PRODUCTION CONTROL IN THE PETROLEUM INDUSTRY

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CHAPTER ONE

PHYSICAL CHARACTERISTICS PECULIAR TO PETROLEUM

Petroleum, in all probability, is the natural product of animal and vegetable matter buried in sedimentary formations of the geologic past. It occurs in the crust of the earth, filling the interstices and crevices in certain types of stratified rocks, particularly sandstones and limestones. It is generally agreed that oil has migrated from its parent abode to its present point of occurence.

> Lighter than water...the oil and gas tend to migrate upward, working their way to porous beds and following freely their course until arrested by a downward curvature or impervious capping. Thus an oil pool is usually a body of convex shape like an inverted basin, lying under the crest or dome of an impervious layer of rock. Normally the order of occurrence is gas, just below the crest, then oil and finally water...[1]

CHARACTERISTICS PECULIAR TO PETROLEUM

While geology has added much to the knowledge of petroleum in recent years, and the development of the core drill and seismograph have aided greatly in the location of oil structure, petroleum is yet the most elusive of minerals. With all the achievements

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[1] Joseph E. Pogue, Economics of Petroleum, I, p. 13.

of science and the petroleum industry, the only sure way to find oil today is to drill for it. Until the well has been drilled, there is no certainty that oil exists in a particular location regardless of how favorable the structure might appear.

Not only is source of petroleum unknown but extent of supply is impossible to estimate. A well may be producing in paying quantities and the well offsetting to right or left a few feet, may come in dry. It is often possible with some minerals, such as coal or iron ore, to estimate fairly accurately how large a supply of the mineral exists in a particular mine or vein. This is not true of petroleum. Again it is necessary to drill in order to ascertain the limits of the field.

Neither discovery of the mineral, or of the geographical extent of the field, entirely solves the problem. Fields have been found, apparently promising, which have produced for a while and soon been abandoned for want of production. Due to the fact that petroleum holds in solution notable quantities of natural gas under pressure, the mineral is exceedingly mobile. Thus, a decade ago uncertainty of supply was thought to be wholly the result of this tendency

of oil to migrate. Legal records are filled with statements that oil "moved from one tract of land to another by percolation";[2] or that oil and gas have the power of transmission.[3] Regardless of the term used, the migratory propensity of oil is freely acknowledged. It is also admitted that, of all natural resources, this characteristic is peculiar to natural gas and to petroleum. This necessitates and justifies especial treatment for the protection of the industry and of those individuals composing the industry.

THEORY OF OWNERSHIP

The philosophy of ownership of oil and theory of production, however, appears to have been built upon a somewhat exaggerated idea of this tendency. Underlying the philosophy of ownership are two somewhat conflicting theories of law relating to oil and gas rights. The first is known as the "ownership" theory and is founded on the supposition that oil is corporeal property. Advocates of this theory maintain

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2. Kelly v. Ohio Oil Co., 40 N.E. 339 (Ohio 1897)

3. Ohio Oil Co., v. Indiana, 177 U.S. 190 (1900)
Logan Natural Gas v. Great Southern Co., 126 Fed. 623 (1903)

that oil and gas are minerals and are therefore a part of the land. They contend that he who owns the fee also owns the oil and gas thereunder. The second, or non-ownership theory, is based on the proposition that oil and gas are incorporeal property. Adherents of this theory admit only the right of acquisition. The weight of opinion of the courts, in number of decisions and dignity of the courts, is with the latter view.[4]

> Out of these court decisions have come the working rules, the usages and customs, that are now strongly entrenched in the industry. It is these working rules that have brought about the present unstabilized condition in the industry. The right to drill when and where one pleases on his own land, or convey this right to another as guaranteed by the courts, is the principle cause of over-production in the industry.[5]

LAW OF CAPTURE

This philosophy of ownership, or theory of production under which petroleum resources have been developed in this country is known as the "Law of Capture". Its original purpose was to protect the

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4 Victor A. Kulp, Cases on Oil and Gas, p. 1.

5 Leonard Logan, Stabilization of the Petroleum Industry, p. 50.

property of the individual and to guarantee his personal liberty to drill when and where he wished. Under this law, title to oil lay in possession and an individual is permitted to acquire title to as much oil as he can capture.

COMPETITIVE DRILLING

The resulting competitive drilling and production is a unique factor, characteristic of no other substance. It has a far reaching effect upon the economic behavior of petroleum and serves to explain its economic peculiarities. Its effect has been to drive production forward insistently and without respite, and to render petroleum peculiarly resistent to retardation in periods when lesser production might be desirable in view of reduced demand.[6]

> Ignorance there may be, carelessness there undoubtedly is, but back of ignorance, of carelessness, or reckless, headlong methods, is the real cause - the fact that the average holding is so small that speed is the owner's sole protection. Let him be careful if he wishes; let him be economical if he can find a way; but careful or reckless, careless or conservative, he must be speedy if he would survive...[7]

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6 Pogue, op. cit., p. 31.
7 Ibid., p. 32.

When a reservoir is once punctured, and oil discovered, the rush is on. Off-setting wells must be drilled to protect near by property from being drained. This starts the endless chain of drilling. The propensity of oil to migrate and the Law of Capture leave no alternative.

OVERPRODUCTION

Discoveries of new fields, with the following competitive drilling, has resulted in production in excess of market demand. Vast amounts of oil have been stored, other enormous amounts were permitted to flow down rivers, or run uncontrolled over adjacent land. This ordinarily resulted in price of oil being forced down (as in 1931 with the discovery of the East Texas field) far below average cost of production. In this instance posted price on crude fell to ten cents per barrel of forty-two gallons. Additional carelessness resulted due to the cheapness of oil. This condition of production of petroleum in excess of market demand at a reasonable point above average cost of production has come to be known as "overproduction".

WASTE

Over-production has resulted in waste of many kinds. Webster's New International Dictionary lists

about seventy-five interpretations of the word, "waste"; about half of them overlap in meaning. The Oklahoma law refers to waste above and below the surface of the earth while the Texas law, in its specific details, deals more with underground waste of natural gas.[8] This law states:

> The term waste in addition to its ordinary meaning shall include (a) escape of natural gas in commercial quantities into the open air from a stratum recognized as a natural gas stratum; . . . (b) drowning with water a gas stratum capable of producing gas in commercial quantities; (c) underground waste; (d) the permitting of any natural gas well to wastefully burn; (e) the wasteful utilization of such gas; . . .[9]

Waste resulting from competitive drilling, is of three types, physical, economic and social.

PHYSICAL WASTE

The physical wastes are those most frequently noted by the general public. These include the actual physical loss of oil from uncontrolled production of newly discovered well such as "Wild Mary" in the Oklahoma City field. Loss of petroleum due to lack of market, transportation facilities or control

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8 Logan, op. cit., p. 2.

9 Railroad Commission of Texas, Oil and Gas Conservation Laws and Regulations for the Conservation of Crude Oil and Natural Gas. Oil and Gas Circular No. 13, p. 1.

devices are also forms of this type of waste. Much physical waste has taken place in the refining and transportation branches of the industry but being less picturesque has been given less publicity.

Inadequate or improper storage of oil results in a greater total loss than physical production losses. Petroleum is most economically stored in its natural reservoir in the ground. This is true for several reasons. Improper storage results in evaporation of oil and loss of volume and of gravity. There is a two fold loss here for oil of high gravity sells at a higher price than low gravity oil.[10]

> Mr. J. R. McWilliams, production engineer of the Skelly Oil Company, states that a loss of one degree in gravity means a loss of two percent of oil above 39 degrees gravity, one and one half of oil between 32° and 39° and one percent for oil below 32°. [11]

In addition to the actual physical waste which is eliminated by storing oil in natural reservoirs, another element should be considered. Unmined reserves do not exert a pressure on the market price of oil; petroleum in storage does.

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10 Logan, op. cit., p. 102.

11 Ibid., p. 110.

SOCIAL WASTE

Social wastes have not ordinarily concerned the public or the industry. However, the working power of a people is one of the most valuable resources of a country. America has wasted oil lavishly. The question arises as to whether such waste of a natural and irreplaceable resource has increased or decreased the fund of human energy in the country.

> Our wasteful use of oil during the past half century will ultimately have to be paid for by a vast waste of human energy. Having burned millions of barrels of lubricating oil, we, or our children will some day have to squander great amounts of labor or energy in an effort to produce some sort of substitute.[12]

The advantages gained by rapid exploitation of oil must be compared with possible future need for those resources. The possible cost of substitutes, in energy and money, must also be considered. Each individual will doubtless have an opinion all his own on this question depending on present individual interests and personal ideas as to future conditions.

ECONOMIC WASTE

In spite of vast physical and social wastes which have occurred in the petroleum industry, of

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12 Ely, Hess, Leith and Carver, The Foundation of National Propperity, p. 275.

recent years economic wastes are given the most serious consideration by the industry, and public as being of greatest importance. Testimony of specialists in the field of petroleum given during the Petroleum Investigation (1934) centered on this problem.[13] Defining "economic waste" we learn

> ...economic waste occurs when the economic value of the good produced is less than the cost of producing it. The waste is the difference between the cost and the return, Cost is here understood to mean the economic value of labor and capital put into the industry, and return to mean the economic value of the oil produced.
>
> It might be suggested here that the value of oil recovered is often greater than the costs incurred in obtaining it but at the same time a waste results from the inefficient methods of recovery in leaving considerable quantities in the sands. The contention is well taken that there is economic waste. The problem must not be viewed from the standpoint of the individual operator but from the social view point; it must include total costs and total returns. Still the question might be asked if the total returns are greater than the total costs and there is considerable oil left, due to inefficient methods of recovery, would there be waste? It would be waste if later attempts to recover it would result in total costs greater than total returns, or if the same amount of labor and capital employed in creating substitutes for petroleum would result in a lower return.[14]

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13 Cole Committee, Petroleum Investigation, p. 404.

14 John W. Ise, The United States Oil Policy, p. 222.

Among the economic wastes may be included the use of enormous capital in the drilling of unnecessary wells. Vast sums have been expended in the drilling of hundreds of wells when ten or twenty would have more economically drained the soil. This resulted in waste of the mineral itself as loss of gas pressure ensued making it impossible to produce the maximum amount of oil. The life of both well and pool was thereby greatly shortened in many instances.

The two most important problems arising from economic wastes resulting from competitive drilling are, (1) abnormal depletion of reserves due to abandonment of "stripper wells" in periods of over-production, and (2) loss of reservoir energy with the consequent loss in production.

THE STRIPPER WELL PROBLEM

Before developing further the loss due to abandonment of "stripper wells", it might be well to define the term. The Petroleum Board defined a "stripper well" as any well which produced oil of less value than forty cents per one hundred feet of well per day.[15] A stripper well has also been defined as:

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15. Cole Committee, op. cit., p. 404.

> ...a well of such small production and of such low gross revenue that the regular labor provisions of the code as to maximum hours and minimum wages cannot be carried out in the operation thereof, and leave a reasonable margin for the operator.[16]

> A "stripper well", in other words, is a well from which the proceeds from the oil sold are so small that they do not cover, in many cases, the cost of production or provide only an unreasonably small margin of profit for the operators taking into consideration all factors, pertaining to the producing branch of the industry.[17]

Dr. Katherine Carman, petroleum engineer, testifying before the Cole Committee differentiated between "stripper well" and marginal well as follows:

> ...people talk rather loosely of stripper wells here and stripper wells there. What they really mean is marginal wells. In other words, wells of small production in which the value of the oil produced is very close to the cost of producing it. That is what I would call a marginal well. A marginal well does not have to be a stripper well, and a stripper well does not have to be a marginal well.
>
> To be more explicit, a well producing a barrel of high grade lubricating oil in Pennsylvania may render a value which is far enough in excess of the cost of production so that it is not a marginal well at all. On the same theory, a well producing 20 or 30 barrels of black oil in Wyoming, which is high in sulphur is not by any means being stripped of the last oil that can be gotten out of the sands and yet the value of that oil may be so low that the well is a marginal well. In summation, the term stripper well is a <u>quantitative</u> term, and marginal an <u>economic</u> term.[18]

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17 Cole Committee, op. cit., p. 1509.

18 Ibid.

"Stripper well" is the term most generally used by the industry in a quantitative sense with no particular thought as to whether the well is marginal or not. Major companies ordinarily cease producing wells when they fall in the "stripper well" class, at least in the Mid-Continent field. These are then purchased by individuals or small independent companies and the operation continued. It is apparent that cost of production enters to make a well "marginal" to the major company long before it would be so considered by the independent. As a general rule, the term "stripper well" may be taken to include all wells whose production is less than two or three barrels a day.

Because of the economic structure of the industry, the need to transport crude petroleum long distances to refineries and the cost thereof, it is obvious that over-production, and price would react on production of stripper wells. Pipe lines are expensive. It logically follows that it is cheaper to transport many hundreds of barrels of oil a day rather than a few barrels through a particular line which may have to transport the petroleum hundreds of miles. Hence the effect of price on abandonment of stripper

wells, or wells of small but settled production, is obvious. This was discussed in great detail before the Cole Committee.

> In 1917, 1918 and 1919 the number of wells abandoned was exceedingly low due to demand for oil and better prices which existed. Subsequent to war the number of abandoned wells increased very materially and ultimately reached a peak in 1923 of 6,271. As the prices increased in 1924 abandonments decreased....in 1925 being only approximately one half as great.
>
> In 1927 price of petroleum went down again and in ...1928, abandonments increased to 5,219. In 1929 there was a small increase in price of oil and abandonments decreased to 2,702. In 1930 price of oil decreased and abandonments increased to 3,922...with a further drop in price of crude in 1931 abandonments went to 5,251.
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> In 1931 when price sagged tremendously from $1.19 ... to 64¢ as the average price... abandonments for the first time in the history of the industry exceeded drillings by 62%...[19]

The economic importance of the stripper well problem and their possible abandonment and their influence on current production may be realized when one recalls that in the United States there are approximately 325,000 wells. Of these about 250,000 produce less than five barrels per day and have a total production of around 250,000 barrels

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19 Cole Committee, op. cit., H. B. Fell, Executive Vice President of the Independent Petroleum Association of America, p. 1512.

or an average of one barrel per well per day. The average production per well in the United States is 7½ barrels.[20] Over-production is keenly felt in the stripper well areas. It often means the end of production, loss of income on capital invested and loss of oil reserves. Inasmuch as flush production often only pays costs on a well, profit is said, by the industry, to be realized wholly from income on settled production. For this reason alone protection of the stripper well would be worthy of consideration in the interest of the economic well-being of the country.

Loss of reserves, represented by stripper wells, would be a staggering waste of natural resources. Petroleum engineers have estimated that a reserve of some two to four billion barrels is accounted for by these wells. Neglect of the stripper well problem would mean that the cream of production would be skimmed off while a field was in a flush, flowing stage. When settled production was secured the field would be abandoned leaving some 80% of the recoverable oil in the ground.[21] The producers

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21 Cole Committee, op. cit., p. 1512.

as well as general public are, in a measure, trustees of a wasting asset. They should administer their trust in behalf of the nation as a whole. We can not afford to lose the billions of barrels of reserves represented by the stripper wells. It must also be remembered that the flush production of today is often the stripper well of tomorrow for almost so quickly does flush production drop to settled production.

The possibility of "shutting in" stripper wells during periods of depressed price has been offered as a solution. There has been discussion as to whether temporary shutting in of a well impairs production in that well. In some cases the well is not damaged; in others it virtually means that the well cannot produce again.[22] It was the consensus of opinion, among producers, that this question could only be answered for each producing area individually. If there is water to contend with, there is little possibility of ever shutting in a well for any length of time without doing permanent damage to the well. Dr. F. B. Plummer

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22. Cole Committee, op. cit., Dr. Carman, p. 399.

gives an excellent discussion of the effects of temporary shut-downs on wells having a high water ratio.[23] He states that ordinarily water encroachment will damage a well, or lifting costs will be greater due to the fact that water will seep through the sands faster than oil resulting in a higher water ratio. Lifting costs will be increased for more water than oil will be the result.

Concerning the problem of the stripper well, in summary we may say that they represent a large portion of known reserves. Excessive and unnecessary abandonments appear to occur in periods of depressed prices. This has, therefore, been conceded to be one of the major problems resulting from competitive drilling and lack of adequate control.

RESERVOIR ENERGY

The second important waste recognized today resulting from competitive drilling is loss of reservoir energy. The importance of this factor has only been realized the last few years.

Reservoir energy may be defined as that pressure which forces oil and gas to the surface.

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23 Transcript of Proceedings of the Interstate Oil Compact, Wichita, Kansas, April 29 and 30, 1938, p. 51.

> Oil and gas are held underground, according to modern authorities on petroleum geology, in reservoirs varying in size and under great pressure. When the reservoir is punctured by the drill the pressure forces the oil and gas to the outlet. As more wells are drilled and more outlets made the less the pressure becomes. It is the gas pressure which forces the oil to the surface.
>
> ...It is the power that moves the oil to the bottom of the hole, and in many instances raises the oil to the surface of the ground. It is recognized that this gas pressure exists in solution with the oil as well as separately from it.
>
> The Oklahoma statutes of 1933, and especially in 1935, recognized this valuable use of gas pressure or gas energy, and particularly provided that the rules of the Commission should be promulgated in such a way as to best conserve it. It is generally recognized throughout all oil producing states.[24]

Reservoir energy is unduly depleted by excess wells; oil is lost for the want of this natural pressure to bring it to the surface. Great amounts of oil are also lost in the sands when gas is allowed to escape without bringing a proportionate share of oil from the reservoir to the surface. Rapid decline of pressure in the sand, resulting from the wasteful practice of blowing wells into the air, shortens the life of the well and hastens encroachment of water.

24 Earl Foster. Attorney, Corporation Commission, Conservation Department, Oklahoma City, Oklahoma. Omnibus.

Lack of knowledge of the importance of conservation of reservoir energy in the early years of the oil industry has resulted in the exploitation and abandonment of many fields where there is much oil which may yet be recovered. Growing realization of the vast amount of oil which has been left in the sand, because of loss of reservoir energy, has led to development of secondary recovery methods as well as more efficient primary production methods.

Among the methods of secondary recovery, which have been found most practical, are water drive and gas drive. These will be discussed in more detail in a later chapter. At best, however, these must be considered salvaging processes. They do not compensate for inefficient earlier operation of wells with the enormous and preventable waste of oil, gas and reservoir energy. Neither should they encourage the continued use of uneconomic production practices today.

According to our present knowledge reservoir energy is indivisable; it does not belong to any one operator in a pool. It should be made to work for the good of all the owners of oil and gas rights in the pool. The efficient utilization of the energy

of the reservoir by all operators will result in a longer flowing life of all wells and maximum recovery from the pool.

It now seems that reservoir energy is really what conservation boards are attempting to conserve.

> Just how far the courts can go in preserving and conserving this gas energy is still undecided, it being remembered that this energy percolates freely throughout the entire pool. One well will reduce the energy or pressure in the entire pool. The oil does not flow so freely and perhaps the drainage of oil e tends only for a short distance, but the drainage or dissipation of gas energy extends great distances, in some cases many miles at least throughout the entire common source of supply. In conservation rules and regulations and in statutes, this will be the important thing in all future dealings with the oil industry.[25]

Under the most efficient known methods of production, less that 25% of the petroleum underground reaches the pipeline.[26] This has been due largely to loss of reservoir energy. Under improper and wasteful methods of utilization the recovery factor becomes as low as ten percent. Such is the estimate of the Smithsonian Institute.

> Small wonder, therefore, that Sidney Brooks, said . . . "America, as one would expect, has been the classic home of all

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25. Foster, op. cit.,

26 Cole Committee, op. cit., N. C. Miller and Ben E. Lindsley, Bartlesville, Oklahoma. September, 1934, p. 47.

> that is hasty, negligent, and well nigh criminal in the misuse of oil as of every form of natural wealth; America in consequence finds herself consuming more oil than she produces.[27]

It is true that vast quantities of oil have been consumed from the many fields already developed in this country and that petroleum is being developed more rapidly in this country than in foreign nations. Possibly rapid exploitation of petroleum resources is not a high price to pay for the benefits we, as a nation, have derived therefrom. It is a question of relative value of present advantages purchased at the price of enormous wastes of a natural irreplaceable resource, as contrasted with possible future value of that resource had it been conserved. This is a question which it is impossible to decide.

> It must be remembered that civilization, customs, and habits of the people change use values. Wants of today are not by any means wants of tomorrow. Use value is subjective and changes from time to time and place to place.[28]

It is barely possible that petroleum will not be so necessary to future generations as it appears

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27 Logan, op. cit., p. 3.

28 Ibid., p. 5.

to be today; a more efficient, or economical fuel may be discovered. Hence it appears foolish to deny outselves the use of petroleum.

Use and waste, however, are two entirely different terms. The oil industry and society are concerned with the elimination of waste whether it be physical, social or economic.

CONSERVATION

The antidote for waste is said to be conservation. The word conservation, like the word waste, has many meanings. Professor Ely has said, "Conservation means a sacrifice of the present generation to future generations." Prof. L. C. Gray, likewise, finds "the real heart of the conservation problem in the conflict between the present and the future."

> The primary problem of conservation, expressed in economic language, he asserts, is the detremination of the proper rate of discount of the future with respect to the utilization of our natural resources.[29]

Conservation, as defined by Mr. Wirt Franklin, means:

> The securing by the citizens of this Nation, of the greatest economic good that can be derived from these resources without waste and without their utilization for inferior uses, which can be supplied adequately and satisfactorily by other natural resources. We realize that

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29 Logan, op. cit., p. 91.

> some people assume that conservation means to set aside, hoard and put away for future use. We do not concur in that view nor do we believe that such a policy is necessary or advisable.[30]

> Conservation means...the prevention of all forms of waste and the use of oil for its higher purposes, as contradistinguished from the use of burning it under boilers at fifteen or twenty cents a barrel...True conservation means that we should properly use our resources...preventing unnecessary waste.[31]

Naturally it would not be to the interests of the industry to encourage fifteen or twenty cent uses of petroleum. Neither is it to the interest of the nation, when our reserves as yet are estimated as adequate only for the next fifteen years and when no substitute has been found for petroleum as a lubricant. This is especially true in view of almost limitless reserves of coal. Quoting Mr. Franklin again,

> Every irreplaceable resource, including all minerals, should be produced in such a manner as to get the greatest possible economic yield with the least amount of waste.[32]

Concurring in this opinion, Hon. Harold L. Ickes, Secretary of the Interior, Administrator for the

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30 Cole Committee, op. cit., p. 1424.

31. Ibid., p. 1424.

32 Ibid., p. 1398.

Petroleum Administration says:

> There is need for a permanent oil conservation policy for the United States. The oil reserves of the United States are limited...The minimum objective of a sound conservation policy should be prevention of physical waste. The elimination of physical waste goes deeper than the balancing of supply with demand. Those who favor the conservation of our oil resources desire to increase to its maximum the amount of oil which can be recovered from producing properties.[33]

> There are minerals, other than oil, which are irreplaceable and the reserves of which are limited. There are minerals, which from the viewpoint of national defense, are more critical than oil. The conservation of oil, however, warrants special consideration for the reason that it has characteristics which are not associated with any other natural resource except its associated hydrocarbon...natural gas.[34]

The petroleum industry has come to be one of the largest and most important segments of our national economy. It has invested about fifteen billions of dollars of capital, and employs nearly a million workers, constitutes a large customer for a wide range of other industries and serves practically the entire economy with essential commodities.

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33 Cole Committee, op. cit., p. 62.

34 Ibid., p. 1398.

Waste of our crude oil reserves would hasten the disappearance of all this investment unless a substitute were found to serve as a marketable motor fuel. It is only reasonable, therefore, to assume that the industry is somewhat interested in conservation as well as in stabilization as is so often asserted.

STABILIZATION

Stabilization is ordinarily defined as a balance between supply and demand. It does not mean the guarantee of profits to the marginal operators.

> Stabilization means the witholding of sufficient quantities of oil so that the scarcity value of that obtained when compared with the total scarcity values of the goods which compose the costs employed by the industry as a whole to the total goods for which they are sold by the industry will leave a profit.[35]

> Stabilization means the production of petroleum under conditions of certainty ..the reduction of uncertainty to certainty. At the present time, the problem of stabilization is the control of supply, not to obtain exorbitant prices, but to insure a reasonable profit to the industry as a whole on the capital invested.[36]

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35 Logan, op. cit., p. 7

36 Ibid., p. 8.

The chief contributing factor to stabilization in any industry is certainty. Settled production, therefore, is not the problem in the petroleum industry so much as is flush production. That new fields are the disturbing factors was clearly evidenced by the discovery of the East Texas field in 1931 followed by chaos. Therefore, those charged with a study of the problem, and the solution thereof, have centered their attention of the elimination of the conditions which existed at that time and the recurrence thereof.

Control applied to flush production should stabilize production at such a price level that waste, economic, physical and social will not be encouraged. Control must also be applied to flush production in such a manner as to insure continued production of stripper wells so that vast reserves will not be destroyed.

Conservation and stabilization thus have a common interest and the equilibrium so effected will insure the welfare of the million workers in the industry, tend to prolong the life of petroleum reserves thus administering a wasting asset to the greatest good of the largest number of people.

CHAPTER TWO

ECONOMIC ASPECTS: SUPPLY, DEMAND, POSSIBLE SUBSTITUTES, AND COST OF PRODUCTION

Recent developments in the United States are said to be the result of acceleration and not of structural change. Petroleum has furnished the energy for this acceleration. The characteristics of modern life are intensified activity, increased supply of power and the wider use of that power. These uses have increased three and three quarters times faster than the growth of population.

> The petroleum industry has kept pace with this march of progress. If speed is the chief characteristic of this age, it is petroleum that has made speed possible.[37]

> When you turn from the oil fields of the United States, which are today in a high state of development to the rest of the world which, except for a few countries, is almost entirely undeveloped, you are face to face with the best possible reason why the United States should try to retain the oil leadership of the world which she has held since the birth of the industry.[38]

AN ESSENTIAL COMMODITY

Petroleum has been a vital factor in achieving industrial supremacy; it will be a vital factor in retaining it.

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37 Logan, op. cit., p. 9.

38 Charles E. Bowled, The Petroleum Industry, p. 31.

> Use of petroleum is very important in the economic life of today....Oil is used in the making of highways, in the tires that wear out the highways, in lubricating and propelling the vehicles that travel over their surface. Subsurface sea crafts would be impossible without oil. Aviation would be impossible without petroleum. Asphalt from oil is used in making airplane runways and without a high grade gasoline the airplane would never be able to leave them. The use of petroleum has found its way into practically every department of human activity, work and play, toil and leisure.[39]

Petroleum is the one indispensable commodity of the machine age. Should its supply be curtailed industry and tranportation would be crippled, if not paralyzed.[40]

Thus we may see that petroleum is an essential commodity and one which has been more or less responsible for the rapid industrial growth in this country. We find, however, that there is a price to be paid even for progress. In this instance the price has been the enormous quantities of oil which have been produced, much of which has been wasted. On one side are those who describe the situation as "rapid development of our oil fields", on the other those

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39 Logan, op. cit., p. 138.

40 Samuel Pettingill, Hot Oil, p. 45.

who call it the "most ruthless exploitation of a necessary and irreplaceable natural resource."

FOREIGN PRODUCTION POLICIES

Like the United States, Mexico developed its petroleum resources as rapidly as possible. In 1921 Mexico reached the peak in its petroleum production with a total of 193,398,000 barrels. Since then its production has declined steadily to 32,805,000 barrels in 1932....a shrinkage of 83%.[42] In 1921 Mexico produced 25% of the world's production, today it produces less than 3%. Poland and Japan also appear to have passed the peak.

Other countries have pursued a different policy. Among these are Trinidad, Russia, Argentina, Rumania, India, the East Indies, Peru, Persia, Venezuela and Columbia who have increased or maintained their production.

Not only have most foreign countries been more conservative in their production policies than has the United States but they have more clearly faced the situation in terms of cold realism. Among these the most notable example is Great Britain.[43]

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42 Pettingill, op. cit., p. 15.

43 Ibid., p. 41.

> Great Britain has gone out and got oil.... She now boasts that she has control of the world's available oil. In other words, Britain is "living off" the enemy right now.... British oil companies, operating in the United States are controlling one eighth of our known oil, are it is reported producing oil from their wells in the United States at the legal maximum.
>
> ....From the standpoint of domestic politics and local public opinion, England's position has been easier than ours. She has no petroleum industry at home; there is only one well, it is said, in the British Isles. It has not been necessary for her to think in terms of wages to her own workers, or profits to her own home oil industry.[44]

UNITED STATES OIL POLICY

No national policy has been developed by our country as regards petroleum. Neither has an international policy, worthy of the name, been suggested. Within the next few years definite decisions must be made on both these phases for as M. Briand stated, "International politics today are oil politics."[45]

It may be readily seen that the problem of petroleum is not wholly a domestic one. If our domestic supply is exhausted and we are forced to buy from foreign nations, we will be at a terrific

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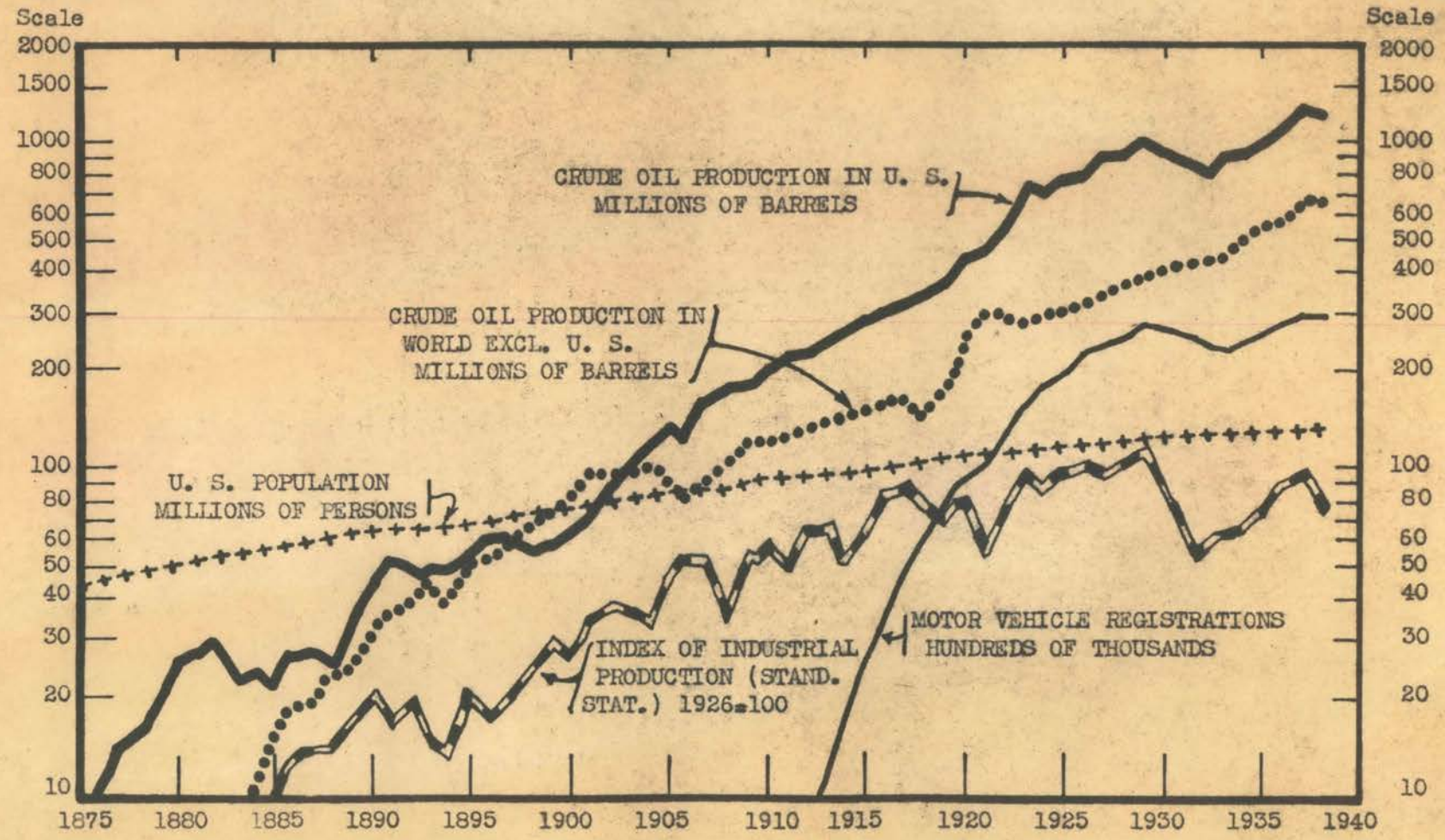
44 Pettingill, op. cit., p. 47.

45 Ibid., p. 48.

Figure-1

RATE OF GROWTH OF CRUDE OIL PRODUCTION IN THE UNITED STATES AND IN THE REST OF THE WORLD, BY YEARS, 1876-1938, COMPARED WITH OTHER SIGNIFICANT INDEXES.



Source: Joseph E. Pogue, Economics of the Petroleum Industry, Mar. 1939, p. 7.

disadvantage in all markets. Foreign nations could build up their domestic economy at our expense. The result might be not only loss of foreign markets but a lowering of standards of living at home.

If petroleum is important to our nation in time of peace, it will be doubly so in time of war.

> If in time of war, the necessary foreign supply of oil were in the hands of our antagonist, the result is known in advance.... If the supply of such an indispensable munition of war were in the hands of a neutral then that neutral nation might refuse to sell to us, in order to maintain that neutrality.... Even if the neutral nation did not prohibit the export of oil to us, we have to consider the difficulty of getting it. Oil tankers were the choice targets of submarines and air craft in the last conflict and certainly would be again.[46]

SUPPLY - RESERVES

The question turns then on extent of supply. If domestic supply is seriously limited, as some would have us believe, conservation should ensue even to the extent possibly of buying abroad and refusing to sell there until greater assurance is had for the future. The reception this suggestion would receive in the industry, even by the most ardent supporters of conservation may be easily imagined.

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46 Op. Cit., p. 48.

Although estimates as to potential supply reassure us on this point, and encourage us to believe that sufficient supply is available for the next decade, slowly but surely we are approaching a period of declining production. It is inevitable.

Actual extent of future supply is another of those many questions, in the industry, which cannot be answered with any exactness. Various estimates as to potential supply have been made by specialists in the petroleum industry. These are shown in the chart on the following page. However, the peculiar characteristics of petroleum which make it impossible to state with any certainty the location of oil, length of production, etc., also make it impossible to estimate with any accuracy total potential supply.[47]

A comparison of the estimates (Chart I) made by outstanding authorities in the field with actual volume produced will show production actually exceeding the amount estimated in volumes ranging from three to fifteen billions of barrels. At first glance these facts, together with the fact that proven resources are ever increasing, would appear to give the retort

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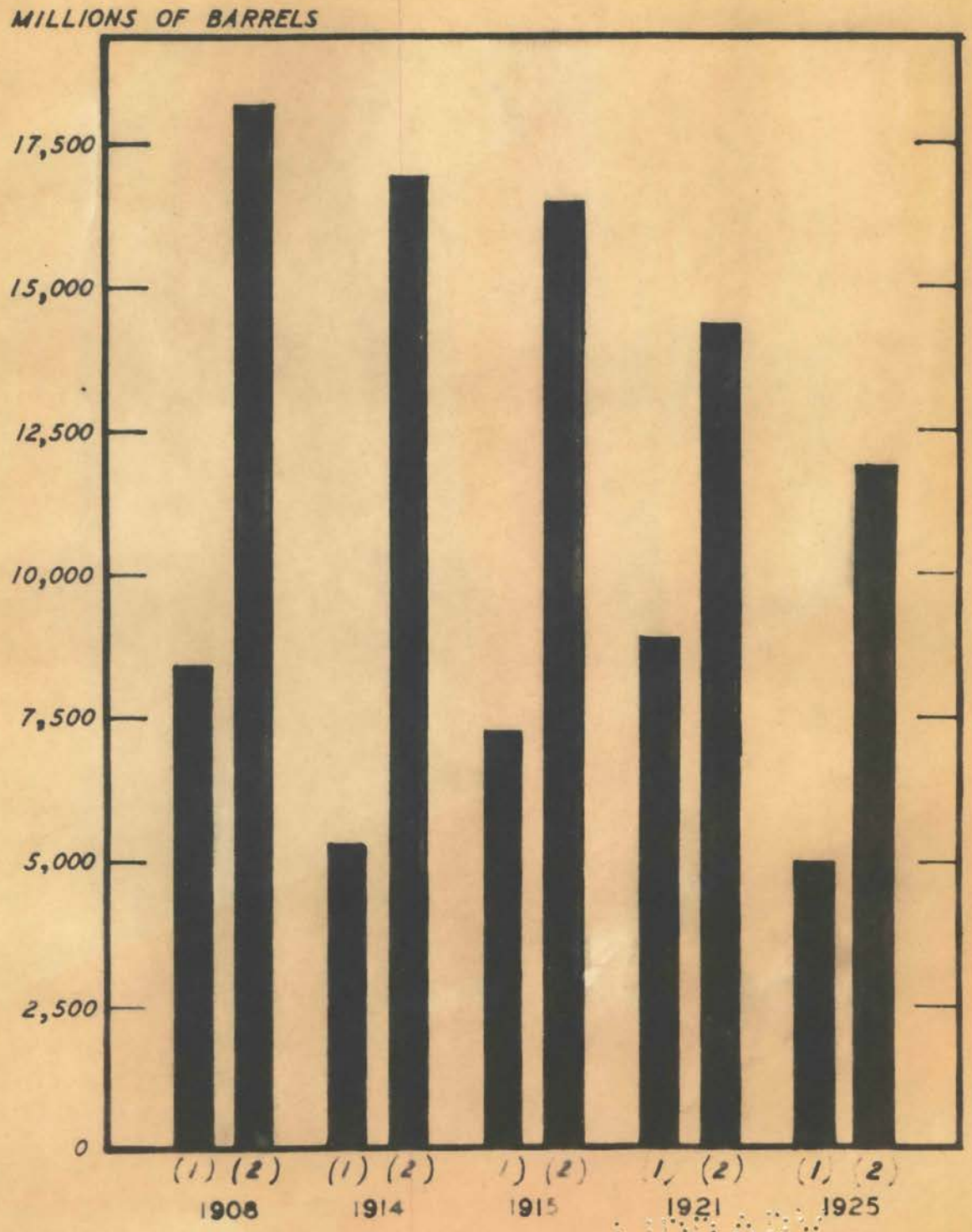
47 See Chapter One.

Figure- 2

ESTIMATES OF PETROLEUM RESERVES(1) COMPARED WITH ACTUAL PRODUCTION(2).



Source: I. P. A. of . Monthly, Marc 1938, p. 12.

courteous to those pessimists in the industry who have long predicted that exhaustion of supply was only a matter of months, or years at best.

However, we should not over-estimate our strength. There is no gainsaying the fact that there is a definite limit to our petroleum reserves, and that each barrel removed from the ground leaves one less for future production.[48] Mexico offers striking proof of that fact.

Various estimates have been made in addition to those quoted on the preceding page. The question is one which is vital to those interested in maintaining the economic well being of the nation. The Hon. Harold L. Ickes, Secretary of the Interior, estimates ten years as the life of our known oil reserves at the present rate of consumption. He says,

> It cannot be contradicted that the United States is using up its oil resources at a rate which is at least three times as rapid as the rest of the world, as a result of which there will be an oil shortage in the United States long before there is one in the rest of the world.[49]

On the other hand, Mr. Harry F. Sinclair (oil producer) thinks our domestic petroleum resources, without

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48 Virgil D. Kirkham, Economic Geologist. Saginaw, Mich., Seventh Annual Meeting of Independent Petroleum Association, Oklahoma City, Nov. 31, 1936.

49 Pettingill, op. cit., p. 16.

recourse to substitutes or foreign imports or curtailments in use on account of radical rise in price, will last the nation from one hundred to five hundred years. He wisely declined to underwrite the prophecy.[50]

The American Petroleum Institute estimated proven crude oil reserves in the United States on January 1, 1939, as 17,348.2 million barrels, a working stock in advance of production estimated at 14.3 years. Table 1, on the following page, presents this information in greater detail.

Extent of proven reserves does not entirely solve the problem for proven reserve is quite a different matter from future reserves or volume of oil yet to be produced. The former represents only the apparent volume of blocked out oil, whereas the latter includes oil yet to be discovered as well as additional oil to be recovered from known deposits by improved methods.[51] Size of proven reserve gives no clue to, and logically cannot be expected to reveal, the imminence or remoteness of scarcity.

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50 Pettingill, op. cit., p. 11.

51 Pogue, op. cit., p. 15

TABLE I[51a]

PROVEN CRUDE OIL RESERVE IN THE UNITED STATES
January 1, 1939
(Data from American Petroleum Institute)

State	Reserve Million barrels	% of total	Production 1938-Million Barrels	Indicated life in years
Texas	9,447.8	54.5	475.6	19.9
California	3,188.8	18.4	249.7	12.8
Oklahoma	1,162.4	6.7	174.9	6.6
Louisiana	1,040.3	6.0	94.8	11.0
New Mexico	703.3	4.1	35.8	19.6
Kansas	613.2	3.5	59.6	10.3
Wyoming	261.1	1.5	19.0	13.7
Illinois	242.8	1.4	23.9	10.2
Pennsylvania	200.5	1.2	17.4	11.5
Arkansas	188.2	1.1	18.1	10.4
Montana	104.5	.6	4.9	21.3
Michigan	42.7	.2	19.2	2.2
New York	40.5	.2	5.	8.1
Kentucky	37.5	.2	5.8	6.5
Ohio	26.4	.2	3.3	8.0
West Virginia	24.5	.1	3.7	6.6
Colorado	17.7	.1	1.4	12.6
Indiana	6.	.0	1.0	6.0
Total	17,348.2	100.0	1,213.1	14.3

51a Pogue, op. cit., p. 15

> The basic consideration regarding future supply of petroleum is not the size of proven reserve but the effective magnitude of future reserve....The problem is not so much one of finding a way of drawing aside the veil that obscures the future, as it is of maintaining an economic mechanism competent to handle any contingency.[52]

SUBSTITUTES

In considering reserves, and possible future supply, the possibility of substitutes enters. The careful attention of the industry has already been directed toward the development of substitutes for petroleum. Science has failed in several ways to achieve the desired results. One of these failures is particularly important.

Industrial life today is more dependent upon petroleum as a lubricating oil than for any other purpose regardless of the fact that this use ranks less in point of volume than many others. Today the most delicate mechanisms like the greatest turbines, move on surfaces smoothed by petroleum. It is evident that they will continue so to move for several years. Science has found substitutes for petroleum, at a price, for most uses, but it has failed to find an adequate substitute for petroleum as a lubricant.

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52 Op. Cit., p. 15.

Science has also failed to find a substitute for petroleum which can be produced at a cost low enough to permit it to compete with petroleum products. Cost is the factor which at present most greatly discourages serious consideration of the utilization of substitutes for petroleum.

Shale is more often mentioned as a potential source of motor fuel than any other substance. It is estimated that there are three hundred ninety four billion short tons of oil shale from which 108 billion barrels of crude shale oil and 25 billion barrels of motor fuel could be recovered. Contrast those figures with total production of petroleum from 1859 to December 31, 1934, ...an amount totaling 16, 598,444,000 barrels.

Slightly more than half of this shale is in Colorado and Utah, removed from large consuming centers. Indiana and Kentucky have large deposits. The Bureau of Mines has conducted an investigation of oil shale utilization at Rulison, Colorado. Amortization alone of retorts, etc., equals 28 cents a barrel of shale oil. Oil produced from shale, therefore, cannot as yet compete with petroleum.[53]

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53 Pettingill, op. cit., p. 21.

Coal and lignite are also potential sources of motor fuel. Commercial recovery of crude from coal has been estimated at 525 billion barrels and of motor fuel at 92 billion barrels. From lignite, it is estimated 70 barrels of crude and 12 billions barrels of motor fuel may be recovered.[54]

Germany has operated a plant at Lenna for several years producing oil from coal. In 1936 England constructed its first commercial hydrogenation plant. Costs of motor fuel from coal have been generally assumed, by the industry, to be around 30 cents a gallon. A. C. Fieldner, Chief Engineer of the Bureau of Mines states that costs to the consumer will be materially higher. Mr. Mark L. Requa, director of the Oil Division of the Food Administration during the World War, seriously mentioned the possibility of using coal dust, without conversion into gasoline, as a motor fuel.[55]

The Texas Corporation and Standards of New Jersey and Indiana have joined with Phillips to produce motor fuel from olefins.[56]

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54 Pettingill, op. cit., p. 22.

55 Ibid., p. 19.

56 Ibid., p. 16.

> It is said that, through the pyrolysis of paraffin hydrocarbons to form olefins and the polymerization of these olefins, natural and refinery gases, except methane, theoretically could provide a motor fuel supply equal to the present production of cracked gasoline.[57]

Science has long since convinced us that there are no barriers for genius. In fact there are those in the industry who fear as much from the generosity of genius in the way of invention, hence increased prpduction, as from the niggardliness of Nature.[58] Increased efficiency in the industry is, in part, responsible for increased production. Thus, it is to be expected that increased knowledge will soon affect substitutes and that there

> ....will be oil from the reduction of oil shale and from the pressure hydrogenation of coal and from reduction of water gas. Each will be able to prevent actual famine, but will be higher priced. Alcohol will be used as a partial substitute for motor fuel but cannot substitute for needed lubricants.[58]

SECONDARY RECOVERY METHODS

Science is, in another way, postponing the time when our petroleum reserves will approach exhaustion. This is being done by technical developments result-

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57 Pettingill, op. cit., p. 22.

58 Ibid., p. 19.

ing in a reworking of old fields. This is commonly known as "repressuring".[59]

Inasmuch as primary production methods extracted from 10 to 35% of the oil in the sand, the possibility of these newly discovered secondary methods of recovery are enormous. Pennsylvania is one of the leading states in the repressuring experiments. This is due, in part, to the unusual value of its oil (which is high in lubricating qualities) and to the character of the underground formation.[60]

Secondary methods of recovery are, at best, salvaging processes and rank with substitutes to some degree in high cost of production of oil so obtained. They are therefore practical only in fields of high gravity as in Pennsylvania. Like substitutes they will be used only if, and when, petroleum demands a high enough price to justify their use or when exhaustion is so imminent as to demand it.

When that time comes it is possible that more efficient motors will have been invented, and made

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59 Gas, air or water introduced into the oil sands, causing oil to flow again is known as repressuring.

60 Alex McCoy, Petroleum Reserves.

available to further postpone actual exhaustion. Economy could also be practiced by substituting coal, and other fuel, for those uses which could be served equally well by other fuels. At present, however, known reserves, possible future reserves and possible substitutes do not present a picture which would lead one to believe that scarcity, much less exhaustion, was immediate or imminent.

DEMAND

Supply, however, has little meaning except as viewed in the light of consumption or demand. When first discovered (1859) petroleum was used only as an illuminant and was especially welcome in view of the decreasing supply of sperm oil which had been used for that purpose. With the development of the automotive industry, in the early part of the 20th century, the need for fuel oil and lubricants increased rapidly. Shortly after petroleum had given impetus to the automotive industry, or vice versa, came the World War with an abnormal demand for petroleum. Following the War time demand came the period of industrial expansion and the again increased expansion of the automotive industry. Today this industry furnishes the greater part of the demand for petroleum and its products.

The next largest consumption is in agriculture. That field accounted for 3.28% of total demand in 1930 of which 80% was used by tractors. The wheat belt in the west uses tractors and combines almost entirely in the planting and harvesting of wheat and the demand for such purposes has increased rapidly. The other principal non-automotive use is that of construction. General construction consumes about 1% and highway construction furnishes about 1% of total demand.

Gasoline consumption per motor vehicle in the United States has increased from 11.67 barrels per year in 1924 to 16.93 in 1933. This averages .65 of a barrel increase per year. Such increase cannot be expected to continue indefinitely for demand will level off some time in the future. At present we can only wonder as to when, and at what point, the leveling off will occur.[61]

Consumption by airplanes is another rather unpredictable feature. In 1930 the flying time for the Army was 3½ times per plane what it was in 1924, while

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61 Cole Committee, op. cit., p. 89.

the gallons consumed per hour increased but slightly. Miles per gallon, however, dropped from 7.01 to 3.79 indicating that the larger type of plane is responsible for increased consumption.[62]

Revenue busses constitute a small proportion of all motor vehicles. Because of their size and because they operate many times as many miles a year as does the average motor vehicle, they become significant in gasoline sonsumption.[63]

All considerations tend to indicate that consumption of gasoline will increase in the future. Increase will depend on two factors, number of vehicles and average consumption per vehicle. Average consumption per motor vehicle is likely to increase for a number of years to come, the rate of increase dependent on several factors. One of these factors is the time each person has to devote to motoring. If all factors exert their maximum influence, it may be expected that motor fuel demand should more than double within the next fifteen years.[64]

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62 Cole Committee, op. cit., p. 89

63 Ibid., p. 91.

64 Ibid., p. 92.

General business conditions have much to do with actual consumption of petroleum. Business recessions cause decline in number of vehicles purchased, decline in use of those purchased, etc. This is clearly reflected in demand for petroleum products and is being taken into consideration in estimates made by the Bureau of Mines and used by states in allocation of production quotas.[65]

Speaking more specifically of demand, Mr. McCoy states:

> Total demand for crude oil in the United States for the next 20 years is estimated at approximately 45,000,000,000 barrels. Total oil discovered to date in the United States is 33,000,000,000 barrels; total amount produced to date is approximately 20,000,000,000.
>
> To meet expected demand the next 20 years in addition to production from known reserve, it is necessary to discover 29,000,000,000 barrels new oil. This rate of discovery is equal to the rate of discovery in the United States since 1924....Considering no additional development present drilled reserves are estimated as capable of supplying demand until November, 1941.[66]

The consensus of opinion, in the industry, is that just as no one knows just the extent of the supply

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65 McCoy, op. cit., p. 16

66 Ibid.

of petroleum neither is there one who knows definitely how long the known reserve will last even at the present rate of consumption which is approximately a billion barrels a year.

It is rather commonly accepted that, if all our known reserves could be produced at the present rate of production and consumption, our known petroleum reserves would be exhausted about 1950. It is likewise admitted that if we are to keep pace with consumption, we must discover one billion barrels of new oil per year. The last five years our rate of discovery has been barely half that much.[67]

Oil pools are apparently getting harder to find even in the face of recent technical improvements in the industry. This is evidenced by the increasing percentage of dry holes. In Texas and Oklahoma, this percentage has risen 30% in twenty years; in California 40% in thirty years. These increases are persistent in spite of the refinements in geological practices and despite the addition of thousands of expert geologists to the staffs of the larger oil companies.[68]

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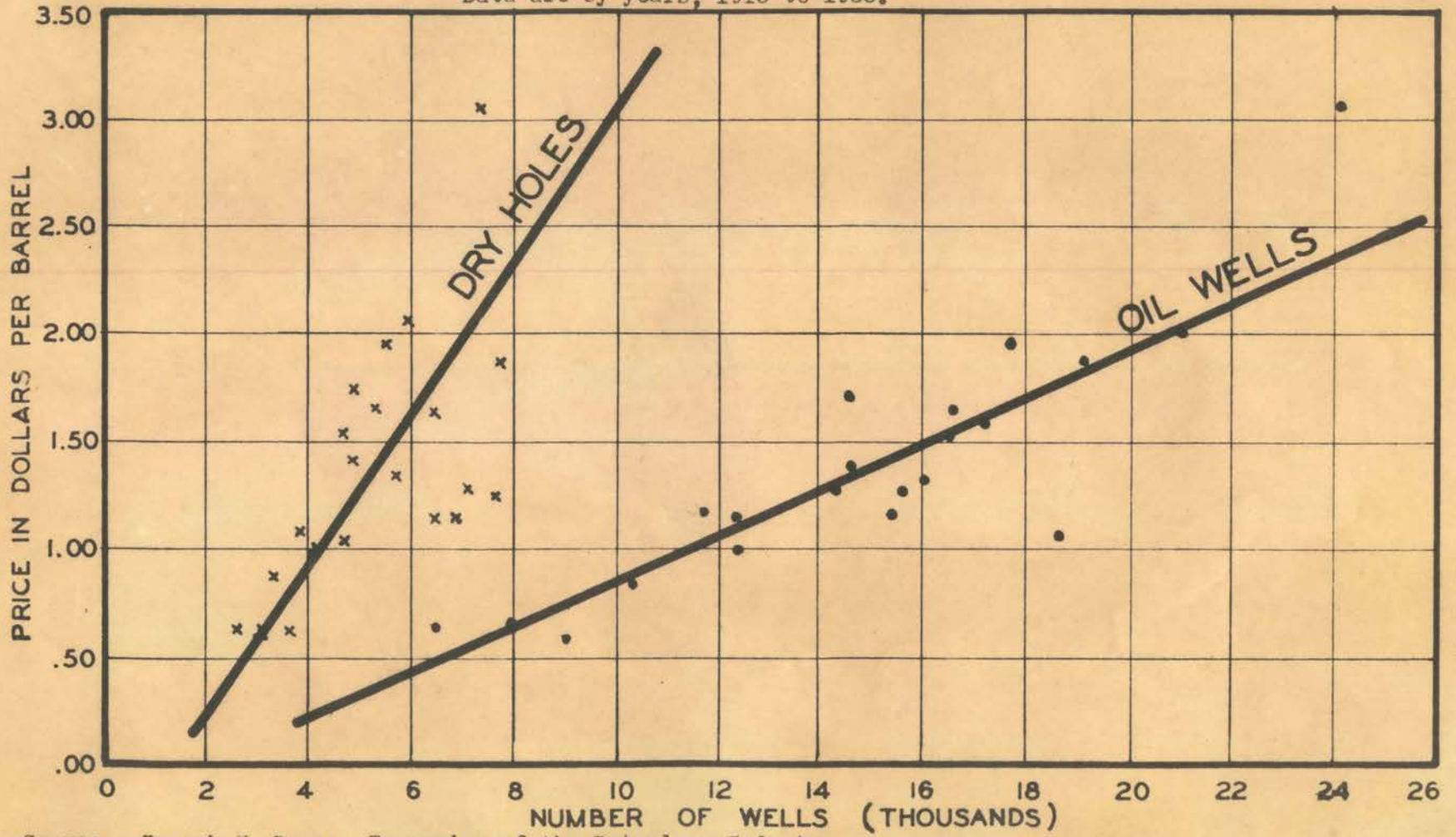
67 Op. Cit.

68 Ibid.

Figure-3

CORRELATION BETWEEN WEIGHTED AVERAGE PRICE OF CRUDE OIL AND (a) NUMBER OF DRY HOLES DRILLED AND (b) NUMBER OF OIL WELLS DRILLED--THE INDEXES, RESPECTIVELY, OF WILDCATTING AND DEVELOPMENT EFFORT.
Data are by years, 1915 to 1935.



Source: Joseph E. Pogue, Economics of the Petroleum Industry.

COST OF PRODUCTION

Cost of production, in the petroleum industry, is another singularly complex question. So many variables exist that it is impossible to fix a definite cost of production within one field much less one which will apply to several fields. Only after a particular well has been completed, depth of oil sand and type of formation determined, amount of labor and equipment lost "fishing for tools" ascertained, etc., may costs be stated with any degree of accuracy. For that reason an estimate as to average cost of production would be a figure which means little. Let us, however, attempt to obtain such an estimated figure from those who are best informed on the subject.

Alex McCoy states that total average cost to the industry for delivering one barrel of oil to the pipe line, considering all investment with interest is:

(a) For oil discovered between 1924 to 1930 . . . . . $1.11

He estimates that costs will rise during the next twenty year period and that cost of delivering one barrel of oil to the pipeline during that period

will average $1.89.[69] Figures as to percentage of dry holes, and depth of drilling would add weight to that estimate. Cost of production therefore begins to assume an even more serious aspect in the future than it has in the past.

> Total cost of drilling a well has increased with the passing years. In the early days of oil development, $5,000.00 was sufficient to meet the cost of putting down a hole. In the days when the shallow fields were being brought in, the costs were small and it was comparatively easy for independent operators to raise sufficient capital to put down a well. It is different today. A few years ago a 3000 ft. well was considered a deep well. Today a 3000 ft. well in considered shallow....According to operators in the Oklahoma City field, it costs from $100,000.00 to $150,000.00 to drill a well.[70]

Testifying as a representative of the industry, at a hearing before the Subcommittee of the Committee on Interstate and Foreign Commerce, April, 1937, Mr. Russell B. Brown gave the following facts concerning total income compared with total cost of production:

> The production cost for approximately four years, according to the Conservation Division figures, show production costs about one cent a barrel more than we received for the oil; in other words, we got

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69 McCoy, op. cit., p. 16.

70 Ibid.

> about one cent a barrel less during the four years than it cost to produce the oil...less than the average cost of production.[71]

Whther this was wholly due to excessive production, or in part to excessive costs of production, it is impossible to determine. No statement is included as to what costs of production included, hence no particular value can be attached to the statement. It is interesting in that it leaves the impression that total income, for the industry, was below total cost of production.

Ordinary economic reasoning would suggest that the industry can not, for a very long time, be conducted at either a loss or an unusual profit. However, Governor E. W. Marland, of Oklahoma, adds to the weight of testimony that:

> The producing branch of the oil business has been operating for 50 years at a total loss of approximately $2,400,000,000; that in the years 1922 and 1923 producers lost approximately $500,000,000 each year; that the oil produced in the Burbank field up to October, 1923, had netted a total loss of $70,000,00...[72]

It is true that competition operated in a crude and bungling fashion in the oil industry. However, it

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71 Russell B. Brown, Hearing of Subcommittee on Interstate Commerce, House of Representatives, April, 1937.

72 John W. Ise, The United States Oil Policy, p. 222.

is almost impossible to believe that total loss resulted instead of total gain. One is tempted to wonder if accurate calculations of profit and loss were made or if possibly all items included were properly evaluated.

PRICE STRUCTURE

It is also true that certain practices other than production practices have been accepted by the industry and are still used which are not as practical as they might be. One of these is the price structure.

> Instead of the retail price being determined upon the proper cost basis beginning with the raw material there long prevailed the custom of first establishing the retail price and then working back through the distributor, the refiner, the transporter, alloting to each of these a more or less arbitrary portion of the consumer's payment and then passing over to the original producer what was left.[73]

It is said that cost or price of crude has little to do with actual cost of the refined product to the consumer. That the item is so small, even at $1.00 a barrel, for forty-two gallons, that it would almost be possible to substitute water with little change in price to consumer.[74]

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73 Brown, op. cit.

74 Hon. Tom Anglin, Senator (formerly Representative on Interstate Oil Compact Commission), Interview.

There is a great deal of difference obviously between cost of production of settled and flush production. About 500,000 to 600,000 barrels of production daily comes from settled production. That is taken from approximately 250,000 wells.[75] The balance of daily production, estimated around 3,000,000 or less barrels, comes from some 30,000 to 50,000 wells.[76] Average cost of production must take into consideration not only production from stripper well areas, where costs are admitted to be around $1.00 a barrel, but production from areas similar to the Kettlemen Hills where costs are as low as a cent a barrel.[77]

If flush production pays only costs of drilling as is so often stated by the industry, settled production should result in an income over many years which should ultimately include some profit.

In summary it may be said that the activities dependent upon petroleum are indispensable. Reserves are limited in size. Rate of supply of oil

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75 Cole Committee, op. cit., p. 1512.

76 Joseph E. Pogue, The Outlook for Oil Demand, p. 2

77 Cole Committee, op. cit., p. 1513.

being brought to the surface is falling behind rate at which demand is growing. Substitutes have been discovered to replace petroleum for most uses. Increased knowledge has made it possible to increase quantity of recoverable petroleum from known reserves, however, output in this country must inevitably decline.

Extent of reserves do not indicate that a period of scarcity is imminent. Cost of production of oil, while impossible to ascertain to any degree of exactness, is still much lower than cost of any known substitute. It is possible that income from petroleum production, on the basis of the uneconomic price structure, has not operated as greatly to the advantage of the producer as might have been the case. It is impossible to conceive that some profit has not resulted to the industry from its operations.

CHAPTER THREE

HISTORICAL SKETCH OF STABILIZATION EFFORTS

The history of the petroleum industry may be divided into three eras in analyzing stabilization efforts. The first of these begins with the well drilled by Colonel Drake in 1859; the second with the organization of the Standard Oil Company in 1882; the third in 1918 with modern stabilization efforts.

Competitive drilling early took its place in production philosophy. That, together with the enormous strides made by the industry and the fact that it was difficult to syncronize supply and market demand, resulted in almost chronic over-production.

FIRST ERA: EARLY CONTROL.

From the very beginning it was apparent that producers felt they should do something about over-production and not sit idly by and permit more oil to be produced than could be sold at a remunerative price. The approach to the problem has always been through control of production.

PETROLEUM PRODUCTION ASSOCIATION

As early as 1869 there was an effort on the part of the industry, in the form of the Petroleum Production Association, to control production. Again in 1876 a plan for pooling surplus oil was evolved as a means of advancing market price. New uses for oil were discovered, prices advanced rapidly, and such schemes became unnecessary. Neither functioned long nor was of lasting value.

In 1877 came the discovery of a new pool, the Buillon pool. Exactly the same thing happened in 1877, as happened some fifty years later with the discovery of the East Texas pool, except perhaps with less intensity. There was over-production, the consequent depression of prices and the uniting of the industry in an effort to stabilize.

PRODUCERS PROTECTIVE UNION

To correct the existing situation, the Producers Protective Union was organized. This was a secret and fraternal order of some 2500 to 3000 producers.[78] The purpose of the organization was to unite interests, suspend operations, and induce friends and neighbors to join until an "unbroken chain" was formed.

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78 Logan, op. cit., p. 132.

In 1884 there was a more general and partly successful movement among producers to restrict drilling.[79] This failed, for the reason that most voluntary efforts have failed, because producers in the new and threatening flush areas refused to cooperate.

PRODUCERS ASSOCIATED OIL COMPANY

Out of the movement of 1884 was formed the Producers Associated Oil Company. From this came the one scientific approach to the problem of over-production offered during the first era. The Producers Associated Oil Company drew a boundary line contract stipulating that there should be an area of twenty acres to each well. Inasmuch as there was an excessive amount of oil in storage at that time (some 31,000,000 barrels) the Company also contracted with the Standard Oil Company to suspend operations and restrict production to one-third, until storage could be decreased. This was a practical approach to the problem and was apparently of value to the industry at the time.

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79 Op. Cit.

SECOND ERA: THE STANDARD COMPANY

The second era of the petroleum industry centers around the Standard Oil Company. That this over-laps the first period may be seen in the above discussion for apparently even so early as 1884 the Standard Oil Company was so influential that it must be bargained with.

The original trust agreement of the Standard Oil Company was formed in 1882. So powerful did this company become that the history of Standard Oil from 1882 to 1911 is essentially that of the petroleum industry.

> From 1899 to 1907 it (the Standard Oil Company) with subsidiaries produced more than one tenth of all the crude oil in the country, transported over four fifths of the oil from the Pennsylvania and Indiana fields, manufactured more than three fourths of the crude oil refined in the United States, owned and operated more than half of the tank cars used to distribute its products, marketed more than four fifths of all the illuminating oil sent forth from the United States, sold more than 4/5 of the naptha sold in the United States, and sold more than 9/10 of all the lubricating oil sold to the railroad companies in the United States.[80]

The original trust agreement was dissolved in 1892 because:

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80 Ise, op. cit., p. 223.

> The court held that the trust agreements in question are acts which must be regarded as the acts of the corporation, and as such are ultra vires; and tending as they do to the creation of a monopoly, to the control of prices as well as production, these acts are against public policy, and accordingly contrary to law. This same year Standard Oil trust dissolved and the various establishments and plants reorganized into 20 constituent companies. The trust certificates when they were surrendered were replaced by a portion of the shares of each company, properly divided. The effect was the same as before and the men who were trustees held a majority of the stock. The unity of action among the several companies was not changed.
>
> This original organization continued to function until 1911, when the Standard Oil Company of New Jersey ass holding company was dissolved by the United States Supreme Court. This corporation was broken into 33 separate and independent companies.[81]

The advantages of large cash reserves, the possession of strategic commercial locations, the experience gained from acquaintance with the industry virtually from its inception enabled the Standard Company to achieve a dominating position.

While the Standard Oil Company did not have a monopoly on production of petroleum, through its control of refining and marketing operations it had a powerful influence on production through price fixing on crude.

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81 Op. Cit.

It may, therefore, be readily seen that one highly organized unit under the guidance of intelligent and centralized direction could and did control production thirty years ago. This was more easily achieved at that time than would be possible today for operations were concentrated in a relatively small area. However, during the domination of the Standard Oil Company there were fewer periods of over-production and the ones which did exist were less acute.

The dissolution of the Standard Oil Company is described in a report of the United States Fuel Administration and quoted in Pogue's Economics of Petroleum:

> One of the immediate and permanent results...was to limit the interest of the executives of the new commercial entities to market value in the territory in which they operated. The factor which had worked to exert national rather than sectional influence upon the trend of the markets and to establish a general level of prices for petroleum products subject only to transportation and similar normal variations had been wiped out of existence.[82]
>
> It is no reflection upon the high purpose and public zeal which brought about the attempts at government control to say that experience had shown that action to be an

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82 Pogue, op. cit., p. 15.

> economic mistake and that the new order which it established accentuated rather than retarded the conditions which it was designed to correct. This development has not been the outcome of lax or unintelligent enforcement of the dissolution...for the weight of evidence accumulated as the result of keen and almost constant surveillance by several departments of the government is entirely in support of the conclusion that the dissolution decree has been scrupulously observed.[83]

The dissolution of the Standard Oil Company brought to a close the second era in the development of the oil industry, one in which over-production played less part than in the decases just previous or those immediately following.

In the early history of the industry various plans had been attempted, in an effort to control production, with little scientific justification. With the growing influence of the Standard Oil Company and the pressure it was able to bring to bear on production, no great periods of excessive production threatened.

Following the dissolution of this organization, and the breaking down of its power to influence production, came an abnormal demand for petroleum and its products due to the World War. Thus it was

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83 Op. Cit.

not until 1918 that attention was again directed to stabilization of the oil industry. It was in that year that the modern movement for stabilization is said to have begun.

THE MODERN ERA: GOVERNMENTAL COOPERATION

If this period differed from those preceding in no other factor than governmental cooperation, it would be worthy of note. In its early development the industry would not have asked for, or accepted, governmental assistance. As no other industry the petroleum fraternity has been united in its acceptance of the laissez faire philosophy When the occasion demanded it the industry has gone so far as to rattle the bones of classical economics in an effort to escape interference. They have quoted Adam Smith's Wealth of Nations to substantiate their claim that improvement of economic conditions are the result of self interest and not of governmental action.[84]

During the third period a gradual change is apparent. This may have been due, in part, to the manner in which the government first manifested in-

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84 Memorandum for Committee of American Petroleum Institute on Information for Federal Oil Conservation Board, March, 1925, manuscript.

terest in the problems of the industry. It may have been due to the fact that the industry felt that governmental assistance was preferable to financial destruction.

About this time (1918) came the more general realization of the fact that petroleum was an irreplaceable and exhaustible resource. In that year Chester C. Gilbert and Joseph E. Pogue published a report for the United States National Museum (Bulletin 102) in which they called attention to the dangers and economic evils of overproduction.

> They expressed the opinion that the fundamental difficulty with the practices of production lie in the competitive development of pools which should be treated as geological units. They recommended the integration of operations insofar as it was possible without having monopolistic control.85

These same recommendations are being advanced today with almost as little result as first attended their presentation. Because of the existing prosperity within the industry in 1918, little attention was given the report or its suggestions. The industry had not yet recovered from a feeling of satisfaction at having met the heavy demands made

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85 Logan, op. cit., p. 128.

upon it during the War.

THE AMERICAN PETROLEUM INSTITUTE

In 1919, as an outgrowth of the National War Service Petroleum Committee, the American Petroleum Institute was born. This organization has consistently rendered an exceedingly valuable service to the industry and to the public.

The annual meetings of this group present an opportunity for discussion of various problems of the industry. In 1920 many papers were read emphasizing the inadequacy of the visible supply of petroleum in proportion to needs, the importance of conservation and improved technology. The situation with regard to supplies from foreign fields was also discussed.

The year following the Institute directed its attention to immediate problems within the industry. Although the Institute was little concerned with the problem of conservation, President T. A. O'Donnell did attack the estimate of reserves made by "super scientists". He also decried any tendency toward government control or interest in the industry.86

He made one suggestion that is being put into practice today and that is the

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86 Op. Cit.

> formulation of agreements to shut down large production pools during the period of seasonal accumulation of stocks. This prevents the usual waste necessary in carrying oil in storage and at the same time assures a sufficient supply being available during the peak of consumption.[87]

Throughout the years the American Petroleum Institute has served the best interests of the industry. It has encouraged discussions of problems of current importance and assisted in molding public sentiment in many other ways. The work done by this organization is so closely related to other developments that it is impossible to separate it from the discussion. Therefore, in the following pages, the American Petroleum Institute will be mentioned now and then.

CONGRESSIONAL INVESTIGATIONS

The interest in visible supply of petroleum, possibility of exhaustion, and the like early drew the attention of Congress. In 1920 an investigation was ordered into the causes for advances in price of fuel oil, kerosene, gasoline, and other products. Congress was interested in, and directed the commission to report on, sources of oil in the nation, profits of the business, and what, if any combina-

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87 Logan, op. cit., p. 128.

tions in restraint of trade existed between those engaged in the business. Information was also desired as to the effect if any, these would have upon the market price of fuel oil, etc., to the consumer.[88]

House Document 801, published in 1920, gave the report of the Federal Trade Commission in response to the above Congressional resolution for an investigation. The Commission found:

> 1. There seems greater justification in assigning advance in price to varying conditions of supply and demand, in the light of emphasized and pessimistic statements as to future supply, than to a combination in restraint of trade.
>
> 2. Recent advance in price was probably due primarily to strong demand with difficulty of many companies in getting an adequate supply of crude oil together with increased expenses of operation.[89]

By the end of 1920 over-production had increased to such an extent that the Prairie Oil and Gas Company was prorating runs in the Mid-Continent field, taking only 7% of production to which its lines were connected. Pipeline proration offered a practical temporary solution to the problem. Importation of crude from Mexico was thought to be the

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88 Logan, op. cit., p. 130.

89 Ibid.

chief cause for forcing oil into storage at this time. Hence, agitation was started for a tariff. No relief was obtained.

In 1921 the Senate authorized an investigation to ascertain the causes of fluctuations in prices of crude petroleum and its products.

In 1922 there was a second Senate Investigation of the petroleum industry by the Committee on Manufactures. Their report, given to the Senate on March, 1923, was unfavorable to the industry particularly regarding alleged domination of the industry by Standard groups. Known as the LaFollet investigation, this inquiry impressed on the minds of the leaders of the industry the real possibility of regulation and the dangers of unfriendly, or ill advised, legislation.

UNIT OPERATION

The plan of operation of pools as units had been advanced by Messrs. Gilbert and Pogue in 1918 but had received little attention.[90] Mr. Henry Doherty who is generally given credit for sponsoring the idea of unit operation, presented this idea to the American

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90 Logan, op. cit., p. 55.

Petroleum Institute in 1921. His plan included:

1. Plan for cooperative activity by entire industry to further expansion of use of petroleum products in new fields.

2. Plan of operation of oil pools as units.[91]

These suggestions were not received sympathetically by the Institute. Mr. Amos L. Beaty, President, opposed them for the following reasons:

1. It would result in impairment of contracts and taking of property without due process of law if plan applied to established fields.

2. The difficulty of exercising rights held on non-productive lease holds if plan applied to existing leases.

3. Difficulty of forming district in most areas considered favorable if plans should not apply to existing leases but cover all unleased territory, in view of large amount of such territory under lease.

4. Difficulty of initiating activities under new plan.

5. Difficulty of securing trustees of sufficient knowledge and capabilities to handle affairs of district and dangers of local politics and petty graft.

6. Difficulty of apportioning royalties.

7. Revolution in entire industry necessary to fit into new system.[92]

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91 Logan, op. cit., p. 134.

92 Ibid., p. 148.

The meeting of the American Petroleum Institute, in 1924, included a discussion of Mr. Doherty's plan in secret session. The directors agreed with a motion by Mr. E. W. Marland, Oklahoma, to draft a resolution disapproving the plan. At the same meeting a resolution was drawn offering full cooperation to the Federal Oil Conservation Board. At this meeting the famous Committee of Eleven was appointed.

COMMITTEE OF ELEVEN

A committee, composed of eleven men, was designated for the purpose of studying petroleum reserves. The report filed by this group, after receiving testimony of some two hundred specialists in the field, stated that there was little danger of early exhaustion of petroleum reserves. The report also advised that there was little waste and estimated a reserve of a billion acres.

The status of this report later gave the Federal Oil Conservation Board some concern (1934). Although referred to as the "Institute Report", it did not bear the endorsement of the Institute; some fifteen letters from men in the industry put them on record as not subscribing to it.[93] While the report was

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93 Op. Cit.

referred to often during the testimony given before the Cole Committee (1934) the same might be said concerning the status of the report at that time.[94]

It is apparent that unconsciously personal reasons must have influenced the analysis of the data involved. This resulted in an over estimation of reserves. The report must have been presented in good faith for the men composing the personnel of the Committee are men whose integrity is unquestioned. The fact remains, however, that the report is admitted to be incorrect by members of the industry who, for like personal reasons, might have preferred to agree with the Committee of Eleven.

The report is interesting in that, as an overstatement of potential reserves, it furnished an additional obstacle to overcome in the argument for conservation. It has been necessary, on several occasions to first prove the report incorrect before attempts at stabilization and conservation might be justified.

FEDERAL OIL CONSERVATION BOARD

December 19, 1924, President Coolidge appointed the Federal Oil Conservation Board consisting of the

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94 Hon. Calvin Coolidge, President of the United States, Executive Order. Federal Oil Conservation Board, Report I.

Secretary of War, Secretary of the Interior and the Secretary of Commerce. He instructed this Board "to study government responsibility and enlist the full cooperation of the oil industry in an investigation to determine actual conditions."[95] This was a more difficult task than it appeared to be. The industry had been favored with a series of investigations and feared another such series. This feeling of indecision on the part of the industry, however, soon gave way to one of candor and cooperation.

The industry realized that there were certain uneconomic practices used in developing production properties and that correction of these was impossible without assistance. The industry was not entirely responsible for these practices; they were the result of court decisions beginning with the analogy of percolating waters and wild game and continuing with the application of the Law of Capture.

The Federal Conservation Board filed its first report in September, 1926. This dealt briefly with development, production and use of petroleum, known fields, future reserves, proven fields, possible new

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95 Op. Cit.

fields with a discussion of foreign sources, substitutes, action to be taken with reference to reenforcement of supply, control of flush production and the government's own problem of public domain. It also included a statement that the inquiry would continue.[96]

In 1927 a Committee of Nine was appointed by the Board. This Committee had three representatives from the industry (all past presidents of the American Petroleum Institute) Thomas O'Donnell, J. Edgar Pew, and W. S. Parish. It had three members from the American Bar Association, Henry M. Bates, James A. Veasey and Warren Olney, Jr. There were also three government representatives, Abram F. Myers, Walter F. Brown and E. C. Finney. This committee filed a report with recommendations in February, 1929. The suggestions included:

1. Federal legislation which shall unequivocally declare that agreements for the cooperative development and operation of single pools are not in violation of the Federal anti-trust laws and (b) permit, under suitable safeguards, the making in times of overproduction, of agreements between oil producers for the curtailment of production. The form of such legislation suggested was:

2. Similar legislation by various oil producing states.

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96 Op. Cit.

3. Immediate further study into matters of waste of natural gas in order that legislation may be formulated which will forbid such waste as fully as may be done without working injustice and unreasonable hardship.

4. Legislation by Congress granting the Secretary of the Interior authority to join and to permit lessees from the government to join in agreements for the cooperative development and operation of single pools.

5. Passage by Congress of the legislation heretofore recommended to it by the Secretary of the Interior, removing the existing mandate upon him to offer for lease annually regardless of conditions, 100,000 acres of Osage Indian Lands.[97]

Overproduction in the United States recurred in a form so malignant "as to seem without precedent" in 1927, according to a press release issued by the Federal Oil Conservation Board. It continued with little dimunition and March, 1929, an American Petroleum Institute committee meeting at Houston, Texas, proposed that production be limited if such action met with the approval of the Board.

Secretary Ray Lyman Wilbur, Chairman of the Board, asked William D. Mitchell, Attorney-General of the United States for an opinion. He replied, March 15, 1929, stating that such action would be

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97 Op. Cit.

in violation of federal anti-trust laws and that by asking the Board for approval the Institute was virtually asking immunity from prosecution under these laws. This immunity, he stated, the Board had no power to bestow having been set up merely to study the industry and make recommendations for conservation.[98]

The Board continued its efforts to promote legislation controlling production. As it appeared that production of petroleum was a matter of state control the Oil Conservation Board worked out a plan for a "Compact" of the principal oil producing states, under federal approval. The details of this plan were set forth in a letter by Secretary Wilbur to R. C. Holmes, President of the Texas Company and Chairman of the Special Committee on Supply and Demand.[99]

Other than this suggestion, the accomplishments of the Federal Oil Conservation Board appear to be a series of reports and the accumulation of a vast amount of information on the industry. It accom-

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98 Federal Oil Conservation Board, Report III, September, 1930.

plished little else....

> The only real good, so far, that has come out of the work of the Federal Oil Conservation Board, has been the education of all the members of the industry and the general public to the needs of the industry and the extent that the public welfare is tied up with it.[100]

This stimulation of interest in the problems of the petroleum industry, generated by the Federal Oil Conservation Board again divided into the two classic views historically held by the industry, and the public, as to the need for (or against) control to stabilize or control petroleum. There is a common basis of interest for the two viewpoints.

THE COMPACT IDEA: CONFERENCE OF GOVERNORS

Growing out of the suggestion made by the Federal Oil Conservation Board, a conference of Governors was called June 10, 1929, at Colorado Springs, by President Hoover. The purpose of the meeting was the discussion and formulation of a practical program for the conservation of petroleum. Mark L. Reque, a personal friend of Mr. Hoover, formerly General Director of the Oil Division of the United States Fuel Administration in 1918 and 1919

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100 Logan, op. cit., p. 152.

was chairman of the conference.

Delegates attended from Oklahoma, Texas, California, Kansas, Arkansas, Louisiana, Pennsylvania, Montana, Colorado, Wyoming, New Mexico and Utah, including four governors. Little was accomplished as delegates came uninstructed and had no authority to commit their governors, legislatures or people as to participation in a compact.

The conference served primarily to accentuate the cleavage between two groups in the industry. One of the groups was the large integrated companies both Standard and Independent; the other represented a smaller investment but included a larger group in point of numbers. This was made up of independent producers, royalty owners, independent refiners, intra-state pipe line operators, supply men, oil field workers, owners of permits to operate on government lands, and lease and royalty brokers.

As a matter of principle both were interested in conservation but they were in business primarily to make money. There was a conflict between the two groups. The larger companies desired curtailment of production to a minimum in order to curtail supply and cause higher prices. The second group

did not wish curtailment of production as it would cut off their source of livelihood. It was necessary for them to produce to make money and money was made in flush pools. Curtailment of production would cut off royalties, sales by supplymen, the source of supply to the independent refiner and the prices of leases and royalties would be reduced.

The Independent Producers Association was formed at this time primarily for the purpose of furthering the interests of this group with especial reference, at that time, to tariff.

Contrasted with these years, when over-production was sometimes great but never staggering, comes the next few years of chaos. In 1929 came the market collapse; in 1931 the discovery of the East Texas field which completely routed any remaining sense of stability in the industry. Oil was sold at any price in order to get it out of the way for still other oil. Posted price on oil fell to 10¢ per barrel and it is more than probable that oil sold for even less than that.

Following closely upon the East Texas field came the discovery of the Oklahoma City field with its hugh potential. Extravagant waste was again

the order of the day. "Wild Mary Sudik", one of the largest wells in the Oklahoma City field, flowed uncontrolled for days. Other such spectacles of waste left the conservationists aghast.

Proration, or production of only a portion of the potential, was the only device which the industry had to fall back upon in such a crisis. Voluntary proration was attempted for thirty day periods in the Mid-Continent field, upon the agreement of independent operators at a meeting held in Tulsa.[101] A major part of the industry cooperated unhesitatingly with the oil umpire who was appointed to assist in stopping the deluge of oil which threatened to destroy many an individual and company.[102] These attempts were unsuccessful. There are always those few who value their personal interests above those of the whole. These few continued to produce either by choice or necessity. The Governor of Oklahoma finally called out the state militia and proclaimed military law in an attempt to enforce proration in the Oklahoma City field where the greatest emergency existed. This was, of necessity, a temporary measure.

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100 Oil and Gas Journal,

102 Roy M. Collins appointed umpire., Ibid.

As may be really seen the problem was not wholly that of over-production. The heart of the problem was rather the break down in control by states.[103] Over-production in any one state or two states can precipitate a national crisis. That was the situation which then existed.

Realizing the acuteness of the problem and the fact that no one state could correct it, the industry for the first time in its history appealed to the federal government for assistance in the solution of its problems. A conference was called at the Mayflower Hotel, Washington, in which representatives from the independent groups of the industry met with the group called by the Secretary of the Interior. This group consisted of governors and representatives of larger oil companies, hence all factions were represented.[104] Recommendations were submitted by the three groups cooperating on this conference but included the suggestions that:

> Immediate closing of flush production ....naturally as a temporary measure effective for a limited time...Some allocation of future

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103 Wirt Franklin, Independents Win at Conference. Independent Monthly, April, 1933, p. 5.

104 Hon. Tom Anglin, Representative, Interstate Oil Compact, 1935-1938. Now State Senator. Conference.

> production was proposed on the only statistical basis commonly accepted...Recognition of the necessity for an adequate competitive tariff was won.105

A copy of this report was forwarded to the Governor of each oil producing state together with a letter from the President regarding the various reports and recommendations. He asked particular attention to some especial points and to the fact that the industry stated an emergency existed which required the enactment of special legislation by Congress. This the President stated he was ready to recommend.

Senator Arthur Capper, of Kansas and Congressman E. W. Marland, of Oklahoma, each presented bills outlining proposed control measures. Neither these or the Federal Oil Control Bill, which was an outgrowth of the two bills, received majority approval.

FEDERAL OIL ADMINISTRATION

Emergency assistance was finally obtained in the form of federal control under the National Industrial Recovery Act, passed June, 1933. Senator Elmer Thomas, of Oklahoma, presented an amendment to the Act, known as the Administration Bill. This

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105 The Washington Oil Conference, Independent Petroleum Association Monthly, April, 1933.

bill intended to substitute for the indefinite and undefined control of the industry, under the broad provisions of the general National Industrial Recovery Act, some definite and specific provision for the protection of the oil industry. This was defeated leaving the petroleum industry under federal control without the specific provisions and protection which could have been provided.[106]

Section 9, Title I, of the National Industrial Recovery Act had to do with petroleum. It provided:

> (a) The President is further authorized to initiate before the Interstate Commerce Comission proceedings necessary to prescribe regulations to control the operations of oil pipe lines and to fix reasonable, compensatory rates for the transportation of petroleum and its products by pipe lines, and the Interstate Commerce Commission shall grant preference to the hearings and determination of such cases.
>
> (b) The President is authorized to institute proceedings to divorce from any holding company any pipe line company controlled by such holding company which pipe line company by unfair practices or by exorbitant rates in the transportation of petroleum or its products tends to create a monopoly.
>
> (c) The President is authorized to prohibit the transportation in interstate and foreign commerce of petroleum and the products thereof produced or withdrawn from storage in excess of the amount permitted to be produced or withdrawn from storage by any state

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106 Industrial Bill Controls Oil. IPA Monthly, June, 1933, p. 6.

> law or valid regulation or order or other duly authorized agency of the state. Any violation of any order of the President issued under the provisions of this subsection shall be punishable by a fine of not to exceed $1,000 or imprisonment, for not to exceed six months, or both.[107]

Section (e) provides for an embargo or limitation of imports.

> The particular type of control inaugurated for oil grew out of the drive for national recovery initiated by the new administration. The industry was to write an industrial constitution called a Code of Fair Competition equitable toward labor and consumer, it was also intended to restore profits for the divergent groups in the industry.[108]

CODE OF FAIR COMPETITION

In this attempt to write a suitable code for the industry, the traditional enmity between the two groups in the industry was somewhat forgotten. It was difficult, however, to arrive at an agreement as to code which would satisfy the divergent interests. Inasmuch as the whole country was attuned to immediate salvation, it was injudicious to permit a "family squabble" to prolong indefinitely the reaching of an agreement.[109] The government finally had to take

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107 National Industrial Recovery Act, Section 9, Title I.

108 Walton Hamilton, Price and Price Policies, p. 165.

109 Ibid.

a hand. On August 19, 1933, a code admittedly expedient was pressed on the industry. This code stated its purpose was:

> ...to eliminate unfair competition in the petroleum industry, to insure the conservation of petroleum resources of the country, to eliminate unfair trade practices, to increase employment, to establish fair and adequate wages, to enlarge the purchasing power of persons related to the industry, to improve the standards of labor, to protect the consuming public from excessive prices, to avoid the premature abandonment of wells of settled production, to so restore the American petroleum industry that it may promote the general welfare and common prosperity of the American people, and to accomplish and effectuate the policies set forth in the National Industrial Recovery Act...110

Walton Hamilton says of this:

> The final code, after a series of definitions and a polite bow to labor, struck boldly at the problem of overproduction. The legal justification for action was the power of the federal government to regulate the flow of interstate commerce.111

The Code provided in Article III, Section 1, for administrative machinery for its effectuation consisting of:

(a) Planning and Coordination Committee, representing the petroleum industry and the National Recovery Administration

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110 Code of Fair Competition

111 Hamilton, op. cit., p. 166.

(b) A federal agency to be designated by the President.[112]

August 28, 1933, the President designated the Secretary of the Interior, Harold L. Ickes, as Administrator for the Petroleum Administration, to exercise all functions and powers vested in the President and designated the Department of the Interior as the Federal agency provided.

The Petroleum Administrative Board was created September 15, 1933, in the Department of the Interior to advise with and make recommendations to the Administrator. The Production and Refining Division of the Board was designated to handle new pool plans; its staff included petroleum engineers and geologists formerly with the Bureau of Mines and the United States Geological Survey, as well as other assistants with training and experience in petroleum engineering, geology and economics.[113]

The Planning and Coordinating Committee was composed of 26 members. Of these three, without vote, represented the government, the remaining members

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112 Code of Fair Competition, Article III.

113 This is the Independents Day, IPA Monthly, December, 1933, p. 9.

were selected from the industry throughout the country.

The Planning an Coordinating Committee was faced with an enormous and unique problem.

> At its very first meeting, it was necessary to realize that the whole nation was embarked upon a system of industrial planning in which neither farms nor factories nor mines nor oil wells would be permitted to produce more of their products than the nation could consume. There was to be control of every phase of our national industry.114

This Committee was to determine and recommend the estimated consumptive demand for the nation and make an equitable allocation of that demand among the oil producing states.

> No one knew what the consumer demand really was. Neither did any one know what our national production had been. Hot oil and oil which had evaded tax payment have been entering the channels of trade in quantities which no one could accurately estimate. Using the most reliable data at our disposal ...we made our estimate of that demand and then endeavored, honestly and fairly, to work out such allocations of that demand as would be just to each oil producing state.115

The Oil Administrator made announcement of monthly average quotas of crude requirement for each pro-

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114 Hamilton, op. cit., p. 166.

115 Wirt Franklin, This is Independents Day. Address. Annual Banquet of Independent Petroleum Association, November 12, 1935.

ducing state.

> The allocations took into account probable withdrawals from crude storage and expected imports; they represented the quantity to meet demand for the ensuing month. Estimates were made by the Federal Bureau of Mines and the Petroleum Administrative Board. Their accuracy and impartiality were generally unquestioned by the industry. Subdivisions of quotas among pools were left to the producing states....The President was granted the power to subdivide the state quota among the intrastate pools. (Section 4, Article III.) Though this power was never used, it provided an incentive to action by the states.[116]

Another great question the Planning and Coordination Committee had to face was the price issue.

> Merely balancing supply and demand was not enough to insure cost recovery to the producer... While there were advances in price under this new production control, those advances were not sufficient either to stop the heavy losses being suffered by so many or to insure the maintainance of our stripper wells and their valuable reserves. One of the fundamental things in the NIRA is the abolition of sales below cost. To merely forbid sales below cost would have transferred the greater part of our market to a few flush fields whose costs were low and who would have been able to undersell the rest of the nation....
>
> We had to begin at the bottom and work out the problem of every part of the nation, considering production, refining, transportation, and marketing. It was a monumental task.... The result of that cost study is expressed in the minimum price schedules which have been announced by the Oil Administrator.[117]

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116 Hamilton, op. cit., p. 166

117 Franklin, op. cit.

A different view of this is given by Walton Hamilton:

> Throughout the life of the code a bitter fight was waged between the "price fixers and the anti-price fixers". The industry differentiated sharply between outright fixing of prices and such indirections as controlled production and fair trade practices. Actually this difference was less distinct than superficial since all the devices had price control as their end...However, the administration accepted price fixing only in principle; no specific schedule of prices was written into the code.
>
> The code authority, representing a miscellany of divergent interests proceeded at once to make the abstract commitment a reality. By a process of mutual bargaining in committee, minimum prices for oil at the field, refinery and service station were agreed upon and presented to the Oil Administrator....Accompanying the schedule was an urgent plea to the administration that they be immediately put into effect for a trial period....
>
> The schedules were referred to the Petroleum Administrative Board, which asked for a conference with the President. The President according to report stated that he was not opposed to a price-control program but could consider it only after the Oil Administrator and the Board had satisfied themselves of its actual necessity, its feasibility, and its economic and legal defensibility.... Response from the industry was so negatively overwhelming that the plan was delayed until a hearing was begun. This in turn was delayed....[118]

In December, 1933, a substitute for the price fixing schedule was presented. A buying pool was to be organized its functions were to hold surplus gasoline from the market.... and to establish a "proper" rela-

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118 Hamilton, op. cit., p. 171.

tionship between crude and refined gasoline price.[119]

> Again a host of objection was raised by the independents. It was becoming clear to the code authority that a schedule of price, no matter how carefully worked out, could not win general support...Elsewhere in the NRA price fixing was falling into disrepute.[120]

Under federal control, as under other systems, the big difficulty lay in production of "hot oil". A number of ancillary devices were used by the government to catch the hot oil producer.

> One resort lay in a law passed by Congress providing heavy penalties for false statements in reports to government agencies....
>
> Another enforcement device was an order of the Oil Administrator requiring detailed information for all movements of oil in interstate commerce. Every shipment was to be encircled with testimony regarding source and destination attended by notaries signatures....This was in the course of time superseded by the creation of a Federal Tender Board for East Texas where the bulk of the hot oil originated. The Board did not permit the shipment of oil in interstate commerce out of that region until evidence was presented that it had been produced in accordance with federal regulations. Nor was any interstate movevement of gasoline allowed until the refiner demonstrated that it had been processed from legally produced oil. For the first time the burden of proof that oil was legal rested squarely with the producer and refiner. This shift in presumption and the vigorous action of the Tender Board arrested the shipment of hot oil.[121]

Something of the problem of the Federal Oil Administration is here indicated and something of the

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120 Hamilton, op. cit.

121 Ibid.

technique. The history of the industry, under its direction, is familiar to all, orders setting quotas, the fight against "hot oil", and finally the growing sentiment as to the unconstitutionality of the National Recovery Act and hence of the Code of Fair Competition.

Between June, 1933 and June, 1935, the petroleum industry accomplished a complete reversal in attitude. When the code was written, the general belief in the industry was that survival depended upon a thoroughgoing Federal control. State control did not even obtrude as an issue. The real fight was whether the federal government should go so far as to fix prices from oil well to filling station. The narrow escape from price fixing was due, not to the industry but to the efforts of public minded officials within the federal government.[122]

Under the Code the industry was enjoying real gains...

> Production which had started upward in early 1933 had been halted; reductions had been made in the accumulations of crude and refined stocks. The balance of supply with demand was further facilitated by an increased demand for oil products as general recovery got under way. A renewed vigor and optimism found explicit

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122 Hamilton, op. cit., p. 175.

> expression in the maintenance of the crude price structure. In an industry which operated openly the psychological attitude of buyers and sellers are of paramount importance. As higher prices and industrial stability made prosperity once more a reality, it also evoked additional antagonism against government interference....By the time the Schecter decision in May, 1935, the large companies and many independents were calling for the complete removal of the federal government from its affairs.[123]

Many suits were inaugurated to test the validity of the oil code and the orders of the Oil Administrator thereunder. The Supreme Court of the District of Columbia upheld the code. In February, 1934, Randolf Bryant, District Federal Judge, held the code unconstitutional but did not sign the order which permitted operations to continue pending the disposition of the Supreme Court.

Many suits and injunctions had piled up trying the constitutionality of the National Industrial Recovery Act. At different times, various phases of it were held unconstitutional. First among these was Section 9-C, which had to do with the movement of petroleum in interstate commerce. This was held unconstitutional on January 7, 1935. Following

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123 Hamilton, op. cit., p. 175.

this decision the Connally Act (so called Hot Oil Bill) was passed which achieved practically the same results as had been accomplished previously under Section 9-C.

In May, 1935, the decision in the "dead chicken" (Schecter) case caused the National Industrial Recovery Act to be declared unconstitutional thus bringing to an end federal regulation of oil production, at least for the time.

> Luckily the Schecter decision came in the spring when the demand for gasoline normally increased....Collapse of the code aroused fearful anticipations...Before its adjournment in 1935, Congress passed a resolution approving in principle the interstate compact....[124]

Reviewing the accomplishments of the Federal Oil Administration, it is generally admitted that much was accomplished. The technique used was logical, all phases of the industry assisted in making and enforcing the regulations. The Oil Administrator attacked the various problems with courage and ability.

Mr. R. M. McClintock, editor and commentator, says, "It is the longest period of stabilized price

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124 Hamilton, op. cit., p. 175.

and least waste in the history of the industry.[125] He also contends, as does Governor Walter Huxman, Kansas, that the legal justification is similar to that of crop control, that both are based on the prevention of exploitation. Regardless of legality, the Federal Oil Administration appears to have rendered the industry and nation a real service. Production was controlled, imports were limited, stocks of petroleum in storage were greatly reduced. Price was stabilized at a point which the industry admitted covered average cost of production.

COLE COMMITTEE

Beginning in the summer of 1934, there was another "investigation" of the Oil Industry. This was one of the most comprehensive and intelligent investigations ever held. Hearings were had, not only in Washington, but all over the country in oil producing states. The Committee (known as the Cole Committee)[126] flew to California, Oklahoma and Texas and were thus enabled to learn more of the actual con-

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125 R. M. McClintock, Oklhoma City, Oklahoma. Interview.

126 So called for Wm. Cole, Jr., Chairman.

ditions than if they had merely listened to testimony.

Experts from every phase of the industry cooperated and gave willingly of their time and knowledge that a more complete picture of actual conditions and problems might be available to Congress, and to the public. The results of these hearings are published and available in six volumes known as the Petroleum Investigation.[127]

The investigation did little toward adding to the knowledge of extent of supply, forecast of demand and the like but it did accumulate the best existing knowledge of those factors. It added little definitely to knowledge of actual or average cost of production. It did establish that conservation was desirable in order to eliminate waste, preserve vast resources in stripper well areas, and to conserve reservoir energy, one of the most valuable elements of petroleum. There was a discussion of various substitutes, and of the practicability in view of excessive cost of production.

After analyzing the testimony carefully, it appeared that the majority of the industry preferred

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127 This material is admittedly the best available, hence has been extensively quoted in preceding chapters of this paper under caption Cole Committee, Petroleum Investigation.

state control and felt that there was little legal foundation for federal control. This was in keeping with the change in sentiment which, at the same time, was making itself evident regarding the constitutionality of the National Industrial Recovery Act. Sentiment appeared to favor the formation of a compact between states, authorized by the federal government and assisted and supported, if necessary by the United States government.

Thus, a resume of the various efforts toward control of the petroleum industry divides itself into three eras, the first marked by various efforts of little influence or long duration, toward production control only one of which was based on scientific principles. The second period centers around the Standard Oil Company. While the Standard Oil company did not control production, through its refining and marketing facilities, it controlled production through posted price on crude. The third, or modern era, is unique in that it represents a complete reversal of the industry's attitude toward governmental assistance. Originally the industry has been an ardent supporter of the laissez faire philosophy; in this period the industry appealed frantically for

federal control. Having once achieved a certain feeling of security, the industry again reversed its position, repudiated federal assistance and quoted loudly and at length the various reasons opposed to federal control and in favor of state control. While apparently unable to unite the various factions warring within itself, the industry shows a remarkably united front when opposing individuals and ideas from without.

CHAPTER IV

THE INTERSTATE OIL COMPACT

The problem had, therefore, resolved itself into four elements. First, granting the need for control, it was believed that some governmental authority was necessary to regulate the way in which petroleum should be taken from the ground so that reservoir energy would be efficiently used to effect maximum recovery from oil and gas.

Second, it was believed that the state, as distinguished from the federal government possessed the authority to legally enforce conservation. Third, it was conceded that the federal government was needed to supplement the states activities by performing three functions; first, preventing the interstate movement of hot oil[122]; second, controlling imports; and third, making findings of fact and forecasts as to supply and demand.

Fourth, it was generally agreed that the state governments ought to cooperate with each other through an inter-state advisory commission so that orderly production in one state would not be penalized by losing outlets to uncontrolled flush production

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122 Oil produced in violation of state regulations is called "hot oil".

in another state.

STATE CONTROL OF PRODUCTION TO ELIMINATE WASTE

To achieve the first objective, that of orderly production, most states passed statutes, (similar to those passed by Oklahoma, which defined waste) and set up the machinery to control production to eliminate waste.

Proration, or pro rata taking, first introduced into use in Oklahoma in 1914, developed into a permanent and nation wide device for achieving orderly prpduction. It has been the neucleus of the conservation system. In recent years this term has come to bear a broader meaning than at first and now includes the entire process by which production of crude oil in the United States is regulated. It is based upon the power inherent in the State to regulate production practices in the interest of waste elimination. This power is expressed through conservation statutes and is administered, in Oklahoma, by the Corporation Commission.[129] This also took care of the second goal, or state control.

FEDERAL CONTROL OF IMPORTS, HOT OIL, FORECASTS:

The federal government passed and enforces the Conally Act designed to regulate oil in interstate

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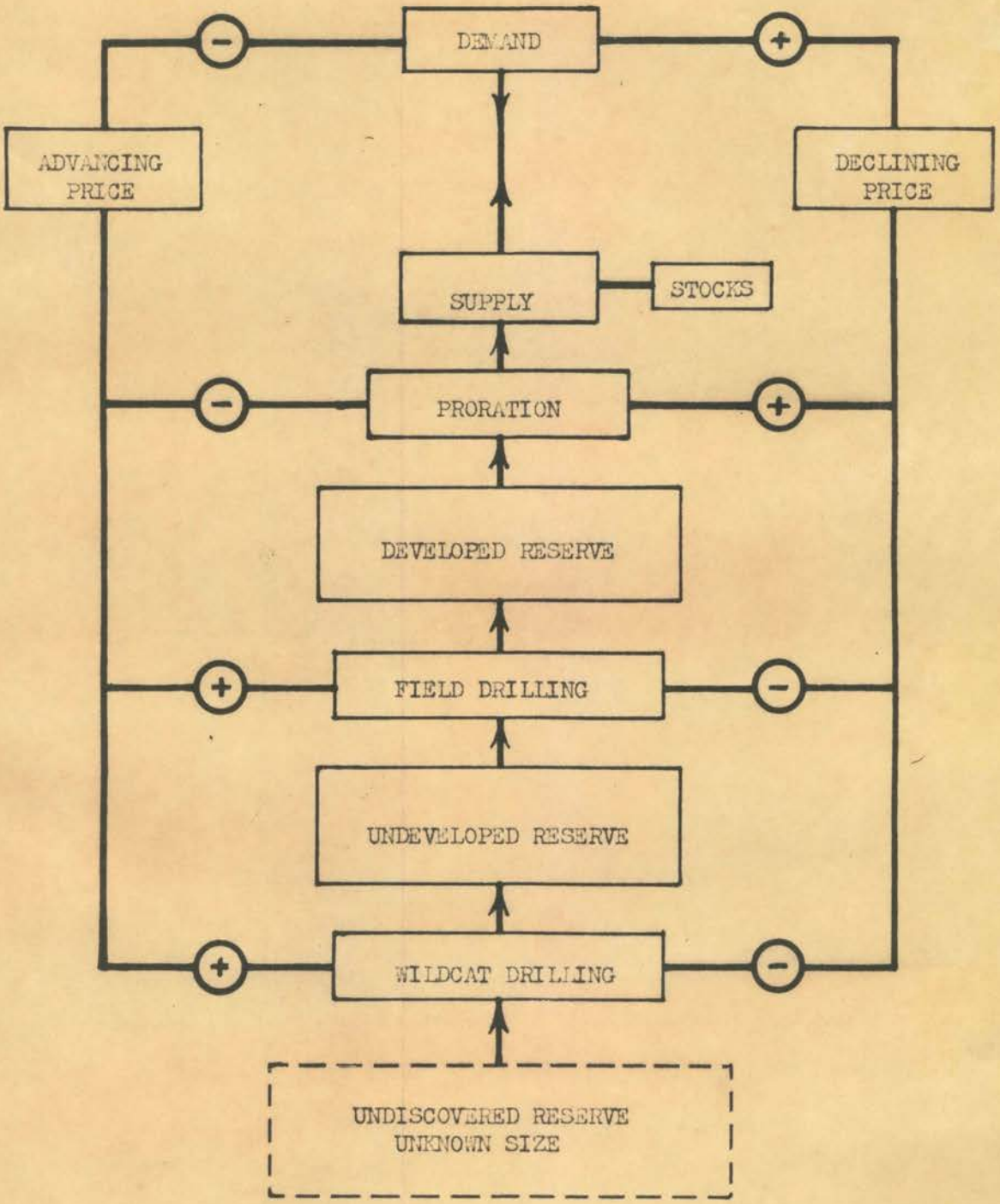
129 Pogue, op. cit., p. 19

Figure-4

DIAGRAMMATIC SKETCH OF ECONOMIC STRUCTURE OF PETROLEUM INDUSTRY UNDER PRORATION SHOWING EFFECT OF PRICE UPON VARIOUS PARTS OF THE SYSTEM.

Plus sign signifies stimulus; minus sign, retardation.



Source: Joseph E. Pogue, Econ. of the Pet. Ind., Mar. 1939, p. 25

commerce and to eliminate "hot oil". The federal government assisted also by limiting imports and, through the United States Bureau of Mines, prepares a monthly advisory schedule of quotas which is submitted to all oil producing states.

BUREAU OF MINES ESTIMATES

In making up the national crude oil allowable each month, and forecasting trends, the Bureau of Mines emphasizes the following fundamental considerations:

(1) Conservation of the country's supply of the vital fuel.
(2) Provision of an equitable distribution among the producing states of the production necessary to meet common demand.
(3) Stability in the industry so that an excessive outpouring of oil will not be permitted to break down the economic structure or waste the reserves.
(4) A careful statistical valuation and study of the demand based upon accurate mathematical and economic data.[130]

The national total of necessary crude oil production is estimated and divided among the States by a method involving the following factors:

(1) Gasoline demand by districts.

(2) Gasoline supply for each district sufficient to meet its demand.

(3) Refinery crude required in each district.

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130 Bow, op. cit., p. 7.

(4) Imports of crude by districts.

(5) Distribution among the producing states of crude for refining.

(6) Exports, fuel and losses of crude by states.[131]

Thus the necessary machinery was set up to achieve three of the four major objectives necessary for the control of production in the petroleum industry.

INTERSTATE OIL COMPACT

To achieve the fourth, or an inter-state advisory commission, the Interstate Oil Compact was drawn up. Shortly after the Supreme Court declared the NRA unconstitutional (hence destroying federal control of petroleum) six of the oil producing states, producing 90% of the oil in the nation, entered into this agreement. Under the terms of the Interstate Oil Compact, or treaty, the signatory states pledged themselves, under date of February 15, 1935, to carry out a half dozen major conservation principles. The ultimate goal was maximum recovery of oil and gas.

> The Compact itself is necessarily a compromise. It is an agreement entered into voluntarily by six states with widely different political backgrounds and concepts of the State's authority, and subject to

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131 op. cit.

> different interpretations by their own courts of that authority.[132]

The idea of interstate compact is not new; more than sixty compacts have been approved by Congress. Compacts have been entered into

> ...with reference to river and harbor traffic between adjacent states, waterways, water power, flood protection, irrigation control between contiguous states, conservation of forestry resources, fishing rights, interstate bridges, boundary lines, and other subjects; and in one instance, as between the states of New Jersey and New York, has been in existence since 1834 or more than one hundred years.[133]

The oil producing states of California, Kansas, New Mexico, Oklahoma, Arkansas, Michigan, Wyoming, Texas and Louisiana have been parties to many compacts, concerning matters affecting the rights of more than one state.

The Federal Oil Conservation Board,[134] April 8, 1929, in a letter to R. C. Holmes, Chairman of an Interstate Committee on World Production and Consumption of Petroleum and its products(American Petroleum Institute) first suggested the possibility of interstate compact in connection with the solution of the problems of the oil industry. This letter states:

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132 E. W. Marland, The Interstate Oil Compact, p. 2.
133 See page 68.
134 See page 69.

> The Board believes it would be worthwhile to renew discussion with the states authorities of the three or four principle oil producing states particularly to learn if it is possible for them to enter upon an interstate compact under the provisions of the Constitution authorizing such compacts, to which the federal government through Congressional action, would be a party. The character of such a compact would need much consideration but it could well comprise creating a joint board for the purpose of constructive conservation and thus secure the nation from the very real peril that will lie in the reckless exhaustion of our oil resources.[135]

In 1931, following the discovery of the East Texas field and the breakdown which had occurred at that time, the first semblance of an interstate compact came into being with the appointment of representatives from ten oil producing states to act with the Federal Oil Conservation Board as an Oil States Advisory Committee. This Committee met at intervals and, in conjunction with the Federal Oil Conservation Board suggested to the producing states estimates of the reasonable market demand. It may be said to the credit of the individual states, or to that of the Committee, that those allocations were reasonably well observed. It may be that the efficiency and fairness of the Oil States Advisory Committee paved the way for the Interstate Oil Compact.

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135 Federal Oil Conservation Board, Report IV, p. 20.

As signed in 1935, the Oil Compact is brief, consisting of eight short articles.[136] The by-laws give name, structure of commission, time and place of meeting, etc.[137]

PURPOSE

The purpose of the Compact, as set out in this treaty, is the "conservation of oil and gas by the prevention of physical waste thereof from any cause."[138] It is inevitable that state restriction of production should be effected under the guise of conservation.

> The courts make free competition their norm of judgment and the proof for regulation rests squarely with the innovators. It was necessary to circumvent the "due process" clause...this could be accomplished only by drawing a distinction between "private industry and petroleum production"...
>
> Further hazards to state control lay in the interstate character of the oil business. The need of the state was for an argument which could stand legal attack at both these points. Conservation seemed to offer the easiest sanction with which to win judicial approval for regulation...
>
> ...as a conservation measure the proration of production had in it a large element of veracity. The compulsions of competitive drilling had made for a wasteful exploitation of oil reserves...Accordingly waste became the enemy against which the state statutes were directed...139

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136 Interstate Oil Compact, Appendix.

137 By-laws, Appendix.

138 Interstate Oil Compact, Article II.

139 Hamilton, op. cit., p. 178.

The Compact pledged the signatory states to enact laws, or if laws had been enacted to continue them in force, to prevent physical waste of oil both above and below the ground. Various types of such waste were set out.[140] It also pledged the states to enact statutes to deny oil, produced in violation to state regulation, access to commerce and to set stringent penalties for the waste of either oil or gas.[141]

The Compact clearly states that it's purpose is not to establish or fix price, to create or perpetuate monopoly or to promote regimentation.[142] Thus it is contended by those favoring the Compact that price control has not been the primary consideration or purpose, but if such has resulted it has been the residual thereof.

It has been stated that various decisions of the Supreme Court have effected a legal separation between activities directed at conservation and the control of price but that the economic distinction is less clear.

> Overproduction in any industry has always had serious consequences upon price. In an open market such as oil, production and price are not inseparable since stock accumulations

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140 Interstate Oil Compact, Article III, Appendix.
141 Ibid., Article, IV.
142 Ibid., Article V.

> have an immediate effect upon price... The producers interest in proration was not in the higher cause of conservation; it rested upon the more mundane consideration that overproduction had broken the price structure and sent the price of crude to a few cents a barrel....[143]

Colonel Ernest O. Thompson, Chairman of the Interstate Oil Compact (1936) discusses the purpose of the Compact further in this regard. He says:

> It is not the function of the Oil States Commission to make oil scarce in order to make it high. That was specifically prohibited... The American people are against waste in any form. They are for efficient operation of oil production to the end that the greatest ultimate recovery may be had; but it must always be kept in mind that they like reasonably priced, yes, cheap gasoline...
>
> There is no sadder sight than oils fields which have been operated for sudden profit without regard for the incident waste and the ultimate loss to the field and the state of oil that has been negligently left in the sands never to be recovered or, if recovered, at a greater cost. Every oil man knows the story. May those economic tragedies soon be a thing of the past! It is to this end the Oil States Compact is dedicated.[144]

We are tempted to think that the Colonel has not been quite as frank as was Governor Walter Huxman, of Kansas, who more nearly expresses the ideas most prevalent as to the real reasons for the Compact.

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143 E. O. Thompson, The Accomplishments of the Oil States Compact, p. 2.

144 Transcript of Proceedings, Interstate Oil Compact, Wichita, Kansas, April 29 and 30, 1938, p. 39.

He says:

> ...it is not a question of rock pressure... you never heard of it before we had an oversupply of oil...We produced in all fields at full capacity when we sold our oil at $2.50 and $3.00 a barrel, and you heard nothing of proration, and you know how far we would have gotten if we had talked it. These engineers would tell you it was better to have an open flow than a restricted flow, and most anything favorable to that viewpoint.[145]

The Governor implies that conservation of rock pressure is not the point most interesting to the oil industry, but stabilization of price at a reasonable point. Regardless of the reason which motivated producers to support the Compact, we can only assume that the purpose as set out in the agreement is the primary goal.

FUNCTIONS AND DUTIES

The functioning of the Compact, duties of representatives, etc., is set out in Article VI. From this we find that each state appoints a representative to a Commission designated as the Interstate Oil Compact Commission. The duty of this Commission is to "make inquiry and ascertain...methods, practices, circumstances, and conditions...for bringing about conservation and prevention of physical waste of oil and gas...and to report those findings to the several

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145 Interstate Oil Compact, Article VI, Appendix.

states together with their recommendations concerning same.[146]

The Commission is a forum, therefore, composed of representatives from the signatory states. Quarterly meetings of these representatives are held in various cities.[147] These are open to the public and are usually well attended by members of the oil industry as well as by officials from compacting and non-compacting states. Transcripts of the proceedings of these meetings are on file in the office of the Secretary of the Interstate Oil Compact, the Hon. Art L. Walker, Capitol Building, Oklahoma, and are available to the public.

The Interstate Compact Commission serves as a coordinating body. It has been working for several years in an unostentatious manner. It has been of value in that it has permitted various states, each with a problem peculiar to it alone, to meet and exchange ideas with representatives from other states. Thus Michigan, covered with blankets of glacial drift which conceals the structural folds and hence slow developments may get a better idea of Texas' problem where there are 69,000 wells, all under proration, including submarginal wells.[147]

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146 By-laws, Appendix.

147 Transcript of Proceedings, Interstate Oil Compact Commission, Dallas, Texas, December, 1938.

ACCEPTANCE OF ALLOWABLES

At the first meeting of the Interstate Oil Compact Commission a resolution was passed whereby the Commission recommended that the oil producing states produce and market oil in accordance with monthly estimates of future demands made by the United States Bureau of Mines.[148]

Table 2, "Production and Bureau of Mines Recommendations" shows the Bureau of Mines recommendation, actual production and percent of Bureau of Mines recommendations produced for the years 1936, 1937 and 1938. Records of the compacting states show little difference from those of non-compacting states. In fact, Illinois, a member of the Compact shows the widest deviation. Oklahoma is the only member showing an average below 100% for the three year period.[149]

REDUCTION OF PHYSICAL WASTE

Great strides have been made in the scientific control of oil production to prevent actual physical waste. Colonel Thompson says:

> We are preventing waste in Texas...The East Texas field has produced more than 1,000,000,000 barrels of oil in its more than five years of production. During the month of October, 14,000,000 barrels of oil

148 See page 96.

149 See Table 2, page 106

Table2: PRODUCTION AND BUREAU OF MINES RECOMMENDATIONS (x1000)

	B of M:	Actual:	% of B of M:	B of M:	Actual:	% of B of M:	B of M:	Actual:	% of B of M:	Av % of B of M:
New Mexico	B 68.5	74.0	108.0	96.8	107.0	110.5	107.4	98.0	91.2	103.2
Texas	1,113.1	1168.0	104.9	1338.0	1398.0	104.3	1354.5	1302.0	96.2	101.8
Louisiana	173.9	220.0	126.5	243.9	249.0	102.2	247.9	262.0	105.6	111.4
Arkansas	30.1	29.0	96.3	29.9	32.0	106.9	46.6	50.0	107.2	103.8
Oklahoma	540.0	565.0	104.6	689.7	627.0	102.8	528.7	476.0	90.0	99.1
Kansas	151.6	159.0	105.0	187.3	194.0	103.6	170.2	162.0	95.2	101.3
Balance Rocky Mt.	54.3	60.0	110.3	70.6	73.0	103.3	76.2	70.0	91.9	101.8
Illinois	11.8	12.0	101.7	15.0	21.0	140.0	44.4	63.0	142.0	127.9
Balance Eastern	129.8	131.0	100.8	142.9	151.0	105.6	153.0	152.0	98.8	101.6
Total east of California	2,273.0	2418.0	106.3	2734.0	2852.0	104.2	2729.6	2635.0	96.5	102.4
California	541.1	587.0	108.3	610.3	653.0	106.9	653.2	685.0	104.8	106.7
Total United States	1,814.1	3,005.0	106.8	3344.3	3505.0	104.7	3382.8	3320.0	98.3	103.3

Source: Hiram H. Dow, Report of New Mexico Representative on Interstate Oil Compact Commission, p. 29.

> were produced in that field and the bottom hole pressure increased one barrel during that month. The pressure is 1,184.5 pounds today. It was 1,201.1 per square inch in July, 1933. Since that time more than 600,000,000 barrels of oil has been produced from the East Texas field. I call that a record in conserving the energy which makes the oil flow. There are 31,500 wells in that field, 18,522 of these wells are still flowing. They make their allowable twenty barrels per day by flowing about 15 minutes per day. They are shut in the rest of the time, and the slow intrusion of water washes the oil through the sand and keeps the pressure constant or builds it up, as happened last month.[150]

Conservation of reservoir energy is admittedly one of the goals of control. It is doubtless true that proration has resulted in conservation in this fashion. Some credit for this may be due the Interstate Oil Compact.

REDUCTION OF STOCKS

The Compact has also directed its attack toward reduction of stocks in an effort to decrease waste. In 1937 a survey of physical inventory of crude oil stocks in the United States was made by the Bureau of Mines at the request of the Compact Commission.[151] Funds for this survey were appropriated by the 74th Congress. The results set forth some interesting information among which was the fact that total net stocks of refinable crude (over 15 years) has fluctuated

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150 Transcript of Proceedings, Interstate Oil Compact, Austin, Texas, March, 1939.

151 Thompson, op. cit., p. 2.

considerably with a high of about 434 million barrels in 1929, and a low of 287 million barrels on January 31, 1937. Major upward movements of crude oil stocks in this period have occurred in periods of numerous discoveries of large fields, specifically the periods of 1922 to 1924 and 1926 to 1929. Proration has tended to prevent radical increases in stocks although several breakdowns of curtailment (in East Texas field) were followed by material additions.[152] See Figure 5, on following page.

While it is impossible to directly attribute reduction of stocks to the influence of the Interstate Oil Compact, it is possible that the enthusiasm and cooperation generated at the meetings of the Commission, together with the statements made there as to the value of such reduction, is responsible for some of the results attained.

The investigation of the Bureau of Mines also found that no important producing state had changed its relative position with regard to the amount of oil stored within it in the last six years. Oil stored in Texas was 35.1% of the total at the close of both 1933 and 1937. Oil in storage in Oklahoma

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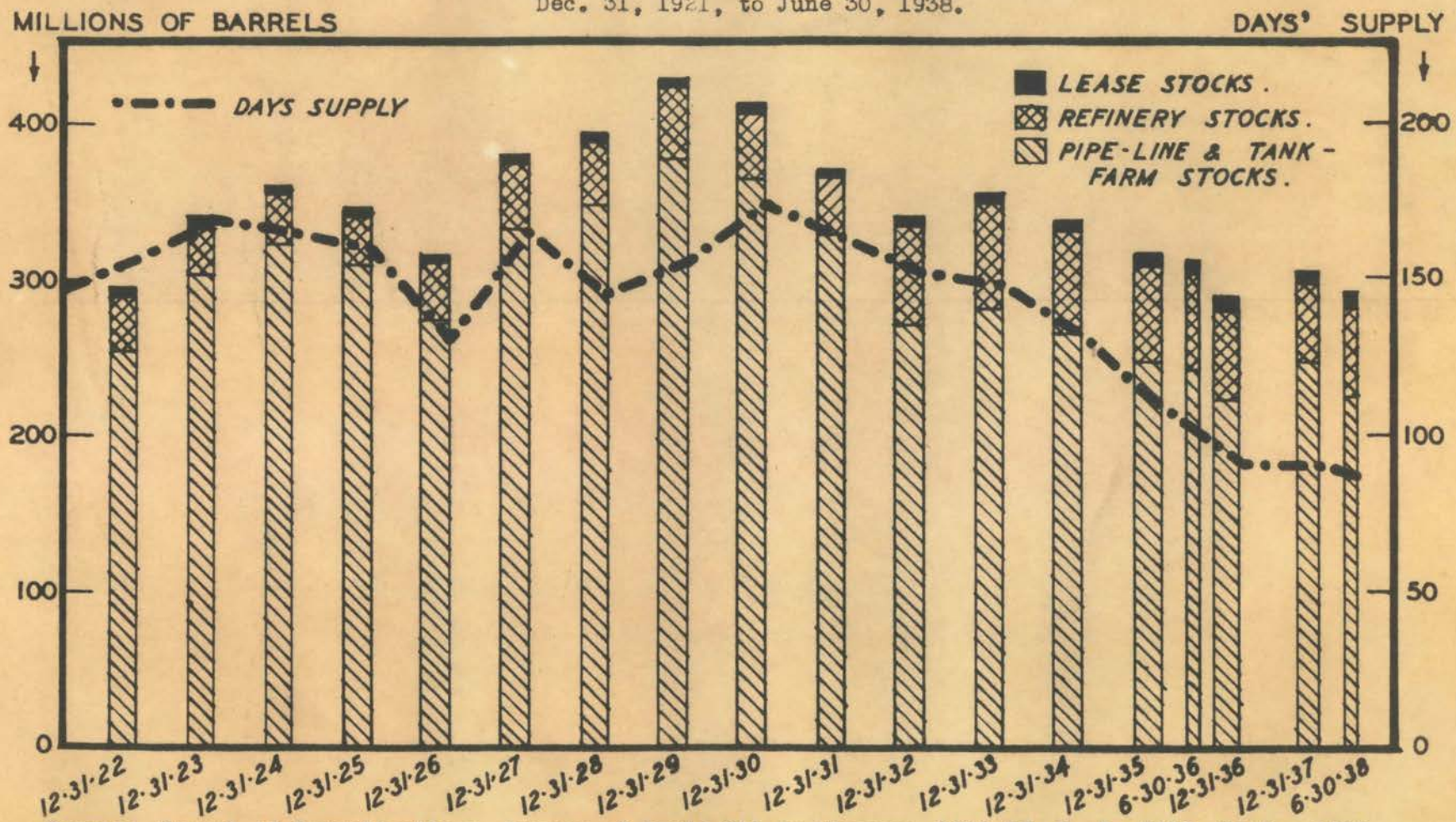
152 Bureau of Mines, Report of Investigation 3417, September 1938. Petroleum Economics Division and Petroleum and Natural Gas Division, p. 7.

Figure- 5

CRUDE-OIL STOCKS BY PRINCIPAL TYPES & DAYS' SUPPLY

Dec. 31, 1921, to June 30, 1938.



Source: Report of Investigations, Survey of Crude Oil in Storage, 1936-37, R. I. 3417, Sept., 1938, Petroleum Economics,Division, and Petroleum and Natural Gas Division, Bureau of Mines, p. 6.

STOCKS OF CRUDE PETROLEUM, BY STATES OF LOCATION, June 30, 1936 and 1937
(thousands of barrels)

	At refineries		At tank farms and in pipe lines		On leases		Total	
	1936	1937	1936	1937	1936	1937	1936	1937
Arkansas	706	737	3,162	1,695	275	245	4,143	2,677
California	7,984	8,451	26,992	21,508	2,880	2,771	37,856	32730
Colorado	369	387	51	53	30	40	450	480
Georgia[1]	655	369	-	-	-	-	655	369
Illinois	985	1,363	9,665	9,686	100	110	10,750	11,159
Indiana	722	1,375	1,385	1,668	8	8	2,115	3,051
Kansas	2,118	2,512	8,362	8,948	540	585	11,020	12,045
Kentucky[2]	615	525	376	473	40	45	1,031	1,043
Louisiana	[3]/3,690	[3]/4,471	6,335	7,492	625	530	10,650	12,493
Maryland	751	1,325	-	-	-	-	751	1,325
Massachusetts[4]	1,073	1,288	-	-	-	-	1,073	1,288
Michigan	166	248	768	841	110	100	1,044	1,189
Missouri	144	341	[5]/3,518	[5]/4,029	-	-	3,662	4,370
Montant	281	337	875	853	155	170	1,311	1,360
New Jersey	5,697	7,108	369	191	-	-	6,066	7,299
New Mexico	18	27	341	488	430	535	789	1,050
New York	1,163	1,045	113	133	18	18	1,294	1,196
Ohio	546	1,098	6,579	6,621	75	75	7,200	7,794
Oklahoma	2,400	2,075	62,676	64,160	1,930	2,020	67,006	68,255
Pennsylvania	4,614	5,016	2,367	1,854	100	100	7,081	6,970
Texas	15,329	15,184	89,628	87,211	2,945	2,850	107,902	105,245
Utah	138	105	-	-	-	-	138	105
West Virginia	36	40	1,690	1,838	150	145	1,876	2,023
Wyoming	6/1,412	6/1,239	23,666	21,638	370	395	25,448	23,272
U.S. Total	51,612	56,666	248,918	241,380	10,781	10,742	311,311	308,788

1/Includes Deleware, South Caroline and Virginia. 2/Includes Tennessee. 3/Includes Alabama. 4/Includes Rhode Island. 5/Includes Iowa and Nebraska. 6/Includes Nebraska and South Dakota.

Source: Bureau of Mines, Report of Investigation 3417, p. 10.

fell from 63.7 to 23.1 percent of the total in the same period and California's stock fell from 10.1 to 9.9%. The first two of these are Compacting states, the latter is not yet almost the same conditions exist in all of them. This may be due to the fact that non-compacting states, who also attend the meetings of the Commission, may feel it wise to follow the suggestions heard there.[153]

Table 4 shows the changes in major categories of stocks by states between the years of 1936 and 1937. It reveals an increase in refinery stocks balanced by a decline in tank farm stocks and is important in view of the present discussion as to the necessity for the Compact to control storage and stocks of refiners. To date no effective suggestion has been offered as to how this could be done.[154]

Another interesting result of the survey, in reference to influence of the Compact, was the finding as to stocks by age groups. Stocks were divided into four age groups: (1) current stocks or oil stored in 1936: (2) stocks stored from 1931 to 1935, or the East Texas era; (3) stocks stored in the period from 1925 to 1930, marked by the dis-

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153 Op. Cit.
154 See page 131.

STOCKS OF CRUDE PETROLEUM, 1933-37, by States of Location. (thousands of barrels)

	Dec. 31, 1933	Dec. 31, 1934	Dec. 31, 1935	June 30, 1936	Dec. 31, 1936	Dec. 31 1937
Arkansas	5,663	3,924	4,314	4,143	3,564	2,541
California	35,879	37,529	38,944	37,856	34,189	30,407
Colorado	317	439	485	450	457	519
Georgia 1/	596	713	706	655	378	562
Illinois	11,952	11,719	11,630	10,750	11,260	10,914
Indiana	3,455	3,122	2,654	2,115	2,447	2,962
Kansas	14,921	13,350	12,171	11,020	8,233	10,715
Kentucky 2/	1,161	1,035	801	1,031	823	953
Louisiana 3/	12,596	11,181	9,204	10,650	10,626	11,848
Maryland	1,123	1,144	1,124	751	1,111	1,320
Massachusetts 4/	1,152	1,078	762	1,073	1,088	1,000
Michigan	1,090	810	744	1,044	766	787
Missouri	5/ 3,480	5/ 3,351	5/ 3,454	5/ 3,662	6/ 3,815	6/ 4,475
Montana	623	1,075	1,127	1,311	1,028	1,430
New Jersey	5,250	5,676	6,051	6,066	5,264	6,294
New Mexico	437	536	669	789	829	1,114
New York	2,007	1,206	1,403	1,294	1,171	1,150
Ohio	8,885	8,079	7,378	7,200	7,040	8,057
Oklahoma	84,029	82,614	70,715	67,006	62,258	70,823
Pennsylvania	5,888	6,533	6,070	7,081	7,036	6,544
Texas	124,320	113,001	106,341	107,902	98,488	107,388
Utah	270	282	194	138	113	136
West Virginia	2,420	2,124	1,988	1,876	1,954	2,151
Wyoming 7/	26,719	26,733	25,926	25,448	24,641	21,995
Total	354,223	337,254	8/ 314,855	311,311	288,579	306,084

1/Includes Deleware, South Carolina and Virginia
2/Includes Tennessee.
3/Includes Alabama.
4/Includes Rhode Island.
5/Includes Iowa.
6/Includes Iowa and Nebraska pipe line stocks
7/Includes refinery stocks Nebraska and S. Dak.
8/New basis for Jan. 1, 1936, is 314,631,000 barrels.

Source: Bureau of Mines, R.I. 3417, p. 9.

covery of Seminole, Oklahoma City and other prolific districts; and (4) stocks stored before 1925, when virtually no curtailment was practiced and when the discovery of a large field was followed inevitably by a build up of stocks.[155]

Table 5 shows the stocks on June 30, 1936, by states of origin.[156] This indicates that on June 30, 1936, current stocks were 193.8 million barrels or 62% of all oil in storage. The next largest group consisted of 50.8 million barrels of oil, stored from 1931 to 1935. These stocks comprised 16% of the total. Primarily because one large accumulation of oil stored before 1925 had not been liquidated extensively, total stocks in that age group exceeded the total in the next oldest group, representing oil stored in the period 1925 to 1930.[157]

On January 31, 1937, total stocks of refinable crude reached 286,759,000 barrels after nine months of continuous decline. During the code period there had been an attempt to set an objective for working reserves of crude oil stock at 200 million barrels.

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155 See Table 4, page 111.
156 R.I. 3417, op. cit., Table 5, page 113.
157. Ibid.

STOCKS OF CRUDE PETROLEUM, June 30, 1936, by age groups, by States of Origin.
(millions of barrels)

State of origin	Stored before 1925	Stored 1926-30	Stored 1931-35	Stored 1936	Total
California	-	2.4	7.0	28.5	37.9
Texas	1.1	10.7	15.6	81.1	108.5 *
Oklahoma	14.6	9.8	19.9	43.5	87.8 *
Louisiana	1.4	-	.1	10.8	12.3
New Mexico	-	-	.4	5.7	6.1 *
Kansas	-	.1	.5	5.2	5.8 *
Arkansas	.6	.4	.4	3.7	5.1
Other states	21.3	4.3	6.9	12.7	45.2
Foreign	-	-	-	2.6	2.6
Total...	39.0	27.7	50.8	193.8	311.3

*Compacting states.

Source: Bureau of Mines, R.I. 3417, p. 5.

In January, 1937, when stocks reached the point mentioned above, a number of refiners complained that stocks were too low which led some observers to believe that the total was approaching an economic minimum. Fred Van Covern, in a paper presented at the annual meeting of the American Institute of Mining and Metallurgical Engineers, February, 1937, placed the minimum economic level at 250 to 275 million barrels. Except for the "objective" set under the code and Van Covern's study little has been done toward determining the proper economic levels for crude oil stocks.[158]

The reduction of stocks occuring in 1936 and the beginning of 1937, may have been the result of influence of the Compact and may have been merely a coincidence in view of the rising stocks the following year. It should, however, be stated that while stocks increased in 1937, day's supply declined thus indicating a healthy condition in the industry. Possibly the increased total in view of diminishing day's supply was approved by the Compact and did not indicate lack of control. See Table 6, page 115.

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158 Pogue, op. cit., p. 21.

STOCKS AND DAYS' SUPPLY OF CRUDE PETROLEUM, June 30, 1936, by age groups, by states of origin.

State of origin	Stocks, June 30, 1936 (thousands of barrels)			Demand Daily Average July, 1936	Days' Supply 6/30, 1936.		
	Old crude Before 1936	Current 1936	Total		Old Crude	Current	Total
California	9,400	28,456	37,856	572.1	16.5	49.7	66.2
Texas	27,390	81,156	108,546	1155.4	23.7	70.2	93.9*
Oklahoma	44,363	43,489	87,852	650.3	68.2	66.9	135.1*
Louisiana	1,483	10,809	12,292	236.5	6.3	45.7	52.0
New Mexico	408	5,746	6,154	65.0	6.3	88.4	94.7*
Kansas	629	5,137	5,766	161.4	3.9	31.8	35.7*
Arkansas	1,374	3,689	5,063	23.8	57.7	155.0	212.7
Other States	32,533	12,672	45,205	222.9	146.0	56.8	202.8
Foreign	-	2,577	2,577	85.9	-	30.0	30.0
Total....	117,580	193,731	311,311	3,173.3	37.1	61.1	98.1

*Compacting states.
Source: Bureau of Mines, R.I. 3417, p. 14.

An analysis of the foregoing charts shows much the same trends in the compacting states as in the non-compacting states, with little difference as to amount of variation in each. In view of the fact that Texas has forty percent of the production of oil, it would appear that greater restraint has been necessary to achieve the results set forth in these figures. As Colonel E. O. Thompson, representing Texas, has been one of the most ardent supporters of the Compact, it might be possible to attribute some of these results to his sincere conviction that restraint is necessary for the good of the whole.

Table 7, page 117, indicates that many other states are staying well within reason especially comparing production figures with indicated reserve life. Texas again ranks first with the Rocky Mountain Region and New Mexico second and third respectively. In defense of Oklahoma and Kansas, it may be said that many wells in those states are stripper wells and must necessarily be produced.[159]

Careful consideration of these charts and the accompanying report of the Bureau of Mines, tends in a measure to refute one argument which has often been

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159 Dow, op. cit., p. 30.

PRODUCTION BY STATES AS OF JANUARY 1, 1938
Daily Production

STATES	Wells*	Reserves** (xM2)	Total (xM)	Per Well	Reserves per Bbl. Produced	Indicated Reserve Life (Years)
New Mexico	1,974	546.6	107.2	54.3	5,100	14.00
California	12,951	3,063.1	711.3	54.8	4,310	11.80
Oklahoma	55,074	1,212.3	543.6	9.9	2,230	6.12
Texas	78,018	8,247.9	1,389.5	17.8	5,930	16.25
Arkansas	2,727	192.1	41.1	15.1	4,675	12.80
Kansas	20,677	601.3	180.2	8.7	3,330	9.13
Louisiana	4,387	713.4	249.6	56.8	2,860	7.83
Rocky Mtn.	5,568	395.4	69.2	12.2	5,710	15.65
Eastern	169,830	536.1	187.3	1.1	2,860	7.83
Total	351,206	15,507.2	3,479.0	9.9	4,470	12.30

* From Oil and Gas Journal
**From American Petroleum Institute

Source: Hiram H. Dow, Report of Representative of Interstate Oil Compact, p. 30.

advanced in favor of proration.[160] It has been generally stated that reduction of stocks will eliminate the loss resulting from loss by evaporation. Oil stored, especially in old type tanks, it was thought lost light fractions by evaporation.[161] The loss by evaporation, it is contended, decreases both quantity and quality of straight run gasoline. The survey made by the Bureau of Mines showed that "much of the oil stored for long periods compared more favorably with current production than might be expected from a consideration of evaporation losses alone."[162]

This favorable showing was explained, in part, by the high average content of light fractions in these oils when they were placed in storage. In general, much of the oil that was run to storage has been surplus oil from fields of flush production. Light fractions in an oil is highest when the field is new. Another factor which may have had some influence was the practice of "topping out".[163] The

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160 See page 7.

161 Light fractions i.e. gravity, See page 7.

162 Bureau of Mines, R.I. 3417, op. cit.

163 "Topping out" is the practice of filling tanks (after evaporation or withdrawal of water and basic sediment) with oil of current stock.

resulting favorable test of oil in storage would tend, therefore, to discount the value of the argument so often used by conservationists (that oil in storage loses quantity and quality) except for the factors mentioned and the impossibility of properly evaluating the influence of these factors.

PRODUCTION TRENDS

While oil in storage has been decreased, production has increased almost constantly during the existence of the Compact. Obviously, then, demand has increased proportionately during the same period. Concerning this increase in production, Colonel Thompson says:

> Since the Compact was signed, we are now producing in the United States, about 900,000 barrels per day more oil than we were at that time.[164]

The survey of the Bureau of Mines shows that 193 million barrels of this has gone into storage. If we agree that a working reserve of some 200 million barrels is necessary and hence that stocks are not excessive; if we admit little waste in storage has ensued; if we believe little waste has resulted in production and that increased production with a corresponding increase in demand (see Table 8, page

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164 Transcript of Proceedings, Interstate Oil Compact, New Orleans, La., May 10, 1937. p. 10.

TREND OF SUPPLY AND DEMAND IN THE AMERICAN PETROLEUM INDUSTRY BY YEARS 1932-38
Data from United States Bureau of Mines. (In Millions of barrels).

SUPPLY, ALL OILS	1932	1933	1934	1935	1936	1937	1938
Domestic production:							
Crude Oil	785.2	905.7	908.1	996.6	1,099.7	1,279.2	1,213.3
Natural gasoline	36.3	33.8	36.6	39.3	42.8	49.2	50.3
Benzol	1.0	1.4	1.7	1.9	2.5	2.8	1.7
Imports, crude:	44.7	31.9	35.6	32.2	32.3	27.5	26.4
Imports, products:	29.8	13.5	14.9	20.4	24.8	29.7	27.7
Total new supply:	897.0	986.2	996.9	1090.4	1,202.1	1,388.3	1,319.4
Change in all stocks	-41.8	-11.0	-37.8	-22.3	-23.6	-45.8	-8.7
Change in crude stocks	-30.5	-15.4	-17.0	-22.4	-26.7	-18.2	-32.5
DEMAND, ALL OILS							
Domestic Consumption:							
Motor fuel	373.9	377.0	407.2	434.8	481.6	519.3	521.6
Kerosene	33.2	38.5	44.2	47.6	51.4	55.0	56.4
Fuel Oil	308.2	316.3	332.0	366.7	410.6	442.3	409.2
Lubricants	16.6	17.2	18.5	19.7	22.3	23.3	21.2
Wax	.9	1.3	.9	.9	1.1	1.1	1.0
Coke	9.6	10.0	7.5	6.7	6.3	5.8	5.6
Asphalt	12.7	11.8	13.9	15.7	20.6	21.9	24.5
Road oil	6.6	5.3	6.4	6.0	7.3	8.0	7.8
Still gas	40.9	45.2	44.4	51.2	57.	64.2	62.4
Miscellaneous	2.	1.5	2.0	2.0	2.1	2.2	1.8
Losses and crude used as such	30.9	44.5	43.1	32.4	32.4	26.6	22.7
Total domestic demand	835.5	868.5	920.1	983.7	1,092.7	1,169.7	1,134.2
Exports, crude	27.4	36.6	41.1	51.4	50.3	67.2	77.3
Exports, products	75.9	70.1	73.4	77.6	81.7	105.6	116.6
Grand total demand:	938.8	975.2	1034.7	1112.7	1,224.7	1,342.5	1,328.1

Source: Joseph E. Pogue
Economics of Petroleum, p. 7.

120) is logical in view of decreasing day's supply, we may concede that production has been kept at a sound level. The Compact is doubtless responsible for the production control achieved. Thus we may admit that it has, in a measure, achieved its purpose of eliminating physical waste of oil and gas.

STABILIZATION OF PRICE

Control of price, as has been stated, is not the purpose of the Compact.[165] Production and price are, however, inextricably related. Greater stability of price and higher price of crude has occurred with control of production under the Compact. While not the reason therefor, it is a residual thereof. During the period of the Compact, price of crude has gone up three times and gasoline has remained about the same.[166] This would indicate an effort on the part of the industry to serve the consumer at a reasonable price.

In explanation of the increase of price, we find:

> ...there was that fact that oil had gone up, but it was due to other causes than the Compact, and I was happy to tell and show the members of the Committee (Cole) through

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165 See page 102.

166 Transcript of Proceedings, Interstate Oil Compact, New Orleans, La., May 10, 1937. p. 10.

> the oil statistics and economics, that the price of oil had gone up along with other things. In fact, the price of oil had not increased anything like as much as the general index had gone up on other commodities.[167]

Colonel Thompson does not indicate what statistics and "economics" he uses to prove that the Compact was not responsible, neither does he indicate what price indices he uses to compare with that of oil.

Dr. Joseph E. Pogue presents a study which compares average price of crude oil in the United States with price of basic commodities by years, 1861-1938, expressed in index numbers with a base of 100 for the period 1910-1914.[168] A copy of this follows. No information is given, however, as to what commodities were used. It is, therefore, somewhat difficult to establish the worth of the study. Inasmuch as the petroleum industry is operating more or less, as a monopoly, with production more or less controlled, it would be difficult to compare that industry with others operating under different conditions. In interpreting variations shown on this chart, it is necessary to keep in mind

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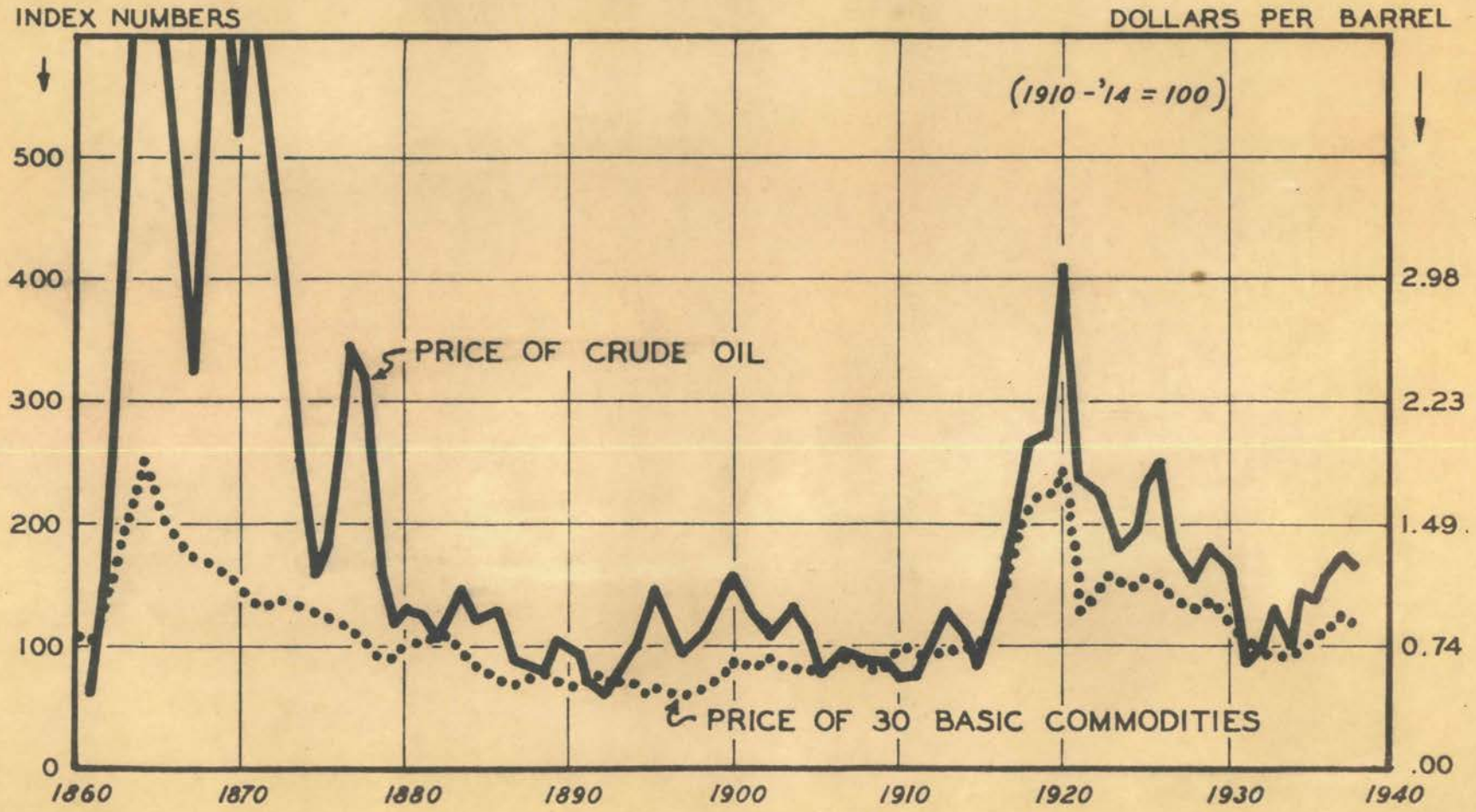
167 op. cit.

168 Pogue, op. cit., p. 10.

Figure-6

WEIGHTED AVERAGE PRICE OF CRUDE OIL IN THE UNITED STATES COMPARED WITH PRICE OF 30 BASIC COMMODITIES.

By years, 1861-1938, expressed in index numbers.



Source: Joseph E. Pogue, Economics of the Petroleum Industry.

the periods of discoveries of new pools. Analyzing the influence of the Compact, or other influences, from 1935 we find price varying slightly but stabilized at a point above price of preceding years.

The Compact has generally been credited with the stabilization of price at a point higher than price of crude prior to the signing of this document. This may have been merely coincidental. Adherents to the Compact protest that such price control is not the result of the operation of the Compact, nor the purpose thereof, but only an incidental and secondary consideration. It would be folly to try to link the happenings too definitely. We are still too close to analyze all the factors which may have caused these things to happen. It may only be said that a higher price prevailed following the signing of the Compact and still prevails. See following table.

Table 9[169]

Year	Price of Crude
1928	$ 1.32
1929	1.36
1930	1.23
1931	.63
1932	.87
1933	.62
1934	1.00
1935	1.00
1936	1.10
1937	1.21
1938	1.18

169 Op. Cit., p. 41.

Some government officials, and others, attribute the somewhat stabilized prices to the "joint action" which developed in oil producing states as a result of the Interstate Compact.[170]

Testimony given before the Cole Committee (1934) set one dollar as the price at which the industry could maintain production of stripper wells and flush production without loss.[171] Price of crude since signing of the Compact has remained at that figure or above. It is possible that these happenings have no relation to each other. Psychology may have been one factor in the coincidence.

Stabilization of price which has resulted since the signing of the Compact, must be considered a residual there. However, if this is true, in a measure higher price tends to eliminate waste. Periods of depressed price, hugh overproduction and the like show a more wanton disregard for oil. Cheapness appears to beget carelessness, even in the oil industry. Therefore stabilization of price could possibly assist in achievement of the greater goal..conservation.

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170 Renewal of Interstate Compact in Present Form Predicted in Washington. The Daily Oklahoman. Wednesday, November 30, 1938, p. 15.

171 Cole Committee, Petroleum Investigation, p. 1512.

While elimination of waste is a primary goal, and control of production at a reasonable point and stabilization of price at a satisfactory basis appear to have existed during the period of the Compact, other accomplishments appear to have been residual.

ADDITIONAL ACHIEVEMENTS

The achievement most frequently listed by members of the industry is that it helped defeat federal control.[172] Just why the industry considers this so valuable is a question the public often ponders. It is barely possible that the industry is not so interested in the perpetuation of state's rights as it is interested in the profit motif or control of the industry by the industry.

Without implying conscious bias on the part of public officials, state or federal, it is possible that public officials of oil producing states are often those who are interested personally in the industry. Often they have, in the past, been oil producers, or officers of oil companies. If they have not, it is possible to imagine a situation whereby funds might be available to assist in the

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172 Thompson, op. cit., p. 3.

election of these officials. It is probable also that these funds could have been furnished primarily by the petroleum industry inasmuch as it is one of the leading industries in most oil producing states.

Hence without imputing motives to these officials, it is highly probable that they could be interested in the price structure, and production schedules, of states being set at a point which would be to the economic welfare of the oil companies. It is highly possible that this point might also be that which would react to the welfare of the states inasmuch as much of the financial structure of said states is built upon taxes from gasoline, petroleum, etc.

Another accomplishment listed is that:

> It has won the almost universal and unstinted support of the industry. All groups, both major and independent have taken an active interest in the work of the Compact.[173]

Article IV of the Interstate Compact directs the Commission to make inquiry as to methods, etc., and to recommend measures for the maximum ultimate recovery of oil and gas. This, in part, the Commission has done. We find:

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173 Thompson, op. cit. p. 3.

> The Compact Commission has made a thorough study and survey of the conservation laws, rules and regulations of all the oil producing states, and is preparing a uniform law incorporating the proven best features from each state. These suggested statutes will be sent to the legislatures of each of the twenty oil producing states for consideration.[174]

The committee which submitted the report on the various conservation laws of the several states stated that there was no state whose laws might not be improved.[175]

> Some states have taken more advanced positions than others, some cover the ground more fully, but we find few if any states where conservation measures may not be improved.[176]

Following the reading of the report, Governor E. W. Marland, Oklahoma, suggested that it would be wise if the Committee would resolve itself into a Ways and Means Committee for the purpose of working toward legislation in the various states. The Hon. Wirt Franklin, well known in the industry, agreed with the Governor, stating:

> ...It seems to me, that based upon the very excellent...report, uniform laws could very well be recommended.[177]

No such definite step was taken at the time.

> There have been important changes in the conservation laws of Kansas, Oklahoma, Texas,

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174 Op. cit.

175 Report of Committee on Conservation, Transcript of Proceedings, Interstate Oil Compact, March 13, 1936.

176 Op. Cit., Committee composed of Marvin Lee, Chairman, Kansas, E. H. Wells, New Mexico, C.C. Brown, Okla.

177 Transcript of Proceedings, Compact Commission, March 13, 1936.

> and New Mexico, four of the compacting states. Some of these, .. during the germination of the compact proposal and before its actual ratification. Others were passed later.[178]

It is possible that the various laws, in the several states, most nearly meet the needs peculiar to each state. This possibly explains the failure of the various states to pass a uniform law. The Commission has assisted several states in working out conservation statutes to fit the especial needs of the particular state.[179] It would appear, however, that a uniform law covering basic regulations could be worked out which would be desirable and feasible.

The Compact has counselled with the United States Bureau of Mines, and has attempted to assist this agency of the federal government when possible. The Interstate Compact Commission was instrumental in securing the appropriation of $55,000.00 from the 74th Congress for the support of the United States Bureau of Mines for the purpose of continuing its forecast of market demand for crude oil and for the physical check of crude oil in storage.[180] It has also:

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178 Marland, op. cit., p. 1.

179 W. J. Halloway, Representative of Oklahoma, Interstate Oil Compact Commission, (1939). Interview.

180 Thompson, op. cit., p. 5.

> Succeeded in getting the United States Bureau of Mines to desist from taking withdrawals from storage into consideration when making forecasts of sources of supply to meet the November, 1936, demand.
>
> ..It has held meetings in Oklahoma, Texas, and an informal meeting in California...and has brought about an amicable spirit and trustfulness between the oil states...has won the respect of the industry it helps to regulate.[181]

Many of these are matters of routine (as meetings) and could hardly be accepted as "accomplishments". It is possible that they have been of value in the way of educating the public concerning the purpose and activities of the Interstate Oil Compact Commission. The petroleum industry has available and uses many means for disseminating trade information to its members and to the public.

DISSEMINATES INFORMATION

> Few industries can rival petroleum in the material for the dissemination of trade information. The newspapers and trade journals carry the current price quotations. The big oil companies maintain scouts in the field who ply their territories from morning to night; like newspaper men this corps of retainers "swap" their routine stories but compete ruthlessly for scoops. Many local periodicals in the field are trade journals for the industry; they take sides and in boisterous vehement language

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181 Thompson, op. cit.

> argue the case for their constituencies. Representatives of large buyers grant interviews to columnists who faithfully repeat with sources deleted. The opinions of producers are disseminated through journal, newspaper, and interminable conversation; everywhere in the industry the price of crude is of absorbing moment.[182]

The Compact Commission has, in a measure, been an additional means of disseminating information. The Chairman of the Commission states:

> The...Compact contemplated that each state shall bring its sister state that advanced experience and advancement of science that comes through their work.[183]

> We hope that some day this Commission will be a place where the last word is put out in the progress and development of sound engineering principles in the industry; where the latest advances will be brought...We have asked some of the most noted talent in economics, statistics, petrolcum engineering and geophysics...[184]

The Compact Commission, April 29 and 30, 1938, meeting in Wichita, Kansas, appointed a committee t of economists to advise with the Commission. Dr. J. E. Pogue and Dr. E. DeGoyler composed the committee

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182 Hamilton, Sec. Iv, op. cit., p. 153.

183 Transcript of Proceedings, Interstate Oil Compact Commission, New Orleans, La., May 10, 1937, p. 11.

184 Ibid., Austin, Texas, September 14, 1937. Among talent mentioned has been Hon. A. G. White, Chief of Petroleum Economics Division of Bureau of Mines, Washington, D.C.; Hon. Fred Van Covern, Economist, Hon. Russell B. Brown, Attorney, Hon. F. B. Plummer, Petroleum Engineer, University of Texas.

with Dr. Alexander Sachs as Chairman. These three gentlemen served as advisers to the Federal Oil Administration amd assisted with the writing of the National Industrial Recovery Act which, upon completion, they predicted would be declared unconstitutional.[185] However, their appointment as members of a committee to serve as advisers to the Commission indicate an attempt on the part of the Commission to retain the interest and efforts of those who have gained prominence in some phase of the work closely connected with the industry.

The Commission apparently has approached the problem with an honest desire to know the industry from the standpoint of producer, consumer, engineer and economist. It has faithfully carried out the duties imposed upon it concerning the "making of inquiry" regarding the various phases of the industry. Outstanding individuals have read papers at the various meetings. These meetings have, when possible, been set to conform with dates of other meetings of the industry as the recent hearing of the Texas Railroad Commission re allowables.[186]

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185 Ted Knoop, Interstate Oil Compact Commission, Oklahoma City, Oklahoma, March 31, 1939.

186 Transcript of Hearing of Texas Railroad Commission, Austin, Texas, March 15 and 16, 1939.

FAILURES OR WEAKNESSES

The Compact Commission is obviously proud of its achievements and does a bit of back slapping on that score. Individuals who compose it, however, are frank enough to admit that the Compact has not been the perfect solution. Governor Walter Huxman,[187] Kansas, criticized the Compact frankly at the meeting in Wichita. He said:

> I think the allocations made in 1935 were fair, but I believe if we are going to solve this problem, we must make reallocations from time to time of markets, of demands, as the conditions within the states change...I think you have got to consider areas and markets and have a fair division of that market between the states that are interested in that common source and that common market, and that must be such a division as lets all of the states interested in that area and that market survive....
>
> I think we are going to have to work out a Compact that has more binding force than the present Compact has...[188]

A report presented by the Committee on Conservation, March 13, 1936, covers, according to Colonel Thompson, "the whole purpose and expresses the entire hope of the Compact Commission". This report states:

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187 Hon. Walter Huxman has recently been appointed, by President Franklin Roosevelt, Justice of the United States Supreme Court.

188 Transcript of Proceedings, Interstate Oil Compact Commission, Wichita, Kansas, April 29 and 30, 1938, p. 54.

> Conservation legislation is needed in most, if not all, of the oil producing states.
>
> Legislation has been and will be affected by individual and group selfishness, as well as by civic pride, intelligent study and patriotic impulses...Conservation includes the consideration of reservoir energy....

To achieve this, it recommends:

> Proper well spacing should serve to prevent physical waste...Well spacing is a matter that should not be rigidly fixed by legislative enactment, but authorization should be given to proper State agencies, to adopt and enforce well spacing rules...No legislation should be enacted to control or restrict exploratory or "wildcat" drilling....
>
> The drilling of wells requires the observance of certain laws, rules and regulations if conservation is to be effected....
>
> The operation of a pool under one management has economic advantages....Unit operation also has its disadvantages...Unit operation should be permitted with the approval and under supervision of the existing regulatory agency when all the persons in interest mutually agree upon the plan and period of operation.
>
> Proration ... is now considered necessary...
>
> The conservation laws of several states provide for ratable taking, both as between wells within each common source of supply and as between different common sources of supply... Ratable taking...is necessary for the protection of the property rights of the various producers, land owners, and royalty interests...189

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189 Transcript of Proceedings, Interstate Oil Compact, Wichita, Kansas, March 13, 1936, p. 32.

> Methods of determining individual well allowables vary widely. The factors used include open flow potentials, bottom hole pressures and acreage....The only recommendations made at this time are that legislatures should not attempt to be too specific in laws pertaining to well allocations, and that a uniform methods for all wells within a state may result in inequities...
>
> All states should have legislation permitting the state regulatory agency charged with the conservation of petroleum to provide, with proper safeguards, for repressuring with air, gas, water or other liquids....[190]

FUTURE TRENDS

It is interesting to note that all control efforts to date, and all suggestions so far presented, have to do with control of production. While this is presumably the big problem, testimony presented before the Texas Railroad Commission leads one to believe that eventually the Compact, or other control, will have to be broaded to include not only production and withdrawals from stocks, but also refinery stocks. It is possible that eventually control will, of necessity be applied to the four phases of the industry production, transportation, refining and marketing.

Charles F. Roeser, producer, testified before the Texas Railroad Commission:

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190 Op. Cit.

> The regulatory bodies and the Compact have made a good job of it, but on the other hand the industry has failed to observe the proper gasoline inventory.[191]

This contradicts Colonel Thompson's statement earlier that the Compact had gained the universal support of the industry. However, "support" may not include cooperation.

Mr. Roeser was asked by Colonel Thompson:

> Do you think the reining industry should be regulated?

To which he replied,

> I do not think they can regulate themselves...I realize that the regulatory bodies and the Compact have no power and that is where the industry has fallen down....So we are faced with the problem as to how to assist the refining industry in getting their house in order. There is only one way that I know of and that is to hold the production of crude oil well in balance with the consuming demand....
>
> Look what is going on; you have pipe line proration in three different states; you have stripper wells, up to two weeks ago, which had not been connected in southeastern Kansas; you have distress oil in Oklahoma; you have pipe line proration in K.M.A., and we were left without a market in Cayuga sixty days ago.
>
> There is too much oil being produced in the nation...Probably only three, or four companies have too much oil in storage....As to the injustice or inequities as between pools in the State, I have nothing to say.[192]

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191 Texas Railroad Commission, Oil and Gas Division, State Wide Oil and Gas Hearing, Austin, Texas, March 15 and 16, 1939.

192 Ibid.

> For the last eighteen months I have been fighting about subnormal prices of gasoline, refineries selling gasoline below the price of crude...Now this industry has been brought to the point where it is on the theory that all purchasers pay the same posted price. For fifty years the industry has gone along on that basis, and only in the last six months have we been getting away from it. That is a bad condition but you can't cure that condition as long as you produce one barrel more of oil than the purchasers need and the industry requires.[193]

The problems here presented and conditions which exist lead one to believe that control, as maintained by the Compact and other proration and enforcement machinery, has not been as perfect as advocates of the Compact would have us believe. It would indeed appear advisable, as Governor Huxman suggested, to strengthen the treaty in some manner which would guarantee cooperation. It would also indicate the possibility of the need for extension of control to refining and marketing agencies.

The possibility and advisability of attempting to include refinery control was discussed at length at the meeting of the Railroad Commission and Compact Commission in Austin, Texas, March 15, and 16, 1939. It was the consensus of opinion that

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193 Op. cit.

there was no legal basis upon which such control could be set up.

Extension of the Compact to include every other oil producing state is also constantly emphasized, in the belief that participation by all such states will strengthen the treaty immeasurably.

IS COMPACT DUE CREDIT FOR STABILITY

A certain stability has resulted in the industry of recent years, there is some argument as to whether the Compact is due the credit for such stability.

> The stabilization effected under the Code regulation was instrumental in getting the Interstate Compact off to a start. Louisiana and California remained outside the agreement and their excessive production caused wide concern. A growing pessimism was lightened in the spring of 1936 when the industry found itself blessed with an unprecendented demand for gasoline. Though as a device of restriction the Interstate Compact was only partially successful, the return of prosperity resulted in an absorption of excess production with resulting profit to the industry. Thus a general improvement in economic conditions, provoked by the earlier efforts of the federal government, redounded to the success of the Interstate agreement. Had the situation been the reverse - with profits receding - it is reasonable to conclude that the industry would again have appealed frantically for federal control.[194]

Even at present there are those who predict eventual federal control of the petroleum industry.[195]

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194 Hamilton, Sec. iv, op. cit., p. 175.

195 R. M. McClintock, Daily Oklahoman, Oklahoma City, Oklahoma. Interview.

STATE VERSUS FEDERAL CONTROL

Much of the information has been from those favoring the Interstate Compact for the reason that the majority of the industry favor the Compact, at present, to federal control. It would be wise, therefore, to look at the other side of the picture as presented by one who admittedly favors federal control. Mr. Walton Hamilton says:

> The Interstate Compact is a political instrument and the necessities of oil are an industrial problem. The adaptation calls for neat and delicate adjustment and presents a number of very difficult questions. The control of production is the crux of negotiations. It can be effected only by a formal allocation of quotas to the separate states. In this allocation the gains of one state are the losses of another. As a result an important problem in industrial planning is complicated by a conflict of local interests. States, conscious of their strategic positions, threaten to abstain from the Compact and to run wide open as a means of enlarging their quotas. "Horse trading" characterizes the conferences and issues tend to be resolved in terms of political pressures and the personal skill of the bargainers. No state secures all the production to which it feels entitled; and the conference breaks up in an atmosphere of mutual suspicion and distrust.[196]

In the allocation of quotas, it is true in a sense that the gains in quotas to one state, are a loss to another. However, these quotas are established, more

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196 Hamilton, op. cit., p. 175.

or less, according to figures released by the Bureau of Mines, an impartial fact finding agency of the federal government. These quotas are accepted voluntarily by each of the states. While it is evident that several of the states feel that their quotas are not, and have not been fairly assigned, there is no tendency on the part of the representatives of those states to "threaten" to exert undue pressure by "asbstaining" from the Compact or otherwise. Neither does a careful reading of the proceedings of any meeting leave one with the impression that anything but the utmost friendliness and cooperation exists between the states represented.

> There is no common police. The sanctions are provided by the parties to the Interstate agreement and law enforcement becomes a matter of mutual good faith.[197]

This may, of itself, explain why the preceding statement, made by Mr. Hamilton is incorrect. It has often been stated that the Compact has no teeth in it. There is no power to enforce quotas, and any state may secede from the Compact at any time desired. The Compact is a voluntary agreement,[198] by which the various states abide, as long as it appears to the

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197 Op. Cit.

198 Interstate Oil Compact, Article, I, Appendix.

advantage of the particular states, or state, in question. This fact and the manner in which the Compact Commission has functioned leads one to agree with Governor Hiram Dow, of New Mexico, who says:

> It has teeth in it because it combines the states together and gives each state a free hand to administer its own laws and its own oil business without interference of the federal government and still to go along with its neighbors because of the fact that each is trying to conserve and prevent waste of oil and gas. If it had in it any stronger language, my judgment is the Compact would probably have failed, because surely the states would have become impatient under the restraint. It has never restrained any state in administering its own laws.[199]

Mr. Hamilton says further:

> The terms of the Interstate Compact are vulnerable at three distinct points. First, they may be modified or overridden by the legislatures....
>
> Next, it may be compromised in enforcement....And last, there is for even the most conscientious and efficient state enforcement agencies...the persistent problem of hot oil.[200]

His first statement stands without argument. It is a matter of opinion whether it be to the advantage of the public that such is true. It would appear that it operate as a check in case of necessity, and thus serve

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199 Transcript of Proceedings, Interstate Oil Compact Commission, New Orleans, La., May 10m 1937, p. 9.

200 Hamilton, op. cit., p. 192.

for good or evil depending upon whether the Compact or legislature was correct in their action. The second criticism, that it might be compromised in enforcement, is a statement which might with as much truth be leveled at almost any group or individual from the highest tribunal in the nation to the most insignificant public official.

The third statement, concerning hot oil, is one which is true. It would appear that a state, which is closer to the problem, may more easily eliminate this than could the federal government. However, the Federal Tender Board, set up in East Texas, during the existence of the Code effectively controlled this problem.[201] The Compact Commission appears likewise to have solved the problem. It is obvious that the industry itself has the power to eliminate the running of hot oil. If any system of control, whether it be federal or state, has the entire support of the industry, it would be impossible for "hot oil" to be produced or transported, refined or sold once it was produced.

Hamilton says further:

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201 See page 86.

> The sanctions of the Interstate Compact are purely voluntary....It is evident that the moral sanctions....upon which rests the efficacy of the agreement...are less compelling for some than for others....The arrangement has little stability if restrictive policies of some state provide markets and profits to others who ignore it.[202]

The efficacy of the Compact is, in truth, based upon the integrity of the signatory states. However, inasmuch as the agreement is purely voluntary, it would appear that states who do not intend to abide by the treaty, would not feel obliged to sign it. Once having signed it, it would appear that the agreement, commonly referred to as a treaty, would have as much value as the individual integrity of the persons or states signing it. In the final analysis almost every law, almost all security depends upon the belief in the sanctity of a man's word. Almost every individual, state and nation, respects his or her obligations and operate on the theory that a promise made is a debt unpaid. It follows naturally that "moral sanctions" are less compelling for some than for others", yet it would be impossible to feel that this would be less true with federal than with state control. Thus there would be only the difference of enforcement. Any enforcement system must be, of

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202 Hamilton, op. cit.

necessity, cumbersome and expensive. State control appears to be simple in comparison if it can be as effective.

A review of production, contrasted with the quotas advised by the Bureau of Mines, offers statistical evidence of the good faith of those composing the Compact. These figures, and the amount which each state is over or under, are quoted at the meetings of the Commission. There appears to be a feeling of friendly rivalry among the various states for the most favorable showing in this respect.[203]

Considering further the criticism directed toward the Interstate Compact, we learn:

> Nor does the interstate compact furnish adequate safeguards to the public. It is a device of the oil producing states; its concern with production and consequent effects upon price is in the interest of producers. It grants to the groups who will profit from restrictions the sole voice in its making. Other states, vitally concerned as consumers of oil products, remain outside the agreement; they are unrepresented in the making of the policy. In the law, in the arrangements of competition, and in common sense, the consumer is recognized as a party to the industrial bargain. He cannot afford to surrender the protection accorded him by the open market without receiving its equivalent

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203 Transcript of Proceedings, Interstate Oil Compact, Wichita, Kansas, op. cit.

> in return. Here then is a dilemma. An interstate compact which included all states is too unwieldy to be efficient; one which excludes the oil consuming states is against public policy.[204]

It is admitted that only about ten or twelve of the forty eight states produce oil. However the Compact is not an arbitrary instrument, drawn up and signed by five or six or ten or twelve states. It is a treaty, drawn up with the approval (and in this instance at the request of the officials) of the federal government. Before it may be effective legislatures of each state must authorize it's signing by the Governor of the respective state. It must be signed by three states, at least. It is then forwarded to Washington for the approval of Congress before the agreement may be considered binding. Hence, we may assume that the legislatures of the various states and the Congress of the United States in all probability will act for the best interests of the nation as a whole and will protect the interests of the consumers as well as the producers.

In summation, Mr. Hamilton says:

> The plain truth is that an attempt to regulate the oil industry by the states...

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204 Hamilton, op. cit.

> either seriatim or in concert....is an anachronism. All that can be done more easily and effectively accomplished by the federal government. The likelihood of inequitable proration among the states is lessened, if not entirely removed. The federal agency is removed from the scene of battle; it is free of the local pressures which characterize state control. The authority for regulation is undivided and enforcement can be given uniformity. The state and federal courts cannot be played off against each other. The structure of control can be worked out to allow a consideration of the interests of the consumer in matters of production, conservation and price....205

It is a matter of opinion as to whether control can be more effectively accomplished by the federal government, as stated by Mr. Hamilton. Either system can be effective only insofar as it has the support of the industry. It is extremely unlikely that there will be great inequity in allocation of state allowable under the present system. The very flexibility of the Compact permits the states to make any slight adjustment considered necessary. The fadt that the federal government is so removed from the scene of battle is one factor which results in instilling fear in the industry. During the Cole Committee the industry martialed its outstanding engineers, economists, producers, etc., in an effort

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205 Hamilton, op. cit., p. 193.

to present the government with a complete picture of the problems of the industry so that a fair decision might be made. The petroleum industry has so many factors, peculiar to it alone, which could (if improperly interpreted) result in very real damage.

Authority for regulation, under federal government, would be undivided. It is true. However, problems of one state in production and the like are not problems of neighboring states. Hence uniform regulations are not as desirable as might be thought.

It is the theory that courts, whether federal or state, merely administer justice according to the laws set up. It is possible that state courts and federal courts are, and have been, played against each other. It is probable that this has not happened entirely with reference to petroleum. It is to be hoped that such practices are not prevalent and that such happenings are the exception and not the rule.

Structure of control, as worked out at present, under the Compact with the approval of the various

legislatures, the industry and Congress, would appear to allow reasonable consideration of the interests of the consumer, producer and public in questions of production, conservation and price. Hence, the question reverts to individual philosophy of government as to whether federal or state control of the petroleum industry is preferable.

A reduction in stored crude has occurred during the existence of the Compact. There has been a large degree of stability in price noted, price has been stabilized at a point somewhat higher than in preceding periods. No great flush discoveries have been made in the period since the signing of the Compact, hence value of such control cannot be determined under pressure. The conditions mentioned above may have been merely incidental and not the result of the operation of the Compact.

Eliminate of waste has occurred as a result of more orderly production and the maintenance of reservoir energy under proration. Conservation of reserves due to protection of stripper wells has ensued.

The Federal Oil Administration likewise accomplished excellent results. The only real difference

federal and state control, as illustrated by these two systems, appears to be the attitude of the industry. When the industry favored federal control and cooperated excellent results were achieved, when the industry favored state control, and withdrew their support from federal control, the reverse appeared to be preferable.

Real testimony as to the industry's attitude and that of the state legislatures is offered by the fact that the Compact, signed in 1935 for a term of two years, was renewed without change in 1937 for a second two year period. The original signatory states again signed the agreement.

The Compact again expires in September, 1939, if not renewed. At the present session of the legislature Oklahoma passed the bill authorizing the renewing of the treaty. New Mexico and Kansas legislatures had already done likewise. The remaining states, of the original group to become members of the Compact, have indicated their intention to continue their membership. In addition it is believed that Arkansas, Louisiana and Michigan will enter the Compact upon passage of the necessary legislation.

We may, therefore, conclude that the Compact, (while not the perfect form of control perhaps) has the approval of the industry. It has also the approval of the state legislatures of the various states, presumably acting in the interests of the public welfare. It will doubtless have the approval of the United States government when presented to Congress for ratification. We can therefore only assume that the conditions of decreased storage of crude oil, stabilized price and elimination of physical and economic waste as existed during the life of the Compact are satisfactory to the people of the nation. We can, therefore, likewise conclude that the Compact appears to be the form of control preferred by the majority of those interested at the present time and hence the form most likely to maintain such stability.

APPENDIX

INTERSTATE OIL COMPACT

ARTICLE I

This agreement may become effective within any compacting state at any time as prescribed by that State, and shall become effective within those States ratifying it whenever any three of the States of Texas, Oklahoma, California, Kansas, and New Mexico have ratified and Congress has given its consent. Any oil-producing state may become a party hereto as hereinafter provided.

ARTICLE II

The purpose of this compact is to conserve oil and gas by the prevention of physical waste thereof from any cause.

ARTICLE III

Each State bound hereby agrees that within a reasonable time it will enact laws, or if laws have been enacted, then it agrees to continue the same in force, to accomplish within reasonable limits the prevention of:

(a) The operation of any oil well with an inefficient gas-oil ratio.
(b) The drowning with water of any stratum capable of producing oil or gas, or both oil and gas in paying quantities.
(c) The avoidable escape into the open air or the wasteful burning of gas from a natural gas well.
(d) The creation of unnecessary fire hazards.
(e) The drilling, equipping, locating, spacing or operating of a well or wells so as to bring about physical waste of oil or gas or loss in the ultimate recovery thereof.
(f) The inefficient, excessive or improper use of the reservoir energy in producing any well.

The enumeration of the foregoing subjects shall not limit the scope of the authority of any state.

ARTICLE IV

Each state bound hereby agrees that it will, within a reasonable time, enact statutes, or if such

statutes have been enacted than that it will continue the same in force, providing in effect that oil produced in violation of its valid oil and/or gas conservation statutes or any valid rule, order or regulation promulgated thereunder, shall be denied access to commerce; and providing for stringent penalties for the waste of either oil or gas.

ARTICLE V

It is not the purpose of this Compact to authorize the States joining herein to limit the production of oil or gas for the purpose of establishing or fixing the price thereof, or create or perpetuate monopoly, or to promote regimentation, but is limited to the purpose of conserving oil and gas preventing the avoidable waste thereof within reasonable limitations.

ARTICLE VI

Each State joining herein shall appoint one representative to a Commission hereby constituted and designated as "The Interstate Oil Compact Commission", the duty of which said Commission shall be to make inquiry and ascertain from time to time such methods, practices, circumstances and conditions as may be disclosed for bringing about conservation and the prevention of physical waste of oil and gas, and at such intervals as said Commission deems beneficial it shall report its findings and recommendations to the several States for adoption or rejection.

The Commission shall have power to recommend the coordination of the exercise of the police powers of the several States within their several jurisdistions to promote the maximum ultimate recovery from the petroleum reserves of said States, and to recommend measures for the maximum ultimate recovery of oil and gas. Said Commission shall organize and adopt suitable rules and regulations for the conduct of its business.

No action shall be taken by the Commission except: (1) by the affirmative votes of the majority of the whole number of the compacting States, re-

presented at any meeting, and (2) by a concurring vote of a majority in interest of the compacting States at any meeting, such interest to be determined as follows: Such vote of each State shall be in the decimal proportion fixed by the ratio of its daily average production during the preceding calendar half year to the daily average production of the compacting States during said period.

ARTICLE VII

No State by joining herein shall become financially obligated to any other State, nor shall the breach of the terms hereof by any State subject such State to financial responsibility to the other States joining herein.

ARTICLE VIII

This compact shall expire September 1, 1937. But any State joining herein may, upon sixty days' notice, withdraw herefrom.

The representatives of the signatory States have signed this agreement in a single original which shall be deposited in the archives of the Department of State of the United States, and a duly certified copy shall be forwarded to the Governor of each of the signatory States.

This compact shall become effective when ratified and approved as provided in Article 1. Any oil producing State may become a party hereto by affixing its signature to a counterpart to be similarly deporited, certified and ratified.

Done in the City of Dallas, Texas, this 16th day of February, 1935.

BY-LAWS
OF
INTERSTATE OIL COMPACT COMMISSION

ARTICLE I: NAME AND STRUCTURE OF COMMISSION

Section 1. The Commission created by virtue of the Oil States Compact which is fully set forth in the Resolutions of the House and Senate of the Seventy-fourth Congress of the United States consenting thereto, was organized at the first meeting of the signatory States ratifying said compact duly convened and held at Oklahoma City on September 12, 1935. The Commission as presently constituted is composed of one acting representative from each of the following compacting States: Colorado, Illinois, Kansas, New Mexico, Oklahoma and Texas. The Commission shall add to its body the representatives of such other oil producing States as shall ratify the compact and appoint representatives to the Commission. The Commission shall be designated "The Interstate Oil Compact Commission' and will be referred to herein as 'The Commission'.

Section 2. The Commission shall be a fact finding and deliberative body with the power to make recommendations to the member States. It shall have no official seal. Its official actions shall be taken in accordance with these By-laws and said compact; the verity of its transactions shall be established by written report thereof, certified to be the action of the Commission under the signature of its Chairman and Secretary.

Section 3. The headquarters of the Commission shall be at the place of residence of the Chairman thereof, and communications addressed to it shall be in care of and at the address of its Chairman.

ARTICLE II: PLACE OF MEETING

Section 1. Regular meetings of the Commission shall be held quarterly on the second Friday at ten o'clock, A.M., Standard Time, of the month on which the quarter falls, the first of said meetings after the adoption of these By-laws to be the second Friday in December, 1935.

Section 2. Upon the written request of sufficient representatives of the member States to constitute a quorum, setting forth the purpose, special meetings of the Commission shall be called by the Chairman of the Commission.

Section 3. As a part of its regular order of business the Commission at each regular meeting shall select the time and place of special meetings with a view to the accomodation of the various Commission Members.

ARTICLE III: NOTICE OF MEETINGS

Section 1. The Chairman shall cause the Secretary to mail to the address of the representative of each compacting State, by registered mail under form for the demand of return receipt thereof, notice in writing of the time and place of all regular meetings, and of the time, place and purpose of all special meetings, said notice to be posted not less than ten days prior to the meeting. Where a compacting State may be represented by its Governor or an alternate, whose name and credentials have been furnished the Commission, notice shall be given both.

Section 2. The giving of notice as herein provided may be waived in writing or by telegram by each several representative of the compacting States, and as to the representative of such State any meeting held in accordance with such waiver shall be valid.

ARTICLE IV

Section 1. The powers of the Commission shall be provided in the Oil States Compact. All findings of fact and recommendations made by the Commission in accordance therewith shall be evidenced by Resolution duly passed by vote in accordance with these By-laws and said Compact.

ARTICLE V: QUORUM AND VOTING

Section 1. To constitute a quorum at any meeting of the Commission or at any time during such meeting, there shall be present a majority of the members of the Commission. Any number less than a quorum may adjourn the meeting from time to time.

Section 2. All action taken by the Commission shall be as the members present may elect, either by viva voce or by written ballot, taken in accordance with the following formula:

(1) by the affirmative votes of th majority of the whole number of the Compacting States, represented at the meeting, and

(2) by a concurring vote of a majority in interest of the Compacting States at said meeting, such interest to be determined as follows:

Such vote of each State shall be in the decimal proportion fixed by the ratio of its daily average production during the preceding year to the daily average production of the Compacting States during said period.

Section 3. The certificate of the Bureau of Mines of the United States shall be prima facie evidence of the daily average production of each Compacting State during the preceding calendar half-year and of the daily average production of the Compacting States during said period. Other evidence of said facts at the instance of any State shall be received and acted upon by the Commission.

Section 4. Except as otherwise provided by these By-laws and said Compact, all meetings of the Commission shall be conducted in accordance with general parliamentary rules.

Section 5. Each State which is now or may here after become a member of the Compact shall deposit with the Secretary of the Commission its official certificate and designation of the name of its representative, together with his permanent address, and if it have an alternate, then also of his name and address. Notice of meetings and the transmittal of other written communications from the Commission to such State shall be made to said representative, and, if there be an alternate, also to the alternate.

ARTICLE VI: OFFICERS AND COMMITTEES

Section 1. The officers of the Commission shall consist of a Chairman, First Vice-Chairman and Second Vice-Chairman, each of whom must be a member of the Commission. There shall also be a Secretary and such Assistant Secretaries as may be needed, who shall not be required to be members of the Commission. Said officers shall be elected by the Commission at the quarterly meeting held in September of each year and shall hold office for a period of one year or until their successors are selected in accordance with these By-laws and have assumed office. Provided, the officers of the Commission, serving at the time of the adoption of these By-laws shall serve until their successors are duly elected and qualified as herein provided.

Section 2. The sole duty of the Chairman in his official capacity as such, shall be to preside at all meetings; to call and provide for notice of meetings; and to perform such other duties as may be placed on him by Resolution of the Commission. But in his capacity as representative of his State he shall exercise all the powers and duties of a member of the Commission. In case of the absence or inability to act of the Chairman, the First Vice Chairman shall act, and in the case of his absence or inability to act, the Second Vice Chairman shall act.

Section 3. The Secretary shall make or cause to be made a record of all transactions taken at each meeting, shall presenve the same, shall keep among such records the official credentials of the representatives, give notice of the meetings as herein required and otherwise perform the duties customarily performed by the Secretary of a deliberative body.

Section 4. Each State shall compensate and bear the expenses of its own representative in such manner and to such extent as it may provide. The representative of any State who is selected as permanent Chairman shall have the right, subject to approval of the Commission, to select the Secretary and shall in such case make provision for his services without cost to the Commission. The Commission is forbidden to accept the donation of funds for any purpose except such funds as may be provided by member States through their representatives and then only by Resolution of the Commission duly passed wherein provision shall be made for the disposition of such funds.

Section 5. There shall be such temporary and permanent committees created and the membership and chairman thereof appointed by the Chairman of the Commission, subject to confirmation by the Commission, as the Chairman and the Commission from time to time determine. Committees which in such manner have become established as permanent committees shall have their membership and chairman named by the Chairman of the Commission at the meeting of his election, which meeting shall confirm or reject such appointments.

ARTICLE VII: AMENDMENTS TO BY LAWS

These By-laws may be altered and amended at any regular meeting upon vote by the Commission as herein provided, upon condition that notice of such change or amendment was first given to the representatives of each compacting State thirty days prior to the meeting.

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