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LEGAL PLANNING OF PETROLEUM PRODUCTION

J. HOWARD MARSHALL* AND NORMAN L. MEYERS†

The heroics of Governor Murray in calling out the troops to close the oil wells of Oklahoma until such time as purchasers would pay one dollar a barrel has dramatized the acute problem of low prices and overproduction which has haunted the petroleum industry in the past few years. The competitive exploitation of oil lands has resulted not only in dissipating huge quantities of both oil and gas through the wasteful rush to market but also in diminishing profits through the production of oil and gas in excess of current demands. It has become imperative that the financial losses of overproduction be checked and that the prodigal physical wastes be eliminated. Until recently, however, in none of the extractive industries has there been any but petty attempts to eliminate such waste, although the conservation of our natural resources has been for decades a campaign cry of a progressive minority. Now conservation, seen as a means of solving this problem of wasteful overproduction, has become endowed with respectability.1 But if overproduction has thus given an impetus to the conservation movement, in turn it is to conservation that the petroleum industry now looks for a legal basis for the rationalization of production.

While the stabilization of oil production in the United States is complicated by conditions in the world market, world-wide rationalization waits upon the United States since it produces approximately sixty-five percent of the world's crude oil.2 Pro-

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1 "Conservation in recent years has lost much of its theoretical flavor and is now understood as having to do with everyday life." Work, Secretary of Interior, Conservation's Need of Legal Advice, (1927) 52 A. B. A. REP. 566.
2 In 1928 the United States produced 68% of the world's total; in 1929, 67.9% and in 1930, 63.3%, the lowest ratios since 1921. Bureau of Mines, World's Production of Crude Petroleum in 1930, Annual Petroleum Statement, No. P. 75 a. See Kiessling, Oil Leasing Policy of the New Administration, (1929) Editorial Research Reports 239.

[33]
duction throughout the world is on the increase; cheap foreign oil is finding its way into the markets of the eastern seaboard, and American exports are faced with sharp competition in the foreign markets. An international conference of the leading oil companies was instigated in 1921 by Herbert Hoover, then Secretary of Commerce, to consider the "broader social and economic aspects of the world’s petroleum situation." But attempts to make world oil agreements or cartels have failed because of the inability of the American petroleum industry to cooperate in the face of the anti-trust laws. To facilitate the disposal of the American surplus of oil under such world conditions, mid-continent operators demanded an embargo or high tariff on foreign oil in the dying days of the last Congress. The session ended in a filibuster. A subsequent appeal to the President to place an embargo on foreign oils under the Tariff Act of 1930 because of "unfair competition" likewise came to naught in the absence of any unfairness. But since foreign imports have been steadily declining until in 1930 they contributed but six percent of the nation’s total supply, the industry must find an internal explanation of its surplus.

Many interrelated factors, economic, geologic, and legal, have created the wasteful overproduction which has beset the industry.


4 In 1929 it was decided at the World Conference to hold American production to the 1928 level and to restrict the output of other countries to definite quotas. MAUNSER, op. cit. supra note 3. The American Petroleum Institute applied to the Federal Oil Conservation Board for approval of curtailment of production but was informed by Secretary of Interior Wilbur, Chairman of the Board, that it had no authority to approve an agreement for the restriction of output. He was so advised by the Attorney-General, who stated, "The proceedings of the Petroleum Institute make it clear that its members already realize that under existing laws such an agreement would not safely be made without the sanction of some officials of the United States authorized to give it and, as I have already pointed out, no such authority exists." U. S. Daily, April 4, 1929, at 270.

5 Committee on Commerce, U. S. Senate, Hearings on Regulating Importation of Petroleum and Related Products (1931).


7 The Attorney-General informed the President that he was powerless to act since there was no evidence of illegal acts. U. S. Daily, July 24, 1931, at 1193.

8 The ratio of imports to the total domestic supply has been decreasing constantly since 1921, a year of "shortage" when imports constituted 21% of the supply. Division of Statistics, Bureau of Foreign and Domestic Commerce, Hearings on Regulating Importation of Petroleum and Related Products (1931) 255.
in this country for the past six years. Geo-physical methods have facilitated the discovery of new fields; the technique for drilling to new depths to tap deeper sands has been improved; and the consequent periodic discovery of new flush pools greatly adds to the potential supply. The methods of competitive exploitation now prevalent in the industry quickly transform potential into actual supplies with little regard to market demands. The physical waste and the economic losses resulting from heedless competition are appalling.

Primarily, the competitive system has failed to adjust production to fundamental geo-physical laws. Oil and gas are usually confined along with water under high pressure in a single reservoir. The three substances are distributed in the structure in which they are entrapped according to their specific gravity; in a "gassy field" gas is found free at the top of the pay sands; below it lies oil with gas in solution; and still further down in the structure water may be found. When a well pierces the cap rock, the release of the pressure at the bore disturbs the equilibrium and results in a "migration" to the well. The principal driving power is the expansive force of the gas; hydrostatic head also frequently serves as a propulsive force. If the well is drilled into the oil level of the structure, the movement of the compressed gas toward that point of lowered pressure carries oil with it to the well, and when the pressure is sufficient, to the surface as a gusher. If, on the other hand, the well taps the top of the structure at the "gas area" the gas escapes, sometimes sucking a little oil behind it. The reductions in gas pressure resulting from the withdrawal of gas effect the recovery of oil in several ways. Loss of gas pressure reduces the lifting force necessary to bring the oil up from the sands. Recent experiments have demonstrated also that lowered pressure decreases the amount of gas dissolved in crude oil and thus directly increases the viscosity of the oil.

Since an oil pool is not a subterranean pond but oil contained in the interstices of sandlike rock of varying porosity, an increase in viscosity hinders the passage of oil through the rock pores and decreases the total recovery. Furthermore reduction of gas pressure permits edge water creep; and too rapid reduction, because of irregularities in the structure, results in finger intrusions of water which drown out large quantities of oil. It has become a commonplace among oil geologists that the rapid decline in production in most American fields is not due to the exhaustion of oil but to the improper utilization of the gas energy and to avoid-

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able water seepage and ill placed wells.\textsuperscript{11}

For under the present system of competitive drainage, the gas energy has not been conserved and even the wells have not been located scientifically on the geologic structure. The fractional ownership of the surface over a geologic unit of oil and gas has created a vicious system of competitive drilling. The location of wells has been determined by the property lines of the surface regardless of subsurface contours, and the utilization of the gas energy has been left to the whim of the individual producer. The bringing in of a discovery well precipitates intensive drilling on surrounding property. Wells are located close to property lines for the recognized purpose of draining as much oil as possible from neighboring lands.\textsuperscript{12} The neighboring property owners are forced to counter with an off-set well on their side of the boundary line. From then on off-set to off-set follows off-set until the limits of the field are proved.\textsuperscript{13} One recalcitrant operator has it in his power to set the pace of drilling and to determine the spacing of wells. Thus in the Oklahoma City Pool the attempts of the majority first to curtail immediate drilling and then to limit the drilling to forty-acre tracts were frustrated by one or two operators who insisted upon immediate drilling on ten-acre tracts. The result was the bringing in of over seven hundred wells in about a year's time.\textsuperscript{14}

The race in drilling is spurred on by the advantages gained by the first wells in. These wells secure great flush production by utilizing the full latent energy of the field. Experience has shown that off-set wells to big producers rarely attain equal flush production. Furthermore, the reckless dissipation of gas energy causes a rapid permanent diminution of pressure in the entire field, decreasing the possible recovery of the other wells, and of

\textsuperscript{11} Numerous technical descriptions in varying detail may be found. See for example, Miller, \textit{op. cit. supra} note 10; American Association of Petroleum Geologists, \textit{Structure of Typical American Oil Fields} (A Symposium, 2 vols. 1929); American Petroleum Institute, \textit{Petroleum Facts and Figures} (1929); American Institute of Mining and Metallurgical Engineers, \textit{Petroleum Development and Technology} (5 vols. 1925-30); Beal and Lewis, \textit{Some Principles Governing the Production of Oil Wells} (Bureau of Mines 1929).

\textsuperscript{12} The situation has been aptly described in a colorful statement by H. L. Doherty, long a proponent of unit operation of oil fields: "What is called competition in an oil field is no more competition than is a run on a bank. In fact a run on a bank is not as much 'cut throat competition' as in an oil field because all the depositors are trying to get their own money, and in an oil field the operators are trying to get not only their own oil but everybody else's oil." U. S. Daily, June 15, 1931, at 3465.

\textsuperscript{13} Stocking, \textit{The Oil Industry and the Competitive System} (1925) Ch. VIII.

\textsuperscript{14} Unpublished Memorandum on the Oklahoma City Pool by Earl Oliver, Chairman of American Institute of Mining Engineers Unit Operation Committee.
the field as a whole. And when wells located high on the structure are allowed to flow, the ratio of gas to oil is higher than in wells tapping the pool lower down in the pay sand. This high oil-gas ratio fails to utilize the full lifting power of the gas energy. In the early days of oil development the conservationist was concerned largely with the waste of natural gas by allowing it to blow to the air; now with a more complete understanding of oil well mechanics, operators are concerned with the waste of both oil and gas arising from the improper handling of gas energy.15

In the ill-planned production of the competitive system as much as eighty to ninety percent of the oil is lost and abandoned in the sands,16 natural gas is blown to the air, and the function of gas energy disregarded in the mad scramble for "more oil now." Instances of shocking waste are accepted as a matter of course in the United States. In Texas two wells on the top of a dome were allowed to blow dry gas in the hope that oil would eventually be drawn up. After blowing for thirty-four and eighteen days respectively, and expending approximately 250,000,000 cubic feet, oil appeared; one well yielded ten barrels a day, the other twenty-six.17 Recently at Kettleman Hills in California a billion cubic feet of gas a day, enough to supply the industrial needs of San Francisco and the whole northern part of the state, has been allowed to escape into the air.18 The concomitant loss of gas energy in such cases brought forth the California oil-gas ratio law.19 Physical waste above ground likewise is generous; "On November 1, 1926, the Seminole Pool was producing more oil than the pipe lines could handle and the producers did not have the steel storage built to take care of the surplus oil, consequently some of the oil was going on the ground and down the creeks."20 Even where hastily constructed earthen pits have supplemented steel tanks there has been great waste through the seepage of oil.21 Further waste constantly occurs by evaporation from the huge stocks in storage.

The physical losses of oil and gas and the waste of gas energy have been accompanied by huge economic costs. The intense duplication of wells has saddled the industry with a great overhead of fixed charges. While lifting and storage costs may be

15 Miller, op. cit. supra note 11; Oliver and German, Conservation of Energy in Reservoir, (1931) 30 Oil and Gas Journal No. 17.
16 Lewis, Methods for Increasing Recovery From Oil Sands, Bureau of Mines Bull. 148 (1917); cf. Miller, op. cit. supra note 11.
17 Unpublished address by Earl Oliver.
18 U. S. Dally, Feb. 21, 1930, at 3571.
19 Calif. Stat. 1929 c. 535. Despite the law, waste of gas in Kettleman Hills was not stopped until the field was put under unit operation.
21 Stocking, op. cit. supra note 13; Mid-Continental Oil and Gas Association, Annual Report, 1930.
delayed—if the oil can be kept in the ground until a market is found—drilling costs are already incurred and add to the total costs of production even though production is restricted. This is graphically portrayed by the Oklahoma City Pool, a typical example of competitive drilling. There, some seven hundred and sixty-five wells, costing approximately $125,000,000, have developed a potential production twenty times that which can be absorbed by the market, so that the wells were reduced to operating less than five percent of the time until the martial law edict shut down the field. In a similar instance of competitive drilling, that of the Seminole area, it has been estimated that a co-operative program would have slashed development costs from $152,800,000 to $82,875,000. These economic wastes have made the industry grimly aware of the need for “conservation.”

Despite these enormous wastes in exploitation, in the past decade there has been an excess in production, with a steadily increasing potential surplus. Because of competitive drilling and drainage, oil production is not responsive to price control. The synchronous discovery of many new pools which were at once forced to peak production by the competitive system has flooded the market. Increased stocks either in storage above ground or held back beneath have brought with them a steadily declining price, until production from the vast new East Texas Field during the past summer caused the final collapse of the price structure. Attempts to curtail production in the old fields were of no avail in the face of free flush flow from new fields. Further demoralization of the price structure from further discoveries already indicated by existing data is imminent, so long as the present system controls.

A program of conservation strictly to eliminate waste in production would incidentally have a beneficial effect on the price structure; it is this and not mere altruism that guides the industry which is, after all, on a production for profit basis. Scientific production would curtail the great flush production of the new fields and thus avoid sudden bursts of supply. Limitations on the number of wells would also reduce the costs of production. But the mere adoption of such conservation tactics would produce an

22 Pogue, Economics of Crude Oil Production in the United States, A. I. M. E. Petroleum Division Transactions (1931) 633.
23 See note 17, supra.
24 Mapes, Seminole and Unit Operation, Mid-Continent Oil and Gas Association, Annual Report 15 (1928).
25 At the present time there are over 650,000,000 barrels in surface storage. Mid-Continent Oil and Gas Association, Monthly Bulletins give current figures. The tremendous volume pinched back in “underground storage” cannot be calculated with accuracy.
26 In Texas the price actually fell below ten cents a barrel while twenty five cent oil was common throughout the mid-continent region.
anomalous situation; unrestrained use of improved technology would increase rather than decrease the total potential recovery of each producing area and still leave the surplus problem. So the industry pushes "conservation" a step further. The financial losses due to the low prices that "overproduction" yields are seen as "economic waste," fully as pernicious in social effect as physical waste. Too rapid depletion of our natural resources likewise suggests the value of a curtailment of production.  

Furthermore, government has now "in addition to its ordinary meaning, shall include economic waste, underground waste, surface waste, and waste incident to the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demands."  

Governmental regulation and assistance has thus become necessary to rectify the situation. Action has been of two kinds. Emergency measures have been taken to reduce the present surplus. Public oil lands have been withdrawn by the federal government from exploitation. State administrative bodies under conservation statutes are setting the daily quota for each field within the state and are prorating that quota among the wells. The extreme of exigent state action has taken the form of a complete shut down of flush wells by martial law. Secondly, a more fundamental reorganization of production through cooperative agreements and unit operation is projected. These restrictions on production are achieved either by voluntary agreements between the operators in an oil pool or by compulsion through state action.

27 The needs of national defense add another force to conservation. With the exception of the late lapse in policy, the Interior and Navy departments have been strong proponents of oil reserves.  

28 2 OKLA. COMP. STAT. (Bunn 1921) Sec. 7957. See note 71, infra.  

29 To fulfill President Hoover's announcement to the press that there would be complete conservation in his administration, the Department of the Interior removed public lands from further exploration and discovery under the Mineral Leasing Law, [41 Stat. 437, 30 U. S. C. § 181 (1928)] Kiesling, op. cit. supra note 2. The order applied to all lands owned or controlled by the federal government except that of the Osage Indians where the annual offering of a minimum acreage for lease is mandatory. BARNEY, LAWS RELATING TO THE OSAGE TRIBE OF INDIANS (1929). Refusal to grant for exploration has been upheld. Wilbur v. U. S. ex rel. Barton, 46 F. (2d) 217 (Ct. of App. D. C. 1931).

Furthermore, through the Federal Oil Conservation Board, the federal government has offered additional assistance. This Board, consisting of the Secretaries of War, Navy, Interior and Commerce, was first organized to encourage the campaign against waste by President Coolidge who was then awoke by the fears of an oil famine. FEDERAL OIL CONSERVATION BOARD, ANNUAL REPORT, 1926. Since then the Board has aided in propaganda for unit operation, granted sympathetic hearings for the industry's demands for curtailment of production, and has sought to find markets for distress oil in the mid-continent area. See subsequent ANNUAL REPORTS. But the federal government's chief contribution has been a negative one—a willingness, at least temporary, to let the anti-trust statutes lie dormant.
Such restraints, made in the name of "conservation," cut athwart both property laws, delimiting but protecting the rights of individual operators and landowners, and anti-trust legislation designed to maintain free competition and low prices to the consumer. In eliminating "waste", conservation measures cannot abridge the constitutional rights of private property, however benignant their purpose. And since the consequent restriction of production will also affect both the total income of the producer and the costs of petroleum products to the consumer, the legality of the restraint of trade must be considered. The legal problems thus involved are complicated. To grasp fully their implications it is essential to keep in mind the manifold purposes of the "conservation" program now envisaged by the petroleum industry. They may be summarized: (1) Waste must be eliminated, and petroleum must be utilized with the greatest economic benefit. (2) Restrictions on production must assure each operator and royalty owner his proportionate share and not constitute a taking of property without due process of law. (3) Conservation must not constitute a device to control prices in contravention of the anti-trust statutes.

II

Legal Foundations of Competition in Oil Production

Although the oil industry is not alone in suffering from "excess of capacity," in perhaps no other industry has it been property law that has conspired to prevent the adjustment of supply to demand. From the beginning petroleum production in the United States became enmeshed in a tangled legal web which forced immediate exploitation. Under the theories of property law applied to oil and gas, any delay in development by an operator has subjected him to the two-fold danger of having the oil and gas drained off by adjoining operators and also of having the lease, under which oil lands are generally developed, declared "forfeit," "terminated" or "abandoned" to the lessor.

The danger which an operator faces from adjoining property owners arises from a strange quirk of property law concerning the ownership of oil and gas. In all states surface owners over a common pool may take and keep all the oil and gas which can be taken from their wells, regardless of possible drainage from

30 Undoubtedly other basic industries suffering from "over-expansion" have found readjustment difficult due to overhead costs, immobility of capital and labor, or the institutional patterns of their own structure. CLARK, ECONOMIES OF OVERHEAD COSTS (1923); HAMILTON AND WRIGHT, CASE OF BITUMINOUS COAL (1926). The business cycle likewise affects the oil industry, even though the industry finds it convenient to lay the entire burden upon the law. See Mapes, BUSINESS DEPRESSION AND THE PETROLEUM INDUSTRY (1930) MID-CENTINENT OIL AND GAS ASSOCIATION ANN. REP. 7.
adjoining land or diminution of flow in neighboring wells.\textsuperscript{31} There are two rationales of this result. Some states have adopted the theory that no title to petroleum vests until possession is taken, while others maintain that oil and gas, like solid minerals, are owned \textit{in situ} but that title is subject to divestment if a nearby operator drains them out.\textsuperscript{32} Long and fruitless debates have raged over the relative merits of the two theories. But

\textsuperscript{31} This doctrine is so well settled that an extensive citation of authorities seems unnecessary. The following cases are typical. Hague v. Wheeler, 157 Pa. 324, 27 Atl. 714 (1893); Barnard v. Monongahela Natural Gas Co., 216 Pa. 362, 65 Atl. 501 (1907); State v. Ohio Oil Co., 150 Ind. 21, 49 N. E. 809 (1898); Kelly v. Ohio Oil Co., 57 Ohio St. 317, 49 N. E. 399 (1897); Gain v. South Penn Oil Co., 76 W. Va. 769, 86 S. E. 883 (1915); Peterson v. Grayce Oil Co., 37 S. W. (2d) 367 (Tex. 1931); Louisville Gas Co. v. Kentucky Heating Co., 117 Ky. 71, 77 S. W. 368 (Tex. 1903); Higgins Oil and Fuel Co. v. Guaranty Oil Co., 145 La. 233, 82 So. 206 (1919). For an exhaustive citation of authorities see Summers, \textit{Oil and Gas} (1927) 72 nn. 10-13. Mills and Willingham, \textit{Oil and Gas}, (1926) Sec. 270; 1 Thornton, \textit{Oil and Gas}, (4th ed. 1925) Sec. 109 n. 214; Greer, \textit{The Ownership of Petroleum Oil and Gas in Place}, (1923) 29 W. Va. L. Q. 172; Veasey, \textit{The Law of Oil and Gas} (1920) 18 Mich. L. Rev. 445. This doctrine has been carried to such an extreme in Texas Pac. Coal & Oil Co. v. Comanche Duke Oil Co., 274 S. W. 193 (Texas 1925) that the court ruled that the owner of a producing oil well could not recover damages from an adjoining owner who had "shot" an offset well with 600 quarts of nitroglycerine immediately after which the producing well turned to salt water. Said the court: "... one may drill offset wells or use any artificial means to force production no matter how it affects other owners."

\textsuperscript{32} The following states seem to have adopted the doctrine that a surface owner does not own the petroleum products beneath his land but has only the exclusive right to reduce to possession by a well sunk on his land. Kentucky—Louisville Gas Co. v. Kentucky Heating Co., supra note 31; Louisiana—Frost-Johnson Lumber Co. v. Stallings, 150 La. 756, 91 So. 244 (1922); Oklahoma—Rich v. Doneghey, 71 Okla. 204, 177 Pac. 86 (1918); Illinois—Poe v. Ulrey, 238 Ill. 56, 84 N. E. 46 (1908). Cf. California—State v. Associated Oil Co., 294 Pac. 717 (Cal. 1930), and Bandini Petroleum Co. v. Superior Court, infra note 92 (oil-gas ratio case). See also Ohio Oil Co. v. Indiana, 177 U. S. 190, 20 Sup. Ct. 576 (1900), and Lindsley v. Natural Carbonic Gas Co., 220 U. S. 61, 31 Sup. Ct. 337 (1911).

The following states appear to hold to the doctrine of ownership \textit{in situ}. Texas—Texas Co. v. Dougherty, 107 Texas 226, 176 S. W. 717 (1915); Indiana—State v. Ohio Oil Co., 150 Ind. 21, 49 N. E. 809 (1898), overruling Townsend v. State, 147 Ind. 624, 47 N. E. 19 (1897); Pennsylvania—Hague v. Wheeler, supra note 32; Ohio—Kelly v. Ohio Oil Co., supra note 31; Arkansas—Osborne v. Arkansas Natural Gas Co., 103 Ark. 175, 146 S. W. 122 (1912); Montana—Gas Products Co. v. Rankin, 63 Mont. 372, 207 Pac. 993 (1922); West Virginia—Williamson v. Jones, 43 W. Va. 502, 27 S. E. 411 (1897); Tennessee—Murray v. Allard, 100 Tenn. 100, 43 S. W. 355 (1897); Kansas—Gas Co. v. Neosho County, 73 Kan. 335, 89 Pac. 750 (1907).

For further citation of authorities consult, Mills and Willingham, \textit{op. cit. supra} note 31, at 20; Thornton, \textit{op. cit. supra} note 31, c. II; Summers, \textit{op. cit. supra} note 31, §§ 6, 46 et seq.; Veasey, \textit{op. cit. supra} note 31; Greer, \textit{op. cit. supra} note 31.
however finely drawn the distinctions may be, the results by courts operating under the competing theories are practically the same. In the apologetic words of the early leading case, "water and oil, and still more strongly gas, may be classed by themselves, if the analogy be not too fanciful, as minerals ferae naturae."33

Although courts in adopting the theory of ownership in situ have ostensibly repudiated the theory of ownership by reduction to possession, the doctrine of capture still underlies the property law of oil and gas throughout this country.34 The drainage of oil by neighboring operators can nowhere be enjoined or checked by recovery of damages, however clear the damage.35

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33 Per Miller, J. in Westmoreland and Cambria Natural Gas Co. v. DeWitt, 130 Pa. 235, 241, 18 Atl. 724, 725 (1889). Justice Miller adds: "In common with animals, and unlike other minerals, they have the power and the tendency to escape without volition of the owner. Their 'fugitive and wandering existence within the limits of a particular tract was uncertain' as said by Chief Justice Agnew in Brown v. Vandergrift, 80 Pa. 147, 148." It seems odd, however, that the doctrine of capture as applied to oil and gas ownership should have its roots in the Westmoreland and Brown cases. Neither decision, on its facts, sustains the privilege of draining from another's land. Westmoreland v. Dewitt holds only that an injunction rather than ejectment is the proper remedy for a lessee to pursue against his lessor where the lessor attempts to drill a well in the leasehold estate. And Brown v. Vandergrift clearly stands only for the proposition that although equity generally abhors a forfeiture, an oil and gas lease providing for forfeiture in the event of any delay in rental payments is not invalid.

34 Of course the distinctions between ownership in situ and ownership by reduction to possession may be of considerable importance in deciding questions of conveyancing, pleading, taxation, inheritance and the like. Consult text authorities cited supra note 31. But in so far as the privileges of a neighboring landowner are concerned, the corollary to the doctrine of ownership in situ that such ownership may be divested by a prior taking from a nearby well, leaves the two doctrines distinguished without a difference. See Oliver and German, Changes Needed in Oil Ownership Law, (1951) 30 OIL AND GAS JOURNAL, No. 11.

35 See, cases and authorities cited supra note 32. Consult particularly cases cited in SUMMERS, op. cit. supra note 31 at 68, 69, nn. 9, 10. The following extracts from early cases illustrate the "reason of the rule": "... no one can tell to a certainty from whence the oil, gas, or water which enters the well came, and no legal right as to the same can be established or enforced by an adjoining owner." Kelly v. Ohio Oil Co., 57 Ohio State 317, 328, 49 N. E. 399, 401 (1897). And see Hague v. Wheeler, 157 Pa. 324, 341, 27 Atl. 714, 719 (1893), wherein the court in discussing the basis of the right of a surface owner to produce without limit from his wells said: "He cannot estimate the quantity in place of gas or oil as he might of solid minerals." In Barnard v. Monongahela Natural Gas Co., 216 Pa. 362, 365, 65 Atl. 801, 802 (1907), it was said: "There is no certain way of ascertaining how much of the oil and gas that comes out of the well, was in situ, under this farm and how much under that." See also Wittengel v. Gormley, 160 Pa. 559, 567, 28 Atl. 934, 935 (1894): "The lines which divide the surface divide, with absolute fairness to all concerned, the sub-mineral that belongs to each. The rules applicable to... leases of land containing... solid mineral are... not always capable of application to leases for the pro-
judicial protection against the efforts of neighboring producers to exhaust the common reservoir have been met with the simple admonition of “Go thou and do likewise.”

Even if an operator does not face the dangers of drainage by others, his position as lessee is made hazardous by the specialized property law of oil and gas leases. Whether the courts have been led by a desire to protect the small landowner against the big producer or whether, as some have avowed, they have thought it sound public policy that oil should be “produced” rather than “held for speculation,” they have developed a body of law tending to force immediate exploitation. The development of oil lands generally has been carried on, because of the speculative nature of petroleum discovery, by the grant of a lease to an operator in consideration of his covenant to pay the lessee a one-eighth royalty of the petroleum products produced. In the early leases

duction of oil and gas because of the difference between solid and fluid minerals and because of the different conditions under which they are found and brought to the surface.” Strangely enough, this reasoning has not been applied where a lessor has sought damages or specific performance of a lessee’s express or implied covenant to protect the leased premises against drainage. In such cases the assumed problematical character of drainage in general has not been regarded as an insuperable obstacle to granting either equitable or legal relief. See cases cited infra note 47.

See Barnard v. Monongahela Natural Gas Co., supra note 35, at 365, 65 Atl. at 802: “The right of every landowner to drill a well on his own land at whatever spot he may see fit certainly must be conceded.... He may crowd the adjoining farms so as to enable him to draw the oil and gas from them. What then, can his neighbor do? Nothing, only go and do likewise. He knows it is wild and will run away if it finds an opening and it is his business to keep it at home. This may not be the best rule; but neither the legislature nor our highest court has given us any better. No doubt many thousands of dollars have been expended in ‘protecting lines’ in oil and gas territory that would not have been expended if some rule had existed by which it could have been avoided.”

See Brown v. Vandergrift, 80 Pa. 142, 147 (1875). “The discovery of petroleum led to new forms of leasing land.... The surface required was often small as compared with results when attended with success; while these results led to great speculation by means of leases covering the lands of a neighborhood like a flock of locusts. Hence it was necessary to guard the rights of the landowner, as well as the public interest, by numerous covenants, some of the most stringent kind, to prevent their lands from being burdened by unexecuted and profitless leases.... Without these guards the lands would be thatched over with oil leases by subletting, and a farm riddled with holes and bristled with derricks, or operations delayed so long as the speculator would find it hopeful or convenient to himself alone. Hence covenants became necessary to regulate the boring of wells, their number and time of succession, the period of commencement and completion.... prominent among these was the clause of forfeiture to compel performance and put an end to a lease in case of injurious delay or want of success.” Cf. Bettman v. Harness, 42 W. Va. 433, 26 S. E. 271 (1896) (delay in developing a lease seen as a “speculation, the thing which a prudent land owner guards against.”).
the lessor's desire to realize on his bargain dictated covenants requiring immediate exploration and rapid exploitation. If per-
chance such covenants were omitted, the courts were quick to
imply them. If any of the terms of the lease were at all am-
biguous, judges invariably decided that immediate and exhaus-
tive exploitation was "intended." At law, courts penalized delay in
development or operation by declaring a lease "abandoned"

38 See Brown v. Vandergrift, supra note 37. For detailed history of forms
and covenants to be found in oil and gas leases, see SUMMERS, op. cit. supra
note 31, c. 10, 11; THORNTON, op. cit. supra note 31, c. III, IV, V; MILLS
AND WILLINGHAM, op. cit. supra note 31, c. III, VIII, IX, X; VEASEY, op.
cit. supra note 31, at 652 et seq.

39 Such implied covenants commonly require prompt drilling and explora-
tion before discovery and diligent and continuous operation after produc-
tion commences. For cases see notes 46, 47, infra.

40 See Bettman v. Harness, 42 W. Va. 433, 26 S. E. 271 (1896), in which
the court said that "such leases are construed most strictly against the
lessee and favorable to the lessor." Any other construction was regarded as
"preventing the use and transfer of property, the development of the coun-
try, and promoting and furthering monopoly." And it was further declared
that since it is to the interest of both lessor and lessee that a productive
well "be continuously operated until its exhaustion" and "forfeiture for
non-development or delay is essential to private and public interests in rel-
tion to the use and alienation of property," the same rule of construction
applies to both express and implied conditions. Similarly in Parisk Fork
Oil Co. v. Bridgewater Gas Co., 51 W. Va. 583, 42 S. E. 655 (1902), the
court favors a rule of construction "which discourages tying up and render-
ing unproductive vast fields of mineral wealth, construes every contract and
lease as to both lessor and lessee so as to best promote production, develop-
ment and progress, and frowns upon every attempt to evade it as being in
contravention of both good morals and public policy." See also Kies v. Wil-
liams, 190 Ky. 596, 228 S. W. 40 (1921); New State Oil and Gas Co. v.
Dunn, 75 Okla. 141, 182 Pac. 514 (1919); Munroe v. Armstrong, 96 Pa.
307, (1880); Huggins v. Daley, 99 Fed. 613 (C. C. A. 4th 1899); Steel-
smith v. Gartlan, 45 W. Va. 27, 29 S. E. 978 (1898); Ohio Oil Co. v. Deta-
more, 165 Ind. 243, 73 N. E. 906 (1905); Monarch Oil, Gas & Coal Co. v.
Richardson, 124 Ky. 602, 99 So. 668 (1907) (lessee required to develop
lease at once despite clear contractual privilege of developing for twenty
years if rentals paid); Cooke v. Gulf Refining Co., 135 La. 609, 65 So. 758
App. 1925) (rule relaxed somewhat in wildcat territory); Rose v. Lanyon
Zinc Co., 68 Kan. 126, 74 Pac. 625 (1906) (courts said to have no right to
rewrite by a rule of construction a lease permitting delay in development or
exploration). See also Leeper Oil Co. v. Rowland, 29 S. W. (2d) 486 (Tenn.
1931) where the current depression in the oil industry was recognized and
used as a basis for the refusal to cancel a lease which the lessee had failed
to develop.

41 Under a doctrine first announced in Venture Oil Co. v. Fretts, 152 Pa.
451, 25 Atl. 732 (1893) that until discovery, a lessee's title under an oil
and gas lease granting merely the right to explore and produce is inchoate
only, courts have frequently held that there may be an "abandonment" of
the lease in shorter period than that set forth in the statute of limitations
or “terminated.” And however much equity might have ab-

252, 27 S. E. 220 (1897); Smith v. Root, 66 W. Va. 633, 66 S. E. 1009 (1909); Harris v. Michael, 70 W. Va. 356, 73 S. E. 934 (1912); New American Oil & Mining Co. v. Troyer, 166 Ind. 402, 77 N. E. 739 (1906); Rowlings v. Armel, 70 Kan. 778, 79 Pac. 683 (1905). And although the rule of the Fretts case has now been pretty largely overruled on the theory that the lessee's "right to explore" is never inchoate (Lindlay v. Raydure, 239 Fed. 928 (D. C. Ky. 1917) aff'd 249 Fed. 675 (C. C. A. 6th 1918)) nevertheless it has played a part in the decisions of courts which have held that the inchoate nature of the lessee's estate until discovery when coupled with the optional character of the drilling clause, gives the lessor the privilege of cancelling the lease at any time prior to the commencement of drilling. Brown v. Wilson, 58 Okla. 392, 160 Pac. 94 (1916); Federal Oil Co. v. Western Oil Co., 112 Fed. 373 (D. C. 2nd 1902) 121 Fed. 674 (C. C. A. 7th 1902); Owens v. Corsicana Petroleum Co., 169 S. W. 200 (Tex. Civ. App. 1914); Ulrey v. Keith, 237 Ill. 284, 86 N. E. 696 (1908); Advance Oil Co. v. Hunt, 66 Ind. App. 228, 116 N. E. 340 (1917); Lima Oil and Gas Co. v. Pritchard, 92 Okla. 113, 218 Pac. 863 (1923). These cases proceed upon the theory that since an estate in land does not vest in the lessee until production is found, and the lessee is usually not bound to drill, there therefore remain only mutual promises unsupported by sufficient consideration because illusory as to one of the parties. The effect of these decisions has been largely overcome, however, either by regarding a recital of consideration in the lease as sufficient (Northwestern Oil and Gas Co. v. Branine, 71 Okla. 107, 175 Pac. 533 (1918); Lindlay v. Raydure, 249 Fed. 675 (C. C. A. 6th 1918)) or by holding that at least the "right to explore" is a vested property interest. Guffy v. Smith, 237 U. S. 101, 35 Sup. Ct. 526 (1915). See Simonton, The Nature of the Interest of the Grantee Under an Oil and Gas Lease (1918) 25 W. Va. L. Q., 315-318.

It should be noted in passing, that the view that the lessee's estate is either inchoate before production, or incorporeal until possession is taken, has led courts to deny a lessee ejectment against a lessor or a subsequent top leasing lessee holding under the original lessor. Funk v. Haldeman, 53 Pa. 229 (1866); Kelly v. Keys, 213 Pa. 295, 62 Atl. 911 (1906). If the lessee purports to grant and demise the land for exploration and production rather than the mere right to produce, ejectment may lie. Barnsdall v. Bradford Gas Co., 225 Pa. 338, 74 Atl. 297 (1909). Yet New York, Indiana, Illinois, Kansas, West Virginia and Oklahoma take the view that owing to the fugitive nature of oil and gas, an incorporeal interest is the only interest possible of creation. See cases cited in Summers, op. cit. supra note 31, at 183 et seq.

Even where a lease purports to demise the land for the purpose of producing oil or to assign and convey the oil (as opposed to the mere right to explore and produce), it has been held that although the lessee's interest vests on execution of the lease, nevertheless the estate secured is only a "terminable fee with possibility of reverter to the grantor" to be terminated upon any abandonment of oil and gas development either before or after discovery. The following selection of cases from Texas are illustrative of the point. Robinson v. Jacobs, 113 Texas 231, 254 S. W. 309 (1923), overruling a line of contrary Texas decisions commencing with Texas Co. v. Dougherty. 107 Texas 226, 176 S. W. 717 (1915). See also Texas Co. v. Davis, 113 Texas 321, 254 S. W. 304 (1923); Walker, The Nature of the Property Interests Created on an Oil and Gas Lease in Texas, (1930) 8 Tex. L. Rev. 483. Thus under the typical modern lease which provides that the lease shall terminate if drilling is not commenced within a certain
horred a forfeiture in the ordinary leasehold situation, equity did
not hesitate to declare countless forfeitures of oil and gas leases
when any phase of production did not go forward as rapidly as
was technically possible or lagged a few hours behind a promised
schedule.\textsuperscript{43} The modern lease attempts to avoid some of these
difficulties. A typical form lease provides that “if operations for
time (usually one year) \textit{unless} yearly rentals are paid during the fixed
term (called the exploratory period), the leases will automatically terminate
for the slightest delay in the payment of required rentals. Humble Oil
and Refining Co. v. Davis, 296 S. W. 285 (Tex. Civ. App. 1927); Walker,
\textit{op. cit. supra}, at 529. Furthermore, since the modern lease also provides
that the lease remains in force beyond the fixed term only so long as oil
and gas “is or can be produced” (see note 45, \textit{infra}), the slightest delay
in securing production within the exploratory period or any interruption
of production (except for repairs, etc.) automatically terminates the lease.
Stem Oil Co., 106 Kan. 848, 189 Pac. 920 (1920); Stephenson v. Callihan,
289 S. W. 158 (Texas Civ. App. 1926); Walker \textit{op. cit. supra}, 516, 517 nn.
113, 118-120. But cf. Eastern Oil Co. v. Coulehan, 65 W. Va. 531, 64 S. E.
836 (1909), and South Penn Oil Co. v. Snodgrass, 71 W. Va. 438, 76 S. E.
961 (1913), in which the court regarded the clause extending the term if
oil and gas was produced during the exploratory term as a forfeiture
provision and applied the doctrine that equity abhors a forfeiture.
A provision requiring that lessees shall drill for pay rentals has likewise
sometimes been regarded as a forfeiture provision requiring affirmative
action on the part of the lessor to cancel the lease. Walker, \textit{op. cit. supra},
556 \textit{et seq}. Yet since equity seems to regard an oil and gas lease apart
from ordinary leases and often does not shrink from declaring them forfeit,
a delaying lessee still finds himself in an extremely precarious position
even under a so called “or” lease or in a jurisdiction adopting the West
Virginia view as to the nature of an “unless” clause. See cases cited note
43, \textit{infra}.
\textsuperscript{43} Thus in the leading case of Munroe v. Armstrong, \textit{supra} note 40, at
310, it was said: “Forfeiture for non-development or delay is essential
to private interests in relation to the use and alienation of property. In
such cases as this equity follows the law. In general equity abhors a
forfeiture, but not when it works equity and protects a landowner from
a lessee whose lease is of no value until developed, except for a purpose
foreign to the agreement.” This is clearly the rule with respect to express
coventants for exploration, payment of rentals, diligent operation, and
protection against drainage where the power of forfeiture for breach of such
coventants is contracted for. See \textit{Summers, op. cit. supra} note 31 at 453,
1004 (1900) (forfeiture refused where no express forfeiture clause is in
lease). And some courts have gone so far as to reach a similar result for
a breach of implied coventants. See Indiana Oil, Gas Development Co. v.
McCory, 42 Okla. 136, 140 Pac. 610 (1914); Pelham Petroleum Co. v.
North, 78 Okla. 39, 188 Pac. 1069 (1920); MERRILL, \textit{COVENANTS IMPLIED
IN OIL AND GAS LEASES} (1926) \S 99 (preponderant view favors forfeiture
for breach of implied covenants). In case a lessor is refused forfeiture,
he can claim “abandonment” or “termination” (see \textit{supra} note 42) or
seek damages or specific performance. For cases, see \textit{Summers, op. cit.}
\textit{supra}, at 445 \textit{et seq}. And if damages are “inadequate,” a cancellation of
the lease in equity is probably available. \textit{Ibid.} 464 n. 32.
the drilling of a well for oil or gas are not commenced on said land on or before one year from this date, this lease shall terminate as to both parties, unless the lessee shall, on or before one year from this date, pay or tender to the lessor" a rental which will cover "the privilege of deferring the commencement of drilling operations for the period of one year." 44

But the modern lessee has not, by assuming an additional charge, avoided the duty of off-setting neighboring wells 45 nor escaped the obligation of continuous and diligent operation,46 both of which courts have long implied in the lease. Since failure to off-set diminishes the royalty, the courts have held that it defeats the purpose and terminates the lease.47 For the same reasons lessees are held to "continuous and diligent operation"; the courts in the past have held this to mean that the lessee may not cap producing wells to avoid overproduction or await a better mar-

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44 See form lease "Midcontinent 88." This habendum clause of the modern oil lease has evolved from a series of somewhat similar clauses. The early leases provided for a single definite term; later leases set a short definite term coupled with a promise either to drill or pay yearly rentals for each year of postponement in drilling; while still later leases added a power of surrender in the lessee to the drill or pay clause. Since about 1875 almost all leases have provided for a continuance of the lease during a short definite term—known as the exploratory period—and made provision for extension of this definite term "so long as oil and gas are produced." For a discussion of the evolution of oil and gas leases and the difficulties avoided by the modern lease, see Veasey, op. cit. supra note 31, at 652 et seq; SUMMERS, op. cit. supra note 31, c. 11; THORNTON, op. cit. supra note 31, c. III; MILLS AND WILLINGHAM, op. cit. supra note 31, c. III.

45 When drainage threatens, courts have not merely permitted an adjoining operator to go and do likewise, they have insisted upon it by implying a covenant to offset each well drilled along a boundary line. MERRILL, COVENANTS IMPLIED IN OIL AND GAS LEASES (1926) 167 n. 302, 179 n. 331 and cases cited. Failure to offset subjects a lessee to the hazard of having his lease declared forfeited, terminated or abandoned. Such failure is likewise sufficient ground for a recovery of damages by the lessor, despite the problematical character of the extent of damage. SUMMERS, op. cit. supra note 31, 447 n. 5. And offsetting may not be postponed by payment of delay rental during the exploratory period if an adjoining owner brings in a producer. MERRILL, op. cit. supra, at 174 n. 315, 178 n. 327. Even where the lessee has contracted to drill only a specified number of wells, it has been held that he is under an implied obligation to drill more if necessary to properly offset his neighbor. Ibid. 371 n. 308. Obviously, the leasing system when coupled with the implied duty to offset, makes it impossible for even a large operator controlling a large block of leases, to operate the block as a unit. See Merrill, Stabilization of the Oil Industry and Due Process of Law (1930) 3 So. Calif. L. Rev. 396, 397.

46 See cases cited in MERRILL, op. cit. supra note 45, at §§ 54, 55.

47 Eastern Oil Co. v. Beatty, 71 Okla. 275, 177 Pac. 104 (1918); Hughes v. Busseyville Oil and Gas Co., 180 Ky. 545, 208 S. W. 515 (1918).
ket. 48 Furthermore, since his lease remains "in force for a term of years and as long thereafter as oil, gas, casinghead gas, casinghead gasoline or any of them is or can be produced," 49 the lessee must seek production within the exploratory period to keep his lease alive. 50 And since leases now generally provide for a "delay rental" 51 for each year during which exploration is postponed, this overhead cost adds to the pressure to produce.

During a period of scarcity, these legal foundations of the productive system were of no great concern to the industry. Now when scarcity economics have given way to "excess capacity," the industry in its attempt to cut production finds itself forestalled by this property law relating to oil and gas. Had production been organized under a law of horizontal severance, 52 whereby the operator became the owner, the present situation would not have been complicated by the clash between landowner and operator which has buttressed the off-set system and forced diligent operation. The lease system, however, has become so firmly entrenched that any plan of reorganization involves not only the realignment of property rights between operators but also of contractual obligations between operators and landowners.

III

The Legal Foundations for Regulation

Not unlike ordinary property, rights in oil and gas are subject to limitations by the police power. Numerous statutes have been

48 The lessee is "bound to diligently work and operate the lease so as to bring the product to a present market so as to yield the lessor his royalties." Halls v. Johnson, 204 Ky. 94, 263, S. W. 679 (1924).

49 See "Midcontinent 88".

50 SUMMERS, op. cit. supra note 31, at 288 nn. 34-36, 294 nn. 42 and cases cited. If production ceases at any time after the exploratory term, the lease likewise terminates. Furthermore, even if paying production is secured, either before or after the expiration of the exploratory term, the lessee may lose his lease if he fails to fulfill an implied obligation to test deeper strata if local conditions make such testing reasonable. Papoose Oil Co. v. Rainey, 89 Okla. 110, 213 Pac. 882 (1923).

51 See "Midcontinent 88." Some states have even gone so far as to hold that an implied covenant of exploration in all leases permits a lessor to refuse delay rental and demand an exploratory well. MERRILL, op. cit. supra note 43, §§ 19-29. And a "drill or pay" clause when unaccompanied by a "surrender" provision was held to be only for the benefit of the lessor with the result that the lessee could only escape paying rental for the entire exploratory term by finding and producing oil or gas. See SUMMERS, op. cit. supra note 31, at 342 n. 38.

52 In states like Texas where oil and gas is owned in situ, there may be a conveyance of oil and gas under a theory of horizontal severance. But in looking through form to substance, courts are quick to seize upon any scheme of paying the purchase price by royalties as evidence of an intention to make a lease. See Walker, op. cit. supra note 41.
enacted to regulate the use of oil and gas lands. All the producing states have laws requiring that abandoned wells be plugged and that new wells be properly cased to prevent water intrusion and gas or oil leakage which would injure the entire pool. In some states drilling has been forbidden within a given distance of a railroad right-of-way for reasons of public safety. For the same stated reason various zoning ordinances have prohibited or limited town lot drilling. The use of natural gas in flambeau lights and for the production of carbon black has been prohibited as "wasteful." Such exercise of the police power has long been accepted as matter of course.53

The first constitutional test of such regulations came in 1900 in Ohio Oil Co. v. Indiana.54 Indiana, believing that its industrial prosperity depended upon a continuous supply of gas, passed a statute, ostensibly designed as a fire safety measure, which prohibited the blowing of natural gas to the air. An oil producer alleged that he was being deprived of his property without due process of law since he could not produce his oil without blowing gas for which he could find no profitable market. The Indiana Supreme Court, ignoring the safety feature, upheld the statute as a public welfare measure. Upon appeal to the Federal Supreme Court, the Indiana court was upheld in a lengthy opinion by Mr. Justice White. As sometimes happens there is no concerted agreement as to the basis of the Court's decision. Although Mr. Justice White stated that one having the right to drill could reduce all he could get to possession without violating the rights of other surface owners, he also stated that—

"the use by one of his power to convert a part of the common fund to actual possession may result in an undue proportion being attributed to one of the possessors of the right, to the detriment of others, or by waste by one or more to annihilation of the rights of the remainder. Hence it is that the legislative power... can be manifested for the purpose of protecting all the collective owners, by securing a just distribution, to arise from the enjoyment by them of their privilege to reduce to possession, and to reach the like end by preventing waste." 55

Foremost among the doubts left by this case is whether legislation designed to regulate production to protect the correlative rights of the surface owners of a pool without the element of waste is constitutional.

53 For compilations of these regulations see Veasey, Legislative Control of the Business of Producing Oil and Gas, (1927) 52 A. B. A. REP. 577; Merrill, Stabilization of the Oil Industry and Due Process of Law, (1903) 3 S. CAL. L. REV. 396 et se. Comment (1930) 43 HARV. L. REV. 1137. Also see treatises cited note 31 supra.
54 177 U. S. 130, 20 Sup. Ct. 576 (1900).
55 Supra note 54 at 210, 20 Sup. Ct. 570.
Subsequent decisions present no clear-cut analysis of the interrelated bases of police power: (1) to protect the general public welfare by a conservation of natural resources, and (2) to protect the correlative rights of the collective owners. Although the police power is usually invoked by the courts to sustain legislative acts to protect the public health, safety and welfare, there is another aspect of police power which justifies limitations upon liberty and property at common law and in equity to protect others in the enjoyment of their property.\textsuperscript{56} Under this aspect of the police power, summed up in the maxim \textit{sic utere tuo ut alienum non laedes}, the more flagrant infringements upon the property rights of collective owners in a gas pool can be restrained even without legislation. Thus in \textit{Louisville Gas Co. v. Kentucky Heating Company},\textsuperscript{57} a gas company appealed to equity and secured an injunction restraining a rival company possessing other sources of supply from unnecessarily depleting the pressure of a common pool by burning gas at the well. But where the common law does not adequately protect adjacent property owners in the full enjoyment of their property, the legislature may exercise the police power to protect such owners. When such legislation is passed, the question of reasonableness constitutes the only fact for judicial determination.\textsuperscript{58} Such measures run a different gauntlet of constitutional attack from that exercise of the police power designed to protect the general public interest. No proof of public interest is necessary.

The statute involved in the \textit{Ohio Oil Co.} case might be supported on either basis of the police power: either as protection of the public interest in a rapidly wasting natural resource, or as protection of the property of collective owners.\textsuperscript{59} But the interest of the public in the nation's natural resources is not always congruous with the joint enjoyment of collective owners in an oil or gas pool. Thus there have been some regulations which can be sustained only on the ground of the public interest in conservation. Such a case is \textit{Walls v. Midland Carbon Co.},\textsuperscript{60} in which the court upheld the state's prohibition of the manufacture of carbon black from natural gas without utilizing the heat units contained in the gas for domestic or industrial purposes. A case involving practically the same set of facts and usually

\textsuperscript{56} \textsc{Freund, Police Power} (1904) \S 8; \textsc{Tiedeman, Limitations of Police Power} (1886) \S S 1, 122.

\textsuperscript{57} \textsc{171 Ky.} 71, 77 S. W. 368 (1903); \textsc{cf. Atkinson v. Virginia Oil and Gas Co.}, 72 W. Va. 707, 79 S. E. 647 (1913) (common law action will lie for leaving unplugged well). \textit{Contra: Hague v. Wheeler, supra} note 31, (burning gas designed to force purchase permitted).

\textsuperscript{58} \textsc{Tiedeman, op. cit. supra} note 66, \S 122 a.

\textsuperscript{59} \textsc{Cf. State v. Thrift Oil and Gas Co.}, 162 La. 165, 110 So. 188 (1926).

\textsuperscript{60} \textsc{254 U. S.} 300, 41 Sup. Ct. 118 (1920); \textsc{cf. Herkness v. Irion}, 11 F. (2d) 386 (D. C. La. 1926).
cited as contra to the Midland case, Gas Products Co. v. Rankin,\textsuperscript{61} is often said to turn upon the distinction between ownership in situ and ownership by reduction to possession. It seems, however, to depend upon a recognition by the court of a difference in local conditions affecting the public welfare. Whereas in the Midland case the statute was limited in application to situations where a consuming public was ready at hand, in the Rankin case the statute contained no such limitation and the public welfare was not affected since there was no nearby consuming public which could be served.

Other statutes, where the public welfare is apparently not involved, seem valid only as an exercise of the police power for the purpose of protecting owners in the joint enjoyment of a common pool. An oft cited leading case involving this type of legislation is Lindsley v. Natural Carbonic Gas Co.\textsuperscript{62} in which New York state, in an effort to protect producers from a common pool of carbonated water, succeeded in checking production where gas was obtained although the water was admittedly wasted. Since here the reservoir, unlike an oil pool, replenished itself, the public's interest in conservation played no part in the decision. A decision upholding an order of the Texas Railroad Commission in Oxford Oil Co. v. Atlantic Oil Producing Co.\textsuperscript{63} likewise appears valid only as a measure to protect correlative property rights. The Railroad Commission forbade drilling within one hundred and fifty feet of property lines. An operator was enjoined from violating a special order allowing him only four wells on a strip of land three thousand odd feet long and some fifty feet wide. The court summarily sustained the order as one calculated to protect adjoining property owners. It is significant that no element of waste was involved.

These cases demonstrate the necessity of distinguishing the alternative doctrines for regulation of production. These are the tools at the state's disposal in acting upon the plea of the industry to extricate it from the economic and legal cul-de-sac into which it has wandered. As the competitive system of production has become more chaotic, and as an increasing surplus has become less and less responsive to price control,\textsuperscript{64} the state has

\textsuperscript{61} 63 Mont. 372, 207 Pac. 993 (1922).
\textsuperscript{62} 220 U. S. 61, 31 Sup. Ct. 337 (1911).
\textsuperscript{63} 22 F (2d) 597 (C. C. A. 5th 1929).
\textsuperscript{64} No later than 1925 Charles Evan Hughes, speaking for the American Petroleum Institute which was then opposed to governmental interference stated "It is evident that any estimate of future supply and demand that did not embrace the price factor would be futile. Price finds the oil and produces it. Price controls and limits its use." \textit{Federal Oil Conservation Board, Public Hearing} (1926) 7. But the industry, now demanding governmental intervention, recognizes that while price might have controlled
been forced to intervene not only to eliminate waste but to attempt stabilization of the industry.

IV

*Martial Law: An Interlude*

The use of martial law as an instrument of economic regulation by Governor Murray of Oklahoma furnishes a diverting interlude in the process of stabilization. For some time the flush fields of Oklahoma had been operating at reduced capacity in orderly fashion under orders of the state Corporation Commission, which is invested with the administration of production.65 Despite this, producers were faced with falling prices. The bringing in of the prolific East Texas field in the early summer of this year precipitated an utter collapse of the price structure in the entire mid-continent area.66 The National Guard of Oklahoma, under the banner of the school children of the state, marched in and closed the flush wells.

The Governor, in proclaiming martial law, set forth reasons for his action. The "legacy to the school children"—royalties from public school lands—was being filched by unscrupulous Corporate Lessees. Oil corporations were engaged in secret intrigues with seditious intent allegedly to bribe the legislature, to impeach the governor and to repeal oil conservation laws—"all in order to depress the price of oil and reduce to a minimum the taxable values . . . from its natural resources, in which the state holds a vested property interest." As a result of the depressed price "the percent of the tax collected is too insignificant for the wholesome public benefit." Monopolistic oil corporations had reduced the price so that independent producers could not obtain a "price equal to the cost of production," while the integrated corporations were increasing their earnings. Independent producers had closed down their wells, while the monopolistic corporations continued to produce to the detriment of adjoining lands, "thereby taking property without 'due process of law,' in violation of the Fourteenth Amendment." 67 "Some of the inferior Federal Courts have for decades assumed to give corporations a footing above the sovereign states . . . doubtless because of the well known fact that many such judges owe their positions to the influence of corporations" and have nullified legislative acts, taking "from the citizen for a time, his constitutional guaran-

and brought forth an increase in supply, price has not controlled and produced a needed decrease in supply.

65 2 OKLA. COMP. STAT. (Bunn 1921) § 7957.

66 See note 26, supra.

67 "No state shall . . . deprive any person of life, liberty, or property, without due process of law. . . ." U. S. CONST. AMEND. XIV (italics ours).
tees.” Although the independents promised to keep their men employed, the monopolistic companies have cut wages and reduced the number of employees, causing threats of dynamiting and mob violence, “as reported to me by my secret scouts.” For all these reasons the worthy governor found it necessary to exercise “the supreme executive power” in shutting the flush wells by military force.68

The governor cited as his authority the constitutional clause providing that “the Governor shall be Commander-in-Chief of the Militia of the State, except when in the service of the United States, and may call out the same to execute the laws.” 69 He omitted that article of the Bill of Rights of the state constitution which reads,

“The military shall be held in strict subordination to the civil authorities.” 70

The law allegedly violated is the Oil and Gas Conservation Law, and specifically section 7955, which he reads as follows: “That the taking of crude oil or petroleum from any oil bearing sand or sands in the State of Oklahoma at a time when there is not a market demand therefore at the well at a price equivalent to the actual value of such crude oil or petroleum is hereby prohibited . . .” He again omitted, this time the rest of the section, which continues:

“. . . and the actual value of such crude oil or petroleum at any time shall be the average value as near as may be ascertained in the United States at retail of the by-products of such crude oil or petroleum when refined less the cost and a reasonable profit in the business of transporting, refining and marketing the same, and the corporation commission of this state is hereby invested with the authority and power to investigate and determine from time to time the actual value of such crude oil or petroleum by the standard herein provided, and when so determined said commission shall promulgate its findings by orders duly made and recorded and publish the same in some newspaper of general circulation in the state.” 71

The Governor announced that martial law would continue until the price of oil reached a dollar a barrel. It is difficult to find a basis for his action. Those orders which had been issued by the Corporation Commission had not been flaunted so as to justify

69 OKLA. CONST., ART. 6, sec. 6.
70 Ibid. ART. 2, sec. 14 of the Bill of Rights.
71 2 OKLA. COMP. STAT. (Bunn 1921) § 7955.
the superceding of civil authority.  

The corporate commission has never made any findings or issued any orders under that section.  

Certainly "supreme executive power" cannot assume what the Corporation Commission might have found and ordered.  

The martial law shut-down of the wells in East Texas which came shortly after the Oklahoma action was predicated on somewhat different grounds. The Texas Railroad Commission, which was charged with the enforcement of conservation legislation, was enjoined from prorating the East Texas Field under the old state statutes. A special session of the legislature passed a new conservation bill on August 12, 1931. Hearings were held and a proration order was handed down by the Railroad Commission on September 8, 1931. But meanwhile production ran wild, wastes were colossal, the interests of royalty owners were jeopardized, and in the boom atmosphere land owners threatened to close the wells with shotguns. So the Governor of Texas proclaimed martial law, but only for East Texas where he saw threats of mob violence and insurrection. The shut-down by martial law was modified as soon as the Railroad Commission was able to issue an order, and the troops were directed to put the new order into effect.

So far no one has challenged the validity of these proclamations of martial law. The industry welcomes any respite however dubious its legality. With the exception of small refineries, all factions wanted higher prices for crude and saw martial law shut-downs as at least a temporary move in that direction.  

Although

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72 The wells have been operating in an orderly manner with production pinched in as required by proration orders of the Commission.

73 The section has generally been regarded as unconstitutional and the Supreme Court of Oklahoma has at least expressed doubt as to its constitutionality. See Julian v. Capshaw, 145 Okla. 237, 245, 282, 292 Pac. 841, 847, 864 (1930).


75 The statute modeled after that of Oklahoma is printed in (1931) 30 OIL AND GAS JOURNAL (No. 14) 32.

76 Ibid. 15.

77 Ibid. (No. 17) 13.

78 The "common people" of the Southwest hailed the move as a drive for higher prices for their chief commodity; independent producers likewise welcomed succor from ruinous prices. The small refiner, looking for cheap crude to permit cut-throat competition in gasoline, protested in vain. The continued silence of the large and integrated oil companies supports the observation of chief counsel of several concerns that the cessation of production, having afforded a reason for raising gasoline prices, was not unwelcome however much it infringed liberty and property.
there were—before East Texas reopened—scattered postings of dollar oil, the concerted agreement to buy dollar oil as demanded by the Governor of Oklahoma has been lacking. But with the wells again flowing in East Texas, Oklahoma cannot long remain shut in. The civil authorities must still face the legal problems of the stabilization program.\textsuperscript{79}

V

Proration

The "conservation laws" under which production has been prorated have been on the statute books for many years, but as long as there was no surplus production, there was little interest displayed in checking "waste." But the succession of flush pools brought in since 1926 glutted the market and created a demand for the full exercise of the statutory powers. The Oklahoma statute, passed as early as 1915, provided "that whenever the full production from any common source of supply of crude oil or petroleum in this state can be obtained under conditions constituting waste as herein defined, then any [producer] may take therefrom only such proportion of all crude oil and petroleum that may be produced therefrom without waste, as the production of the well or wells of any such [producer] bears to the total production of such common source of supply."\textsuperscript{80} And waste includes "waste incident to the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demands."\textsuperscript{81} An appropriate state commission is empowered to hold hearings and to determine the allowable quotas. Other oil states have adopted this general form of proration statute.\textsuperscript{82} And in the past six years most important fields throughout the country have been prorated and the allowable quota restricted to the amount the pipe lines indicate they will carry.

In so far as proration restricts production of an entire pool to available transportation and storage facilities it does forestall surface waste in flush pools by making it unnecessary for operators without marketing or storage facilities to run oil into earthen pits in self-defense against underground drainage. In fact the proration provisions of the conservation statutes are the result of experiences such as that in the Healdton pool where six hundred thousand barrels of oil stored in earthen pits were washed

\textsuperscript{79} Since this article was written Governor Murray has reopened the flush fields of Oklahoma for seventy cent oil.

\textsuperscript{80} 2 Okla. Comp. Stat. (Bunn. 1921) § 7957.

\textsuperscript{81} Ibid. § 7956.

\textsuperscript{82} (1931) 30 Oil AND Gas Journal, No. 14 (new Texas statute); Kan. Laws 1931 c. 226.
out in floods. It seems clear that where there is a threatened waste of this nature, proration is a valid exercise of the police power in effecting a conservation of an exhaustible natural resource. But the general public has no special concern in the method of allocating production among the collective owners. This aspect of the proration laws is designed to protect private correlative rights.

Since restrictions of production under proration orders promoted the self-interest of the operators, there was no serious challenge of the orders until C. C. Julian, a wild-catter in the Oklahoma City Pool owning a single well located on a quarter-acre, demanded the privilege of flowing his well at capacity. The Supreme Court of Oklahoma denied his petition for a writ of prohibition against the Corporation Commission and upheld the statute under which it had acted as "a valid method of preventing waste of the oil of this state." 84

The Champlin Refining Company, an integrated producer, subsequently challenged the method of allocating production among the wells as a deprivation of property without due process of law. The method of allocation in the Oklahoma City Pool is the common one of prorating among all the wells the gross "allowable" as determined by the total "market facilities." The Champlin company, owning producing wells, pipe lines, refineries and retail outlets, alleged that it was able to take oil from its wells in excess of the quota allowed without the commission of any waste. A three-judge federal court, however, also upheld the actions of the Corporation Commission. 85 The Court justified the action of the Commission as one calculated to prevent wasteful earthen storage by competitors of the Champlin company who do not have comparable marketing facilities and designed to obtain the greatest ultimate recovery of gas and oil by eliminating underground waste. Since flush flow by the Champlin company would injure others if still shut in, the Court held the restrictions on the Champlin company valid because the right of the state to make regulations "to prevent one from taking in an undue proportion to the detriment of the others, and to prevent one from committing waste to the injury of the rights of the other is well settled." 86

No doubt it is well settled by the earlier cases that the state may prescribe a quota for an entire field to promote conservation

83 Smith, Oil Proration—What it is and what it does (1930) Midcontinent Oil and Gas Assoc. Ann. Rep. 15. The Oklahoma statute was enacted in 1915 as a result of the conditions in this and in the more extensive Cushing pool.


86 Ibid 826.
for the public welfare. However, since waste detrimental to the public welfare has always been an integral factor in those cases which developed the doctrine of correlative rights as applied to oil and gas, it is not clear from the opinions whether ratable apportionment would be sustained in the absence of such waste. The facts of the Champlin case for the first time sharply present this issue. Although the three judge court assumed its answer, there seem to be two valid bases for the Supreme Court to uphold the validity of the statute on appeal.

Since under either theory of ownership of petroleum deposits surface owners of a common pool have an unrestricted right to produce, regulations of production must be administered without discrimination to satisfy the guarantee of equal protection of the law. Whereas restraining production within the limits of available transportation and marketing facilities is a conservation measure, prorationing among the wells of a field adapts such regulation to vested property rights. Proration seeks to protect an owner's title, whether in situ or in common, from divestment by legislative denial of an equal opportunity to produce from his property. In the Champlin case, the Court is protecting the property of all by compelling the Champlin company, which can produce beyond its present quota without waste, to gear its production to the pace necessary for all to produce without waste. Thus ratable taking is a necessary incident of the exercise of the police power to achieve conservation.

The other basis for the decision in the Champlin case is suggested by the court's manifest concern in the waste of gas energy as well as the immediate wastes of the substance of oil and gas. The readiness to take judicial notice of recent scientific discovery of the function of gas energy in the extraction of oil points the question of the "ownership" of gas energy and hydraulic head. Since the drive of these forces is an attribute of water, oil and gas in a peculiar structure, claim to it should be correlative. Indeed, were the function of these forces fully appreciated by the courts, ratable taking could be established simply as a doctrine of correlative rights. In fact ratable taking restricted to a scientific rate of flow in order to avoid property damage might be predicated on common law principles of lateral support and preservation of natural barriers against flood. It would seem that the police power comprehends at least legislative recognition of and protection against such property losses due to the disproportionate using of gas and water drive.

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87 See section III supra.
88 See note 11 supra.
89 1 Tiffany Real Property (1920) § 345 and cases cited therein.
90 Ibid. § 341, n. 36.
91 Tiedeman, op. cit. supra note 56. See Hardwicke, Legal Aspects of
The oil-gas ratio law of California was recently sustained by the courts of that state on just such a theory.\textsuperscript{92} The California statute provided that the production of gas exceeding a reasonable proportion to the amount of oil produced from the same well or wells, even though it appears that the gas produced is being utilized economically, may be restrained if sufficient gas to supplant it can be obtained from other wells. A California producer was restrained from using gas for lifting power in a greater proportion per barrel of oil than the ratio declared reasonable for lifting power by state authorities. The restraint was upheld not on a theory of conservation but solely on the ground that the disproportionate use of gas caused a correlative loss of oil by other owners. The oil-gas ratio law was expected to cut down the current oil production in California since the back pressuring necessary to check the disproportionate flow of gas would not permit wells to run to capacity. Since this indirect method of prorating has not been sufficient and because the measurement of gas flow has proven too difficult of administration, a statute modeled after the Oklahoma proration statute has been passed by the legislature and awaits referendum.

So far in few cases has the administration of proration made a scientific apportionment of the “allowable” between the common owners. In the most recent proration order for the East Texas field the Railroad Commission allocated the “allowable” by setting a flat rate per well.\textsuperscript{93} This type of apportionment on a per-well basis fails to take into account the size of the tract upon which any particular well is drilled and is a direct invitation to drill. A well on a small tract like a town lot of the Oklahoma City Pool is permitted to exhaust the common reservoir to the same extent as a well drilled on a forty acre lease. In East Texas record drilling has followed the proration order setting up the per well standard.\textsuperscript{94} Thus proration substitutes competitive drilling for competitive drainage. On the other hand proration based on surface area does not give due weight to the relative location of tracts on the producing formation. Oil content varies as one progresses from the water line to the gas zone, and allowance of equal volume to tracts of unequal content is inequitable.

Proration according to acreage content has been recommended as the more equitable manner of adjusting these various factors. Since it is now possible to compute with reasonable accuracy the

\textsuperscript{92} Bandini Petroleum Co. v. Superior Court, 293 Pac. 899 (Cal. 1930).
\textsuperscript{93} See (1931) 30 OIL AND GAS JOURNAL (No. 17) 13.
\textsuperscript{94} At the present time there are 500 wells rushing to completion. Associated Press Dispatch, Oct. 1, 1931. \textit{Cf. Breakneck Drilling in East Texas}, (1931) 30 OIL AND GAS JOURNAL (No. 19) 31.
oil and gas content of each tract in a pool,\textsuperscript{95} it is argued that the flow of wells should be proportionate to the content of each tract regardless of the number of wells. But without an oil-gas ratio law to conserve the lifting power wells located high on the formation may produce a disproportionate amount of gas. With an oil-gas ratio law, those located high on the structure are compelled to conserve the gas for the benefit of those lower down who then secure both the energy and the immediate supply of gas. Compromises weighing the various factors must be made.\textsuperscript{96} In those fields where political compromise ignores geology in the determination of the measure for proration, the aid of equity may have to be invoked in order to defeat as unreasonable proration orders not based on scientific data.

Furthermore, although prorationing to market facilities may eliminate surface wastes, there is no necessary relation between market facilities and a rate of flow which will conserve gas energy and control water drive. And no mere scheme of prorationing will curtail excess drilling and eliminate the costs of unnecessary off-set wells. Nor will proration insure the proper location of wells on the geologic structure to secure the maximum recovery. These shortcomings of proration can only be obviated by unit operation. Unit operation contemplates a fundamental reorganization of the entire system of competitive production.

VI

\textit{Unit Operation}

Even before the collapse of the price structure of the past summer, economic pressure forced scattered beginnings in the reorganization of production. The fear of falling prices produced a spirit of cooperation where the demand of engineering technique failed. For years engineers have pointed to unitized production as a practical method of reducing overhead costs and increasing the total recovery. To them it has long been obvious

\textsuperscript{95} Oliver and German, \textit{State has Right to Protect Ownership}, (1931) 30 OIL AND GAS JOURNAL (No. 11) 14 (publishing results of questionnaire to engineers and geologists on this point).

\textsuperscript{96} Formulae in terms of the particular problems of the individual fields have already been worked out in some pools. Donoghue, \textit{Proration in Texas}, TRANSACTIONS, A. I. M. E. (1913) 74; Lahee, \textit{Unit Operation and Unitization in Arkansas, Louisiana, Texas and New Mexico}, \textit{ibid.} (1930) 34; Jensen, \textit{Unit Operation in California}, \textit{ibid.}, 80. The umpire in the Van Pool of Texas explained to the authors that production was prorated among the leaseholds there by a formula correcting the well potentials in terms of acreage; and then by a further correction to assure a minimum production for wells of small capacity. See also Allen, \textit{Proration of Production Within the Field}, AMERICAN PETROLEUM INSTITUTE PRODUCTION BULL. No. 207 (1931) 62.
that from a technical viewpoint the pool should be regarded as
the unit, that wells with standardized equipment and installation
should be located according to subsurface contours, and that the
rate of flow should be determined by the peculiarities of each
producing formation. By various voluntary agreements among
operators certain pools have been operated somewhat in accord-
ance with these sound engineering principles.

The term "unit operation" has been variously used but "in
general it implies that all properties in the respective oil and gas
pool shall be consolidated into a single operating unit in some
manner that will eliminate the competitive drilling-drainage fea-
ture in its development and operation, and will permit the maxi-
mum utilization of the expulsive forces native to the reservoir." 97
The most general form now in use has been based on a loose
form of coöperative agreement. Under such an agreement the
various producers retain the management of their leases; but a
joint committee is authorized to regulate in varying degrees the
rate and character of development and production from the entire
field. The Yates Pool in Texas is, perhaps, the most successful
example of coöperative development. 98 There the field was
divided into one hundred acre units and the total output for the
field was prorated between the units. This scheme was placed
in effect by order of the Railroad Commission which appointed an
umpire for the field. An Advisory Committee consisting of one
representative from each company appointed an Executive Com-
mittee to work in collaboration with the umpire. This is, in
effect, but a highly efficient method of proration; such coöpera-
tion achieves some economies, and the comparatively large-sized
tracts have minimized the amount of new drilling. A more inte-
grated form of unitization is secured by entrusting operations
to a single management. This may be effected either by assign-
ment of leasehold interests to one party who reassigns undivided
interests in the whole, 99 or by transfer to a trustee. 100 Under a
merger of leasehold titles, the Pure Oil Company, one of the
major lessees, manages fifty-four hundred and fifty acres of the
Van Pool for a "joint account." 101 This achieves many obvious
economies but, as in the coöperative plan, the location of wells is
still determined to considerable extent by surface boundary lines
and conflicting royalty interests rather than by reservoir struc-
ture and content.

97 Oliver and Umpleby, Principles of Unit Operation, TRANSACTIONS, A. I.
M. E. (1930) 105.
99 See Form Contract in MID-CONTINENT OIL AND GAS ASSOC., HANDBOOK
ON UNITIZATION OF OIL POOLS (1930) 87.
100 Ibid. 98.
101 Ibid. 25.
To insure the proper location and scientific operation of wells surface boundaries must be disregarded. This calls for a completely unitized operating agreement to which all lessee and lessor interests are party. By this means wells can be strategically placed and the latent propulsivé forces utilized to the maximum. The unit plan for Kettleman Hills in California provides for an association of the producers formed with the consent of the royalty owners which produces the oil and gas and each member obtains whatever proportion “the estimated ultimate productivity” of his leasehold “bears to the total estimated ultimate productivity of the Field at the time of incorporation of the association.”

The rights of consenting royalty owners are “computed upon the share of production from said field which said tenants shall be entitled to receive as a member of such association.”

The advantages of complete unit operation are strikingly illustrated by the Masjid-i-Suleiman (Temple of Solomon) field in Persia. Since 1912 this reservoir, twenty miles long by four miles wide, has produced 300,000,000 barrels of oil by flush flow. Many years more of flush flow are expected, and, in the words of Sir John Cadman, president of the Anglo-Persian Oil Company, “to secure the production of crude required for export all that has to be done now is to open the necessary valves by means of which the production of crude can from day to day or from hour to hour be regulated to our requirements to a nicety, just as regularly and as accurately as when one turns on the water for one’s bath.”

Whereas in the Anglo-Persian and the Russian fields oil

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103 Ibid., The Kettleman Hills field is one of the greatest ever discovered in this country. Fortunately the royalty interest was highly centralized, 97% of the area being owned by Standard Oil of California and the federal government. Special legislation permitted lessees on government land to enter unit programs. 46 STAT. 1007 (1930) ; 30 U. S. C. SUPP. § 184 (1930). Contracts were signed on behalf of the government on Jan. 31, 1931, the dead-line under the statute. The Lease Law limits the amount of public land one party can hold under lease, but the proposed plan provided for no merger of leasehold title (as in the form contracts, supra note 99) but that “the title to all oil . . . shall be vested immediately upon . . . production in the association which shall have the right to dispose of all such productions . . .” Unit Plan for Kettleman Hills, supra note 102.

104 Cadman, Unit Operation in Persia, A. P. I. PRODUCTION BULL. 204 (1929) 31. See also Comins, Unit Operation of Oil Fields, ibid. 32.

105 Hill and Estabrook, Unit Operations in Eastern United States and in Foreign Countries, TRANSACTIONS, A. I. M. E. (1930) 17. One very important advantage of unit operation is the simplification of the administration
wells are allowed to flow only until they turn to gas, in this
country gas wells are allowed to blow wild in the hope that they
may turn to oil. Failure to unitize has been the chief cause of
the profligate squandering of gas energy. Even partial unitiza-
tion has effected huge savings. Under the scheme adopted in the
Van Pool, flush flow is expected from five to ten years. If com-
plete competitive conditions had prevailed, the pool, in the opin-
ion of the superintendent in charge of operations, would "have
blown its head off in from three to six months."

Despite the fact that unit operation is necessary both to repair
these wastes and to control the surplus which has been produced
in the face of waste, voluntary unit operation has made but
slight progress. Where "enlightened self-interest" fails to dem-
onstrate to a recalcitrant operator that his lot is a happier one
within the ranks of the unit, his piratical free-lancing, protected
under either legal theory of ownership, permits him to play
havoc with any voluntary agreement. Furthermore, the legal
weapons at the command of the lessor make participation by
an operator in even partial unit operation precarious. For a
failure to comply with the implied covenants of diligent opera-
tion may result in the termination or forfeiture of an operator's
lease. There is the ever-present danger that a court will find
that any agreement for partial unit operation curtailing either
production or drilling burdens a particular lessor with a dispro-
portionate sacrifice.\textsuperscript{106} As for complete unit operation, the leasing
system makes it impractical as a voluntary proposition. The
minute subdivision of the one-eighth royalty interest reserved by
the lessor makes it a practical impossibility to secure the unani-
mous consent of all parties in interest. It is not unusual for
single productive quarter sections to have hundreds of royalty
claimants scattered throughout the country.\textsuperscript{107}

Since liberty of contract promises no relief, the force of law
must be employed to eliminate the waste in the public interest
and to protect the property of the common owners. This means
legislative compulsion. A model statute for "compulsory coöp-
ervative development" was framed by a committee of the Amer-
ican Bar Association in 1929.\textsuperscript{108} It would have provided that

\begin{footnotes}
\item[106] Agreements satisfactory to lessees' setting, drilling and production
programs between large and small tracts in a field may not appeal to a
court as satisfying the implied duties of exploration and diligent operations
owed to lessors by the individual lessees. See section II, \textit{supra}.
\item[107] "Wild Mary Sudik," a well on a quarter section in the Oklahoma City
Pool under lease to the Indian Territory Illuminating Oil Co., was reported
to be divided among some twenty thousand royalty interests, some of whom
receive royalty checks of no more than a cent.
\item[108] (1929) 54 \textit{A. B. A. Rep.} 749 \textit{et seq.}
\end{footnotes}
upon the petition of a majority in a pool and approval by a state body, all producers in the pool could be forced to adhere to a plan curtailing production, conserving gas pressure, and restricting drilling. But the sweep of events has installed a more stringent control under the ordinary proration statutes; states are acting without consulting the wishes of the majority of operators. The inadequacy of such proration measures demonstrates the necessity for more fundamental reorganization of the productive system. The solution is compulsory complete unit operation.

The obvious need is some compulsion, not to insure coöperative development of individual tracts, but to effect scientific production with the entire pool as the unit. The rule of proportionate taking has already been sustained, and the correlative rights of the surface owners in the latent energy of the pool, a common attribute of the entire structure, has been given judicial recognition. Thus, the doctrine that an owner is entitled only to the contents of his acreage, which can now be determined with reasonable accuracy by scientific investigation, is established. Since, paradoxically, these established rights can be protected only by ignoring surface boundaries, it is necessary to allocate the production from the pool to the common owners regardless of the location of the wells.

The legal basis for legislation to effect this is clear. Such legislation can be justified both as an exercise of the police power to protect private property rights and as a conservation measure to eliminate underground waste. If it be challenged as a deprivation of property without due process of law, it can be answered that since it is the most efficient way of extracting oil and gas, it is the most reasonable way to insure each surface owner his full proportionate share. This is not a deprivation of property but a protection of property. It is an old principle of property law that it is "a just and constitutional exercise of the power of the legislature to establish regulations by which adjoining lands, held by various owners in severalty, and in the improvement of which all have a common interest, but which, by reason of the peculiar natural condition of the whole tract cannot be improved or enjoyed by any of them without the concurrence of all, may be reclaimed and made useful to all at their joint expense." 109

In the analogous cases of drainage and irrigation legal problems similar to those of unit operation have been met. Drainage and irrigation ditches are laid out according to the topography of the unit. Drainage, like gas energy, is no respecter of boundary lines; in irrigation projects ratable taking prevails, and the costs are assessed in proportion to the benefit conferred. Land owners are compelled to allow the ditches to be constructed on their land.

And every owner within the prescribed area is compelled to enter into the joint project.\textsuperscript{110}

Since unit operation is the only effective means of controlling underground wastes, the state is also justified in compelling such operation as an exercise of the police power in the public interest. In \textit{Marrs v. City of Oxford} \textsuperscript{111} the federal courts have already sanctioned compulsion of this character. The City of Oxford prohibited drilling of more than one well to a city block. The permit to drill which was required for the sole well allowed provided that all owners or their lessees in the block should have the privilege of sharing in the production upon payment of a proportionate share of the costs. The ordinance was upheld as a police measure to promote the public safety,\textsuperscript{112} and the provisions that all might participate in the well located on one site found reasonable. Here, as in the case of proration,\textsuperscript{113} the requirement that the production from the select wells be allocated proportionately may be sustained as necessary to satisfy the equal protection guaranteed by the Fourteenth Amendment. Exercise of the police power to prevent the waste of natural resources is no different in principle than exercising it for public safety, and the requirement that wells be properly located on the structure is more reasonable than the restriction of one well to an arbitrary city block.

In all probability any claim by a lessor that compulsory unitization impairs the obligation of his contract with the lessee would prove fruitless. Insofar as implied covenants are concerned, there is no vested right in a rule of common law. And the express covenants providing for exploration, production and payment of royalties are not impaired. Unitization is only a change in the technology of production. Oil and gas leases are contracts to secure production; and so long as production commences or continues, the covenants governing the term before production—such as those of exploration, drilling and rents—are performed. The payment of full royalty there-

\textsuperscript{110} \textit{Ibid.} and cases therein cited. See German, \textit{Compulsory Unit Operation of Oil Pools, Transactions, A. I. M. E.} (1931) 11, 22 \textit{et seq.}

\textsuperscript{111} 24 F (2d) 541 (D. C. Kan. 1928), \textit{aff'd.}, 32 F (2d) 134 (C. C. A. 8th 1929); \textit{certiorari} denied, 280 U. S. 563, 50 Sup. Ct. 24 (1929).

\textsuperscript{112} But it appears from the records that oil was piped out of town as soon as it was produced and that power was supplied by internal combustion engines to minimize fire hazards. By the time the case reached the Circuit Court of Appeals, Oxford (population 850) had as counsel James A. Veasey, Chief Counsel for Carter Oil Co. and Chester I. Long, then chairman of the A. B. A. Committee on Conservation of Mineral Resources. However, it is interesting to note that Mr. Long's Committee in advocating compulsory cooperative development could perceive "no constitutional basis for compelling operators in the same pool to so merge their separate holdings that they may be operated as a unit." \textit{Op. cit. supra} note 108, at 750.

\textsuperscript{113} See Sec. V, \textit{supra}.
after satisfies the contractural claims of the lessor, no matter through which conduit the oil and gas is taken from his land. By this means the vicious incidents of the leasing system are eliminated.

Unitization is technologically advisable and legally possible. It provides a fair deal to the public by eliminating waste of an essential economic asset. It provides a fair share to operators and lessors by assuring to each his proportionate share produced with relatively low cost. It furnishes an efficient engineering control of production. But when a scheme of proration is superimposed upon unit operation to set quotas to meet "reasonable market demands," a potent economic control of supply is created. Controlled supply has a way of affecting prices. A controlled production must therefore be accompanied by a planned price structure to insure a price fair to all.

VII

"—And When the Uproar Dies Down, and Prices Go Up."

Thus far we have considered only the geologic and legal problems in the rationalization of production. But it is impossible to ignore the fact that the driving force in the industry for stabilization has not been the zeal of the exploiters of oil to conserve supplies of petroleum for future generations but the desire to conserve their fortunes for their descendants. So widely and openly has the economic plight of oil been discussed that, as Judge Hutcheson remarks, the courts might even take judicial notice of the fact that the purpose of proration orders has been to prevent the "loss of market price because of market glut." 114 Governor Murray's edict of martial law as a conservation measure looks strange in the light of his public pronouncement that the wells will re-open for "dollar oil." And the withdrawal of the public domain from further exploitation by the Department of the Interior in 1929 "to meet conditions due to great overproduction" 115 evidences an interesting interpretation of President Hoover's announcement that "there will be complete conservation of Government oil in this administration." 116 Conservation even to statesmen is more a matter of price levels than elimination of wastes.

In the administration of the proration statutes commissions have set field quotas designed to equate production with the anticipated "transportation and marketing facilities." Anticipated facilities have been determined by securing nominations

116 See note 29 supra.
from purchasers of what they expect to buy in the next succeeding month. The projected demand and not the maximum pipe-line and storage capacity or scientific rate of flow which has set the quota to which supply will be restricted for the month. The power to control the demand to which supply will be pegged is the power to fix prices. The enforcement by the state commissions of the industry’s production quotas, while effective in eliminating surface wastes, permits the industry to dictate its own price structure. A petition for rehearing in the Champlin case has been filed charging that the entire oil curtailment program of Oklahoma is a “price-fixing scheme.” Thus, while the final decision may well uphold proration, the courts may be forced to hold that the administrative orders of the Corporation Commission go beyond the statute.

In Texas the new statute provides that “the Commission shall not have power to attempt by order, or otherwise, directly or indirectly, to limit the production of oil to equal the existing market demand for oil.” Under this statute, the Railroad Commission first set a daily quota for East Texas of 225 barrels per well on September 2, 1931. This was declared temporary pending a finding by the commission of a proper oil-gas ratio. As the number of wells increased, the total output exceeded the anticipated 400,000 barrels daily. Some two weeks later the Commission reduced the per-well quota to 185 barrels, roughly maintaining the 400,000 daily run while still determining the “correct oil-gas ratio.” There followed within a few days the formal signing of a compact between Oklahoma, Kansas and Texas setting quotas for the three states. This succession of events indicates an attempt, despite the new Texas statute, to equate production to existing market demand.

But the market is still demoralized, and apart from possible wastes in the East Texas Field, a demoralized market means incalculable wastes through the premature abandonment of productive wells in older fields. The courts have been faced with a

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117 It was this system which was condemned in the MacMillan case, supra note 74.
119 See dissent in the Champlin Refining Co. case, supra note 85.
120 (1931) 30 OIL AND GAS JOURNAL (No. 14) 32.
121 (1931) 30 OIL AND GAS JOURNAL (No. 17) 13.
122 Ibid. (No. 18) 13.
123 Ibid. (No. 19) 19. The compact was signed on September 18, 1931 by representatives of the Governors of Texas, Oklahoma and Kansas, and by the chairmen of the Corporation Commission of Oklahoma and the Texas Railroad Commission, and by a member of the Kansas Public Service Commission.
124 When price temporarily falls below actual operating costs old wells are frequently abandoned. Such wells, once abandoned, seldom return to their former production.
dilemma in dealing with the two-fold program of waste and price control. In the Julian and Champlain cases the courts upheld proration as a waste measure. The court in MacMillan v. Railroad Commission enjoined proration orders issued under the old Texas statute as price-fixing measures. On the one hand the courts regarded price control as "incidental," on the other, waste. But the power of controlling price cannot be separated from a reorganized system of production along scientific and economic lines. The dilemma cannot be solved by calling either waste or price control a "mere incident" to the other. It has been suggested that the anti-trust statutes be modified to exempt the oil industry in order to permit the reorganization of production along the proposed lines. But this delivers to the industry not only planned production but also controlled price.

While thus far there has not been a coördinated program of proration and the entire mid-continent market has been broken by a single uncontrolled major pool, interstate control is projected. Interrelated operating and financial management working through a hierarchy of interstate commissions leaves little chance for free competition between pools as protection for the consumer.125 However, the anti-trust statutes have not been directly invoked, and how they apply is debatable.126 Since unitization aims at scientific production and elimination of waste, it in itself is not likely to be found an unreasonable restraint of trade.127 But since price control is an inevitable concomitant of proration, technical violations of state statutes may be made out. And while intrastate proration might not come under the federal anti-trust statutes, the interstate agreements may well be affected by the federal act.128

Faced squarely, the problem of price in the new industrial order is not a simple one of supply and demand freely operating

125 The quotas assented to in the compact (supra note 123) were agreed upon by an interstate committee. Among those present at the Committee meeting Sept. 12, 1931 were: Chairman of Public Service Commission of Kansas; Chairman of Corporation Commission of Oklahoma; representatives of the Governors of Oklahoma and Texas; the presidents or vice-presidents of the Standard Oil Co. of Indiana, and the Humble, Carter, Barnsdall, Gypsy, Shell, Phillips, Wirt Franklin oil companies; four members of the Oil States Advisory Committee from California, New Mexico, Colorado and Wyoming; and the presidents of the American Petroleum Institute, the Mid-Continent Oil and Gas Association and the Independent Oil Men of America. (1931) 30 Oil and Gas Journal (No. 18) 13.


127 However, even this is questionable in such states as Texas which deny the rule of reason.

128 See note 124, supra. Also see the projected international proration scheme presented to Sec. Wilbur for approval by the Oil States Advisory Board. (1931) 30 Oil and Gas Journal (No. 19) 20.
on a graph. Determination of the demand factor of the price equation cannot be lodged within the industry if the users of gasoline are to be protected. Price fixing must come to the industry. A frontal attack means an assault upon the orthodox doctrine of "affected with a public interest." 129 If this be too Utopian, a Fabian retreat in terms of public control of demand will probably be the way out. 130 In the resulting struggle between competing vested interests for price advantage, control of waste implicit in conservation may again become merely a campaign cry. But if legal planning of petroleum production is to deliver the industry from the chaos of competition in which it finds itself, this governmental deliverance should be accompanied by an impartial control of price levels. 131

129 "Five years ago the mention of price in a meeting of regulatory bodies would have caused shivering and shuddering of spines. Conditions today require direct action. The federal-court decisions forbidding states to fix oil prices are based on erroneous conclusions that oil and its derivatives are not tinged with public interest. After the past years' oil activities only an indifferent court, insensitive to what is going on about it, would deny the public interest in oil." Commissioner Hill of the Kansas Public Service Commission in an address to the interstate committee, see note 125, supra. Will the industry still endorse this when the time comes to move prices down and not up?

130 The content of demand—a problem of competing uses—is beyond the scope of this article.

131 Complete impartiality can scarcely be expected from commissions of only the producing states; for the consuming interests of the nation federal control may be the only adequate protection. To the effect that in matters of interstate commerce there is "a welfare which transcends that of any state," and that "the welfare . . . of each state is made greater by a division of its resources . . . with every other state," consult West v. Kansas Natural Gas Co., 221 U. S. 229, 255, 31 Sup. Ct. 564, 571 (1910), and Pennsylvania v. West Virginia, 262 U. S. 555, 599, 43 Sup. Ct. 658, 665 (1922), in which the Supreme Court held that a state may not conserve its natural gas for its own consumers. But cf. Hessler v. Thomas Colliery Co., 260 U. S. 245, 43 Sup. Ct. 83 (1922) in which the same court held that a state may subject anthracite coal to a tax, the main burden of which falls on consumers in other states. It has been suggested that federal control of oil production may be effectuated through federal control of the pipe lines. See Stanley, The Drama of the Oil Industry—Calling for Federal Regulation.