, the Zimmermann book moves competently from basic definitions through detailed discussions of the nature of petroleum production, the structure of the oil industry, the history of oil conservation, present state laws, federal participation in conservation, the Interstate Oil Compact Commission, the function and conservation of natural gas, and the availability of energy. The author concludes that, on balance, an unequivocal endorsement should be given to "the petroleum conservation program as a socially desirable method of aiding this unique industry in the quest for reasonable order . . ." <sup>10</sup> Zimmermann finds that oil should be conserved because present estimates indicate a future need for all known forms of energy. He also finds that the benefits of market demand proration outweigh any possible bad effects. Conditioning his endorsement upon further improvements in the conservation program, he devotes one chapter of the book to a consideration of the problems presently before conservation agencies, including allocation standards within pools, allocation between pools, well spacing, unitization and the import problem. <sup>11</sup>

By way of definitions, Zimmermann offers a "dynamic" concept of resources as "environmental aspects available for use by man." <sup>12</sup> This is the social science approach, which recognizes that resources expand and contract as man's ability to use them fluctuates. In this respect his definition may be contrasted with the view of resources as static substances—the physical scientist's idea, which has been used by other writers. <sup>13</sup> For "conservation" the author chooses, at least initially, a standard definition: "the quest for that 'time distribution of use rates (of resources) that maximizes the present value of the flow of (expected) net revenues.'" <sup>14</sup> To apply this definition to the conservation program requires a mathematical formulation of the special nature of petroleum including the determination of factors for discounting future production to present worth. Zimmermann makes no such formulation but points out that the public has inferentially decided the definition is satisfied through its approval of the conservation statutes. Therefore, any further search for mathematical certainty is largely academic. <sup>15</sup> Nevertheless, since conservation brings about larger ultimate rates of production by reducing present rates, it is obvious that the existing conservation statutes satisfy the definition if a discount to present worth factor greater than the rate of interest is chosen.

In the most extensive analysis to date of the effect of proration on the crude oil and products markets the author shows, first, that the conservation

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10. P. 394.

11. Ch. 10.

12. P. 7.

13. See NETSCHERT, *op. cit. supra* note 5, at 5, for a further discussion of the definition of "resources."

14. P. 30, quoting CIRIACY-WANTRUP, *RESOURCE CONSERVATION: ECONOMICS AND POLICIES* 77 (1952).

15. Pp. 31-32.

program has increased supply by increasing the available oil reserves, which should result in lower costs to producers and lower prices to consumers,<sup>16</sup> second, that the conservation program has resulted in a reduction in the number of wells drilled with a consequent saving that should ultimately be realized by the consumer,<sup>17</sup> third, that the prices of crude oil and other petroleum products have been reasonable over the period in which the conservation program has been effective,<sup>18</sup> and fourth, that the rate of return on capital invested in the oil industry, in comparison with other industries, has not been excessive.<sup>19</sup> In answer to Watkins' claim that the conservation program actually lowers production efficiency, Zimmermann shows that the experience of the last twenty years (which was not available to Watkins) clearly indicates that conservation has had no adverse effects in this respect, since it has neither reduced recovery nor required additional wells. In fact, the conservation program has had just the opposite result. It has reduced well investment and increased recoveries of in-place oil. Generally speaking, conservation practices result in a reduction of immediate income and an increase of future income, with the overall effect of increasing the present worth of the resource under a proper discount factor.<sup>20</sup>

In considering Rostow's suggestion of unitization and federal control of drilling and well operations, Zimmermann discusses the difficulties involved in unitizing properties which have vaguely defined geographical boundaries or varying characteristics within boundaries. Under a compulsory unitization statute, these problems would principally concern the extent to which operators of edge tracts will participate in the proceeds of the unit.<sup>21</sup> Also apropos to Rostow's suggestions is the author's consideration of the MER concept. According to Rostow, the ratability and market demand problems usually answered by proration would be solved by unitizing all fields.<sup>22</sup> To prevent underground waste, MERs presumably would be established for each field and the owners of the unitized property would be free to produce the field at any desired rate up to the MER. But Zimmermann would doubt that the price of crude would be lower in a system of unitized properties operating under MERs than it is under the present system of non-unitized fields with proration. The demand for crude is essentially inelastic, and there is no indication that proration has produced any shortage.<sup>23</sup> Moreover, the foregoing scheme fails to account for the indefiniteness of the MER standard. For example, most reservoirs are of the dissolved-gas-drive type. At this time, calculating MERs for such pools is impossible.<sup>24</sup> Nevertheless, unitization is the most

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16. P. 279.

17. Pp. 279-81.

18. Pp. 291-98.

19. Pp. 298-300.

20. Pp. 300-09.

21. Pp. 344-48.

22. See Rostow, *op. cit. supra* note 8, at 45.

23. P. 393.

24. P. 327.

efficient method of operating most oil fields, and measures which would facilitate the institution of unitization are socially desirable even if compulsory unitization in lieu of proration is an alternative of questionable value.

Mr. Zimmermann's study should be read by all who want to know how oil conservation developed, how it operates today, and how it is faring against its present critics. It is a significant book about an industry of which Dean Rostow once said: "All things considered, *the oil industry is one of the most striking instances in our history of . . . the driving force, creativeness, and vitality of American business . . .* It is turbulent, active, and aggressive, with a good deal of room for change and growth. . . ." <sup>25</sup>

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CREEDS IN COMPETITION: A CREATIVE FORCE IN AMERICAN CULTURE. By Leo Pfeffer. New York: Harper & Bros., 1958. Pp. 168. \$3.00.

WHILE much has been written on the uniquely American concept of separation of Church and State, most of it has been little more than a thin rehash of familiar Supreme Court opinions. Pfeffer's book is a refreshing exception. Unwilling to confine himself to the traditional list of Church-State topics, he lucidly and objectively discusses such diverse subjects as the Establishment Clause, education, gambling, censorship, blue laws, taxes, divorce, adoption, abortion, birth control, euthanasia, sterilization, sex education in public schools, artificial insemination, conscientious objectors, and welfare laws. In addition, Pfeffer considers the three major religions' attitudes on pacifism, communism, civil liberties, the atomic race, foreign policy, and international relations. The author's sources range from Papal encyclicals and the Talmud through Canadian, Dutch, and American law to Myrdal, Byrd, Ebersole,<sup>1</sup> Cubberly,<sup>2</sup> *The Churchman*, and *The Commonwealth*. Each of the book's sections demonstrates that the legal resolution of a problem mirrors social strife. Each suggests the profound responsibility of the Supreme Court in balancing and containing the activities of the conflicting churches in their attempts to influence governmental action in order to mold the society at large. Seldom does a book capture so well the tip-of-the-iceberg quality of decisional law and the area of social tension and interaction underlying this subject.

The book's purpose is briefly stated as "an examination of the efforts of the major religious forces to shape American culture through governmental action."<sup>3</sup> Religious groups, quite naturally, "seek to translate their own particular hierarchy of social values into categorical imperatives for the community at large . . ."<sup>4</sup> This they accomplish by lobbying, and forming "a series of alliances

25. Quoted in *Am. Petroleum Inst. Q.*, Winter 1959, p. 40. (Emphasis in *Quarterly*.)

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1. EBERSOLE, *CHURCH LOBBYING IN THE NATION'S CAPITAL* (1951).

2. CUBBERLY, *PUBLIC EDUCATION IN THE UNITED STATES* (1934).

3. P. 7.

4. P. 153.