The arrival of British and American industrialists to develop the petroleum resources of Mexico coincided with a political climate favorable to foreign capital investment. President Porfirio Díaz attracted both capital and technology in an effort to stimulate an infant petroleum industry. The disciples of positivism especially supported his endeavors. These científicos believed that financial stability, necessary for political order, originated from internal economic growth. In turn, Mexican development depended on foreign capital investment. Mexico might retain such capital on a permanent basis only if investors had confidence in the stability of the political regime. México, therefore, could immediately achieve industrial growth without waiting for a large-scale accumulation of domestic capital. By the turn of the century, José Ives Limantour, Minister of the Secretaría de Hacienda y Crédito Público (finance), had established positivismo as the philosophical driving force of the Porfiriato. In theory, Mexican material progress depended upon foreign capital, technology, engineering skills, and markets for successful achievement.¹

The strong desire of Díaz to encourage foreign investment moved


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him to alter basic principles of the Spanish legal system which upheld the inalienable right of the crown, and subsequently the nation, to subsoil resources. In a series of legislative enactments, however, property and exploitation rights to potential subsoil deposits of petroleum and gas reverted from the Mexican nation to surface property owners. The linkage of surface and sub-surface soil also included the right to acquire, possess, and use freely the oil or gas from the state of nature. Consequently, the Porfirian legislation developed new concepts of ownership, exploitation, and taxation. Collectively, the laws created the legal incentive for petroleum development by foreigners in Mexico.

During the administration of Manuel González in 1883, the Mexican Congress amended the Constitution of 1857 to provide for the promulgation of mining and commercial codes by the federal government. The following year, the Mining Code of 1884 marked the departure from juridical tradition which separated private ownership of the surface from national ownership of the subsoil. Starting from a clean slate, the law declared all prior mining legislation null and void. Specifically, the law (Article 10) made "petroleum and gaseous springs" the exclusive property of the surface owner. Furthermore, the specific exclusion of pe-

2 According to Mexican legal definition, exploitation meant production of petroleum or extraction from subsoil to surface.


troleum and gas (bitumens) from other minerals, as well as the inherent right to exploit the subsoil on private lands without official denouncement or special permission, clearly indicated in principle the separation of combustible resources from the mining sector. The elimination of denouncement and permission (concession) greatly restricted the bases for future tax revenues from petroleum resources. Finally, the code provided no regulations of any kind in the exploitation of petroleum (as with water) resources on the surface or from wells.

Supplementing the Code of 1884, additional statutes underlined the concept of exploitation as regards to petroleum resources. In addition to providing for special commercial concesions under the Department of Fomento—such as the free importation of construction materials for 10 years—in order to encourage new infant industries in Mexico, the Law of 1887 specifically exempted the exploitation of petroleum on private lands from all federal, state, and municipal taxation with the sole exception of the internal revenue duty. As well as setting low freight rates on products destined for export, the law also provided for low property tax rates on industrial plants and surface real estate. Finally, the law obligated the concessionaire merely to invest a specified amount of capital as well as to begin and complete industrial buildings within a certain period of time. Furthermore, the Mining Law of 1892

5 A denouncement is a formal announcement or registration of intent to exploit subsoil resources.
6 The National Archives, Records of the Department of State Relating to Internal Affairs of Mexico, 1910-1929, Record Group 59, National Archives Microfilm Publication, Microcopy No. 274, Washington, D. C., The National Archives, 1959 (Hereinafter cited as NA-RDS), American Consulate at Tampico, to Sec. of State (Enclosure: Message from the President of the United States Transmitting Report of the Secretary of State in Response to Senate Resolution No. 330, Submitting Certain Information Respecting Oil Lands or Oil Concessions in Mexico, February 16, 1927), 812.6363, Nov. 21, 1911; PEMEX, Documentos Relacionados con la Legislación Petrolera Mexicana, pp. 40-41; PROBLEMAS, VI, 19-20; and IMA, II, 2385. Statement of Frederick R. Kellog.
7 PROBLEMAS, VI, 20, 23.

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(Article 4) restated the right of surface owner to exploit freely the “oils” from subsoil deposits on private lands without official denunciation or special permission (concession). As under the Code of 1884, the exemption from registration in order to exploit petroleum resources virtually eliminated the payment of taxes. While not abolishing the Mining Code of 1884, the Mining Law of 1892 did not, however, restate the extension of surface ownership to subsoil resources.

After the Department of Fomento granted a “new petroleum industry” concession to Edward L. Doheny of California in 1900, the first piece of Porfirian legislation dealing exclusively with petroleum appeared the following year. Concerned mainly with the right to exploit and possess subsoil “petroleum or gaseous carbides” (Article 1) on public lands by means of special permission (concession),10 the Petroleum Law of 1901 empowered the president of Mexico to concede the exploration and exploitation of terrenos baldíos o nacionales (vacant or national lands) and waters held by the federal government.11

With the production of only the minimum of 2,000 liters (125.8 barrels) of oil daily per well and suitable for fuel, the concessionaires received 10 year patents of exploitation (Article 2) and reaped a harvest

to Protest Against the Proposed State Taxes on the Production of Petroleum: The Legal and the Moral Aspect of proposed Vera Cruz Tax), 812.6363/6, July 18, 1912. Walker attributed the Law of 1887 to the production failures of Cecil Rhodes which frightened off other foreign investors.

9 PROBLEMAS, VI, 23, 25; PEMEX, Documentos Relacionados con la Legislación Petrolera Mexicana, p. 42; and Bernstein, p. 27.

10 A concession is something conceded by a government as a grant of land, a privilege, or franchise — usually to promote economic development in the national interest. The privilege may take the form of an exemption from customary regulations. Unlike the U. S., Mexico in most cases merely leased the privilege to exploit in contract and retained proprietary rights. Fred Wilbur Powell, The Railroads of Mexico (Boston: The Stratford Co., Publishers, 1921), pp. 167-168.

of lucrative privileges (Article 3). Furthermore, the pioneer well in each state on federal land brought its discoverer either the right of sole exploitation for a 10 year period or the right to purchase all land within a 3 kilometer (1.86 mile) radius. Significantly, the Petroleum Law of 1901 also provided a 10 year period for the free exportation of both crude and refined petroleum as well as the exemption from all federal taxation on capital investment with the sole exception of the internal revenue stamp duty. In addition, the Petroleum Law of 1901 allowed the free importation on a single occasion of all construction materials for production, transportation, refining, and the storage of Mexican petroleum.12

Most significantly, however, concessionaires received not only the right to purchase government lands but also to expropriate private lands for surface needs in the exploitation of petroleum resources (Articles 3 and 4). Concerning the expropriation of private lands, the Petroleum Law of 1901 secured both rights of transit for the construction of pipelines as well as rights of purchase for the erection of industrial plants. Nevertheless, despite easements or surface titles to private lands, the principle of appropriation by means of concession essentially facilitated the exploitation and possession (ownership) of crude petroleum from the national subsoil. As under the Mining Code of 1892, the Petroleum Law of 1901 thus strayed from the principle of linking subsoil with surface ownership.13

The Petroleum Law of 1901, nevertheless, retained some rights for the Mexican government in the concessions of exploitation. Especially important were the first but mild regulatory measures pertaining to the infant petroleum industry. Responsible only to the Department of Fomento, an official inspector examined both the books for earnings as well as business practices (Article 5). In addition, concessionaire com-


13 Regardless of the reason for the expropriation of private lands, ownership entailed the right to exploit subsoil resources. PEMEX-RECOPILACION, ANEXO NUM. 1, pp. 537-538; and The Mexican Year Book 1912: A Financial and Commercial Handbook, Compiled from Official and Other Returns (Mexico City, Department of Finance, 1912), pp. 385-388.
panies advanced $2,400 per year to the Mexican government as payment for the petroleum examiners—considered by the Department of Fomento as members of the boards of directors. Furthermore, the Petroleum Law of 1901 (Article 6) required a comprehensive annual report on petroleum development from every company holding a patent to exploit on government land. Concessionaires paid annually 10 per cent of the total dividends and reserve funds to both federal and state governments.14

Finally, with specific reference to the Mining Law of 1892, the Petroleum Law of 1901 recognized the free right of exploitation on private lands by surface owners or leaseholders with two minor exceptions (Article 7). The Department of Fomento restricted surface owners from sinking wells not only within the limits of towns and within a radius of 300 meters from the outermost houses, but also within the privileged 3 kilometer radius from pioneer wells (Article 3). Finally and significantly, as an incentive for owners or leaseholders of private lands to apply for concessions helpful in the exploitation of such lands, the Petroleum Law of 1901 waived the payment of 5 centavos per hectare for permits to conduct explorations (Article 7).15

After 1884, Porfirian legislation appeared to emphasize, principally by means of concessions, the right to exploit subsoil deposits, and consequently, to attain ownership of petroleum resources by actual possession as the right of capture with buried treasure. Though not challenging the Mining Code of 1884, later legislation stressed the right of appropriation from the subsoil rather than the right of subsoil ownership vested in the surface title. In principle, the ownership of petroleum came only after discovery, exploitation, and actual possession. After the actual discovery of quantitative Mexican petroleum deposits in 1908, however, the final piece of Porfirian legislation reversed the trend.16

14 PEMEX-RECOPIACION, ANEXO NUM. 1, pp. 538-539; and Harold C. George, "Petroleum," The Mineral Industry (Hereinafter cited as MI), Vol. 16 (1907), 764-765.
15 Rents on private lands were often cheaper. PEMEX-RECOPIACION, ANEXO NUM. 1, p. 539; and López-Portillo, "Primera Década...", p. 69.
16 United States Senate, Oil Concessions in Mexico. Message from the President of the United States Transmitting Report of the Secretary of State in Response to Senate Resolution No. 330, Submitting Certain Information Respecting Oil Lands or Oil Concessions in Mexico. 69th Cong., 2d sess., Senate Document No. 210 (Wash-
In a few scanty paragraphs, the Mining Law of 1909 explicitly sustained the exclusive ownership of "deposits of mineral fuels under all its forms and varieties" (Article 2) by the surface proprietor thereby retaining the right to exploit the subsoil on private lands without denouncement or special concession. Furthermore, the law assigned all future legal questions of ownership exclusively to federal courts. Hence, judicial as well as legislative powers joined the President in promoting foreign investment.

In addition to mining and petroleum legislation, Mexican corporation laws also favored foreign investment. Restrictions as to the place of residence or nationality did not exist to hamper foreign incorporatos or directors. All foreign corporations in fact (as Mexican corporations) which registered in Mexico, received exemptions from the payment of annual franchise taxes. As with proprietary and exploitative rights, the Porfiriato essentially abandoned the application of taxes and restrictions to foreign corporations in the petroleum industry.

Nevertheless, despite conscious endeavors to encourage investment, the lack of restrictions resulted in part from the Mexican legal system. Operating under a variety of laws which overlapped in jurisdiction and lacked adequate clarification, foreign companies exploited the quandary. Throughout the entire Porfiriato, a comprehensive body of petroleum law did not appear to fully delineate the legal and fiscal bases of the infant industry. As a result, both the Mexican government and foreign companies operated in a state of confusion and developed conflicting
Nevertheless, the Porfirian laws collectively became the magnet for foreign investors to enter the business of petroleum development in Mexico. The linkage of subsoil to surface titles (with free exploitation) brought maximum security to owners and leaseholders. By means of concessions, the extension of exploitation to the public domain expanded the scope of petroleum growth. While consistently avoiding taxation (significantly export taxes), minor restrictions in no way comprised a system of regulation for the petroleum sector. Therefore, without these legal and fiscal inducements, foreign investment on a large scale could not have been possible.

Despite Mexican initiatives, however, foreign pressures during the twentieth century helped to enact the Porfirian laws. Without favorable concessions and security for property, foreigners refused to invest in Mexico. Their demands for legal and fiscal privileges, consequently, brought new political pressures to bear on the Mexican government. In order to obtain favors and to use their influence, some foreign industrialists planted científicos and high government officials on their boards of directors and incorporated under Mexican law. Incorporating the Compañía Mexicana de Petróleo El Aguila, S. A. in 1908, Weetman D. Pearson (Baron Cowdray of Midhurst) placed Governor of Chihuahua Enrique C. Creel, Governor of the Federal District Guillermo de Landa y Escandón, and Colonel Porfirio Díaz (Jr.) on his board of directors. In 1907, Doheny also organized his Huasteca Petroleum Com-


22 NA-RDS (Enclosure: Abstract of Argument to be Presented by Mr. Harold Walker . . .), 812.6363/6, July 18, 1912; and Vernon, p. 42.

23 The degree of involvement by foreign governments in capital investments often determined the nature and latitude of demands by industrialists.


25 Pearson doled $1 500 000, U. S. currency (Hereinafter cited as US.CY.) in stock
pany under Mexican law. Furthermore, although Pearson lobbied for the Petroleum Law of 1901, several companies—both American and British—prodded the Mexican government to enact the Mining Law of 1909. After the Doheny "new industry" concession of 1900, the Porfirian laws originated both from the Mexican government as well as from Anglo-American corporations.

A combination of foreign and domestic stimuli also set into motion Mexican internal improvements. Encouraged by the construction of harbor and port facilities by S. Pearson & Son (Limited) at Veracruz, Coatzacoalcos, and Salina Cruz, the Mexican government financed a massive coastal improvements program specifically to boost the petroleum industry. Plans to improve the harbor at Frontera, however, pro-


ved short-lived. After exciting oil strikes at Macuspana in early 1909, government engineers immediately surveyed and charted the bar and channels of the Ríos Grijalva and Usumacinta. By July of 1909, however, production slumped considerably which caused Pearson to suspend further developments. Likewise, the Secretaría de Comunicaciones y Obras Públicas (Public Works) announced an indefinite postponement of harbor and river improvements.29

Notwithstanding the lack of success in Tabasco, the Mexican government granted a contract for the removal of the bar at the mouth of the Río Soto la Marina — north of the Tampico-Túxpan Basin. Plans also existed to make the river navigable 100 miles west of the Gulf of Mexico as well as for deep water facilities at the town of Soto la Marina. In early 1909, the Department of Public Works still considered the river vital to the development of potential petrolierous lands in East-Central Tamaulipas. Since the nineteenth century, knowledge of abundant surface setpages and asphalt lakes pointed to future, successful development.30 In 1909 also, official plans developed to remove the bar at the mouth of the Túxpan river and to construct port facilities at the town of Túxpan. As with Soto la Marina and Frontera, Túxpan boomed simultaneously with petroleum developments.31

The most ambitious government project, however, envisioned a Tampico-Túxpan inland waterway system centering on shallow Lake Tamaiahua as the natural span between the Ríos Pánuco and Túxpan. Providing cheap transportation for bulk commodity shipments, the system essentially comprised an intercoastal canal constructed 120 miles through the heart of the most potentially productive petrolierous lands.32

construction since 1902, the Mexican government—anxious to provide exportation facilities for raw materials abroad—pushed the contractor, Captain Charles E. Shillaber, to finish the job before the reality of petroleum production. Beginning in January, 1910, the government increased its activity to rush completion of the southern end near Túxpan.33

In addition to creating a favorable legal and commercial environment, the Mexican government moved to publicize its existence in order to attract foreign capital investment. Under the direction of Carlos Pacheco, the Department of Fomento financed an extensive campaign of propaganda to promote investment in the petroleum sector.34 Mailed from Washington, D. C. with the consent of the United States Department of the Interior, a flood of pamphlets heralded the opportunities in Mexico as well as the promises of Díaz for legal protection and fiscal exemptions. Mexican advertisements thus contributed to extensive development of petroliferous lands.35

The Department of Fomento also implemented the Porfirian laws of 1887 and 1901 through the means of granting and approving specific concessions. After a "new industry" concession in 1900 finally initiated a petroleum sector the following year,36 the Department of Fomento expedited federal and state exploitation, expropriation, and commercial concessions during the remaining decade under the Petroleum Law of 1901. Nevertheless, because of the minor restrictions and the 10 per cent sharing of profits provision, most companies chose not to apply for concessions relating to public lands. Furthermore, the Department of Fomento specifically required that all such concessionaires incorporate under Mexican law. Political and financial considerations, therefore, kept many industrialists away from government lands.37

37 Jesús Silva Herzog, Historia de la Expropiación Petrolera (México: Cuadernos

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Pearson, however, applied for land concessions under the Petroleum Law of 1901. Rather than emphasizing the exploitation of subsoil resources on public lands with the 10 per cent sharing of profits stipulation, the English investor shrewdly took advantage of options as the purchase of public domain and the expropriation of private lands. Since ownership entailed the right to exploit subsoil resources, Pearson in fact obtained a monopoly of choice as to Mexican subsoil exploitation. The right to expropriate private surface lands naturally led to their subsoil exploitation. As a result, this advantage enabled Pearson after 1905 to further compete with Doheny and Pierce in Mexican petroleum development. Nevertheless, with the reception of a major pipe line concession in 1908, Doheny essentially acquired all the privileges under the Petroleum Law of 1901 (Article 7) without the exploitation rights and duties on government lands. Generally, concessions emanating from the Porfrian laws served a dual function for the Mexican government. Securing additional foreign capital investment vital to sectoral growth, concessions also worked to check the political influence of foreign industrialists. Therefore, Díaz cleverly utilized the Mexican means of granting special concessions to implement the Mexican ends of economic development and national security.
Since the nineteenth century, the spectre of monopoly consistently haunted the President and leading científicos. Given the experience of American domination in both railroad and mining sectors, Díaz saw the pitfall in the control of an industrial sector by one national group of foreign investors. Because economic monopoly meant unlimited political influence, the President and his Finance Minister attempted to maintain an equilibrium of foreign national investments. Especially wary of the Standard Oil (NJ) octopus with its tentacle of Waters-Pierce in Mexico, Daíz manifested his opposition to monopoly in the infant petroleum sector. Directed at the Standard Oil (NJ) Company, the President proposed a law in 1905 to prevent the formation and operation of trusts in Mexico. By 1908, the Porfiriato strictly enforced and additional law which required public disclosure of all shareholders in corporations purchasing oil lands, as well as government approval for all land transactions in Mexico. Conceding the promise never to sell his holdings to "a very strong foreign organization" without first giving the Mexican government the right of purchase, Doheny tactfully assured the President that his Mexican Petroleum Company of California was not in any way connected with the Standard Oil (NJ) Company. Consequently, Díaz ordered the Instituto Geológico Nacional to report on the development activities of Doheny —together with Pearson— as possible competitors to Waters-Pierce.

41 American capital controlled the two principal railway system in Mexico: the Mexican National (James Speyer) and the Mexican Central (Henry Clay Pierce). Fearing a merger and eventual absorption by U. S. railroads, the Mexican government purchased a controlling interest in 1908 and consolidated the two trunk lines into the Ferrocarriles Nacionales de México the following year. Edgar W. Turlington, Mexico and Her Foreign Creditors (Volume 1) Mexico In International Finance and Diplomacy (New York: Columbia University Press, 1930), pp. 227, 237-238; Powell, The Railroads of Mexico, pp. 4, 131, 173, 175-177; "Leading American Company May Retire from Mexican Petroleum Field," OP&DR, Vol. 78, No. 19 (Nov. 7, 1910), 28D; and Vernon, p. 40.


Deliberately encouraging competition among foreign companies, Díaz and Limantour eventually chose to balance both British and American interests within the petroleum sector. Their policy succeeded mainly because only a few large petroleum companies actually existed with the financial and technological stature to undertake Mexican integrated development. Essentially, the Porfiriato did not concern itself with foreign exploitation of the Mexican economy. Instead, the government of Mexico reacted only to the monopoly of an economic sector by one foreign concern or group of interests possessing the same national origin.44

During the first decade of the twentieth century, Díaz successfully balanced the petroleum sector in Mexico in terms of foreign investment. Principally with American capital, Doheny initiated the petroleum industry in the Ebano District of San Luis Potosí in 1901. Achieving success with moderate production, he quickly became the most significant developer and dominated exploitation of the Huasteca.45 Marketing and refining without competition since 1875, Pierce reinforced the reality of American domination. On the other hand, Pearson obtained only minor successes in production within the Isthmus of Tehuantepec and Tabasco-Campeche-Chiapas basins. After 1905, however, government land concessions (with lucrative options) encouraged Pearson to extend


his operations into refining at Minatitlán in the Southern Zone, as well as to transfer the focus of production development under the Mexican Eagle Petroleum Company to the Túxpan District within the Northern Zone—closer to the area of more promising quantitative subsoil deposits. Financed with British capital, the Oil Fields of Mexico Company of Percy N. Furber also received exploitation rights and franchises based on the Petroleum Law of 1901 (Article 7). On the other hand, Díaz cancelled government land concessions granted to Standard Oil (NJ), affiliated with Waters-Pierce in Mexico. Significantly, this retraction from Standard Oil (NJ) marked a further escalation in the control of the Pierce monopoly. The President thus regained command of the petroleum sector through the British firms of Pearson and Furber. Influenced by the fear of domination by the United States in Mexico, the Porfiriato deliberately provided a counterpoise to American political influence though British capital investment.


50 The following attempts to control Pierce show the consistency of Díaz: a refining concession granted to Luis De La Barra for Cheesewright, De La Barra & Furber (1893); a direct tax levied on refineries (1896); refusal to cancel the refining concession of the Mexican Compañía Martínez (1897); and the legal provisions for competitive refining in numerous concessions (1901-1910). Luis Nicolau d’Olwer, “Las Inversiones Extranjeras,” Historia Moderna de México, El Porfiriato, La Vida Económica (Part 2). Edited by Daniel Cosío Villegas (México, D. F.: Editorial Hermes, 1965), 1126; PEMEX-RECOPIACION, ANEXO NUM. 1, p. 537, ANEXO NUM. 2, p. 539; and Meyer, p. 42.

Although balanced foreign investment served as one reason for the grating of Porfirian concessions, a concomitant motive for petroleum exploitation developed from the need of a cheap, efficient, and substantial quantity of domestic fuel for the transportation, metallurgical, and manufacturing sectors. Uniquely, Mexican positivist thought activated the concept of petroleum as fuel for industrialization. In addition to liquid capital, positivism stressed the need for foreign engineers and corporate managers in order to quickly achieve the goal of material progress. Originally, the President applied this technique to the problem of Mexican railroad construction. In turn, the railroads stimulated other economic sectors and created demands for lubricants and fuel. The idea to use petroleum as fuel became more a reality after Díaz named A. A. Robinson as President of the Mexican Central Railway. Concerning the San Luis Potosí and Monterrey lines to Tampico, Robinson realized that regional development was necessary to finance original costs in construction as well as future expenditures of the Mexican Central. Furthermore, based on experience in California, he speculated on the source of a cheaper fuel than coal necessary for efficient operation. Since petroleum exploitation would furnish both fuel and revenue to the Mexican Central, he expeditiously undertook a survey of potential petroliferous lands adjacent to railroad trackage west of Tampico.  

President Díaz also became aware of the necessity to develop domestic fuel resources for Mexican railroads, as well as for manufactures, heavy industry, and the smelting of ores. Moreover, because of the lack of restrictions in the deforestation for charcoal fuel, Mexico had already lost much of her timber reserves. Mining only 409,125 tons by 1899, mostly soft bituminous quality from the State of Coahuila, the coal industry in Mexico failed to expand at the rate of other sectors because

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Comparative tonnage weights are: 1 metric ton 2204.6 lbs., 1 short ton 2000 lbs., and 1 long (British) ton 2240 lbs. Hereinafter cited as tons because of incomplete statistical data.)
of limited known deposits and excessive costs in transportation. Given domestic demands by the turn of the century, a scarcity developed for fuel in terms of quantity and costs. Mexico essentially did not produce a substantial domestic supply at competitive prices. In 1900, Díaz expressed hope that the use of petroleum as an inexpensive and suitable fuel would conserve Mexican timber resources and eliminate the large importations of coke and coal. To accomplish this end, he explicitly enacted the Petroleum Law of 1901.

The high costs of imported coal from the United States and Great Britain acted as a thorn in Mexico’s balance of trade payments and further focused attention on the need for petroleum substitutes. Large importations, of course, ran contrary to the aims of financial stability and material progress which stressed export to foreign markets. Nevertheless, rapid industrial expansion in Mexico after the turn of the century created demands for coal and coke in excess of domestic supply. The

construction of railroads, factories, and smelters in Northern Mexico caused the rates of consumption to consistently increase throughout the decade.\textsuperscript{58} With the lack of a substantial domestic supply, industrial consumers increasingly depended upon foreign imports. By 1910, Mexican railroads still imported up to 140,000 tons of British coal per year.\textsuperscript{59} Specifically, the Mexican Central Railway alone consumed 840,000 tons a year of which 540,000 tons came from abroad—mainly from the United States.\textsuperscript{60} Together with railroads, metallurgical industries primarily were responsible for increased demands. Lead smelters, for example, at Monterrey, Saltillo, Aguascalientes, and San Luis Potosí, shipped bullion from Tampico and imported coal and coke on return trips in the same steamers. Large importations into Sonora also occurred for the smelters of the Cananea Consolidated Copper and the Phelps-Dodge interests.\textsuperscript{61} Significantly, the importation-consumption ratio of coke and coal narrowed considerably during the last years of the Porfiriato. By 1908, approximately two-thirds of the 6.5 million tons of coke and coal consumed in Mexico entered from abroad.\textsuperscript{62}

Despite increased output since 1900, the infant coal industry in Mexico could not compete with American production. With the exception

\textsuperscript{58} "Fuel Oil on a Mexican Railroad," OIJ, Vol. 6, No. 9 (Oct. 5, 1907), 22; "-\textsuperscript{--}," Min. World, Vol. 25, No. 11 (Sept. 15, 1906), 291; "-\textsuperscript{--}," E&MJ, Vol. 64, No. 13 (Sept. 25, 1897), 364; and "Coal and Coke Needed." MH (Nov. 3, 1905), 3.


\textsuperscript{61} Parker, "Coal Production of Mexico," MR (1902), 336; and Bernstein, pp. 36, 38, 40, 54, 69.

of anthracite pockets in the State of Sonora, Mexican deposits generally contained soft bituminous coal although useful for coking purposes. Nevertheless, Mexican coal contained a high ash content which boosted costs in maintenance for railroads and smelters. High prices as well as low quality coal thus drove consumers to foreign imports or to domestic sources of petroleum fuel and hydroelectricity. The basic problem, however, was inadequate production which fell short of domestic demands. Similar to nineteenth century petroleum ventures, the coal industry failed to attract the capital necessary to exploit deposits distant from existing railroad lines. Throughout the decade, the lack of transportation facilities seriously retarded significant development. As the gap continually widened between domestic production and consumption of coal and coke, importations increased proportionately. The infant industry, consequently, failed to match energy requirements for Mexican industrial expansion.

In 1909, the Mexican government moved against the growing imports with a circuitous freight levy of $1.00 US.CY. per ton on foreign coal. Actually a protective tariff rather than a revenue device for the National Railways of Mexico, the duty gave Mexican coal a chance to compete with foreign production. Nevertheless, given the limited output of the infant industry, the tariff merely succeeded in raising the price of domestic as well as foreign coal thus retarding economic expansion.


measure, however, failed to solve the immediate needs for industrial fuel, nor did the Mexican government budge from mounting sectoral pressures which demanded the removal of import duties on petroleum from the United States.  

The railroad, smelting, and manufacturing industries particularly clamored for an end to the tariff. Most persistently, the Sonora Railway, part of the Southern Pacific system, petitioned that oil for fuel purposes be allowed freedom of entry.

Debating the necessity of importing fuel oil from Texas and California without a tariff restriction as early as 1900, Díaz insisted that Mexico acquire her own domestic supplies of petroleum and coal and thus supported the infant industries. Despite a scarcity of fuel commodities in Mexico, the President was unsympathetic to the arguments that lower prices and greater efficiency made petroleum superior to coal as fuel and therefore necessitated free importation.

With the price of petroleum at 45-55 cents per barrel as to $3.00-3.50 per ton for coal (US.C.Y.) and, moreover, with 3.5 barrels of oil equivalent to 1 ton of coal in terms of energy, the Mexican Central Railway claimed a 50 per cent reduction in the cost of fuel. Furthermore, fuel oil substantially reduced the cost of labor and eliminated the back-breaking process of shoveling coal. Using 9,000,000 barrels of oil fuel per year at the end of the decade in California, Arizona, and New Mexico, the Southern Pacific Railroad found 3.88 barrels of oil equal to 1 ton of coal, and hoped to extend such efficiency to its Mexican lines. Also


70 Prices are those delivered to railways at places of production or at ports of entry. (Hereinafter cited as f. o. b.) Energy equivalents in generating steam are measured in terms of British Thermal Units (BTUs). "Mexican Railways Revert to Use of Coal," OP&DR, Vol. 76, No. 8 (Aug. 23, 1909), 42; Brendel, "Mining Coal in Mexico," E&MJ, Vol. 89, No. 21 (May 21, 1910), 1077; Brendel "Coal and Coke," MI, Vol. 18 (1909), 128; and IMA, I, 216, 236. Testimony of Edward L. Doheny.

71 Generally, petroleum from the California and Gulf Coast fields varied between
adapting crude oil as fuel in new smelting processes, the Cananea Consolidated Copper Company discovered that 3 barrels of oil for the reverberatory furnaces equaled 1 ton of coal, thus cutting the cost of fuel nearly in half in addition to the considerable savings in labor. Finally, the greater efficiency and lower costs of oil fuel served to encourage the development of manufacturing in the Mexican Republic. The new revolving kilns of cement factories, for example, in the State of Hidalgo, cut operational costs substantially by using petroleum rather than other fuels.

Despite the proven superiority of petroleum as fuel, the President remained standpat in the protective tariff debate. Even when the American coal strike in 1906 briefly threatened a shut down of industrial and transport sectors in Mexico, Díaz refused to approve the free importation of petroleum as a substitute fuel. Given the tariff on American petroleum, together with deficiencies in domestic fuel supplies, the effects of the strike on the Mexican economy were especially severe. Notwithstanding long-term contracts for coal from the United States and Britain, Mexican railroads confiscated coal en route to factories and smelters, thereby assuring for themselves a minimum supply. These frantic economic moves, however, caused shut downs and thus retarded industrial growth. If shortages of fuel caused temporary shut downs for large concerns, the increase of $2.00-3.00 (US.CY.) a ton in the price of coal resulted in failure for many smaller enterprises. Nevertheless,
Porfirio Diaz steadfastly adhered to protection at all costs for the infant coal and petroleum industries thus retarding the Mexican economy.75

The domestic coal industry, however, failed to supply the fuel necessary for industrial growth. Even more serious, considering the capital investment, petroleum production in Mexico during the first decade of the twentieth century proved disappointingly meager. As a consequence, the limited production failed to meet the expanding demand for petroleum as a cheap and efficient energy source in the new industrial and transportation technology. Specifically, actual production from the Ebano field in San Luis Potosí by the Mexican Petroleum Company fell short in supplying the needs of the Mexican Central Railway.76

The experience of Robinson and Doheny with California petroleum on the Atchison, Topeka & Santa Fe prompted the official introduction into Mexico of the first oil burning locomotive in May of 1903.77 After Doheny demonstrated the superiority of Mexican petroleum over coal in terms of costs and efficiency in raising steam, the Mexican Petroleum Company secured a contract in May of 1905 with the Mexican Central for the supply of 6,000 barrels of crude oil daily for 15 years at 55 cents (US.CY.) a barrel. The contract, moreover, charged Doheny with the costs of conversion from coal to oil (or reconversion back to coal) and stipulated that the crude contain less than 5 per cent water.78 Significantly, the Mexican Central Railway approved the contract with the provision that the Mexican Petroleum Company supply in the future sufficient fuel oil for all locomotives on the system. During the term of contract, Doheny stood to sell the minimum of 45,000,000 barrels

—computing on the basis of 8,000 barrels as the probable average daily consumption of oil for all locomotives in November, 1905.79

Elated with the $25,000,000 (US.CY.) contract, Doheny quickly set out to achieve conversion and expedite storage and tank car facilities on the Mexican Central. Initially, the pioneer industrialist from Los Angeles hoped for conversion from coal to oil on all Mexican railway systems. With the wells at Ebano producing only 2,000 barrels daily in 1905, and 4,000 barrels daily by 1910, limited supplies thus forced slow conversion on the Mexican Central throughout the decade.80 Other problems besides production handicapped the success of petroleum as railroad fuel. Excessive smoke, explosions from gas vapors, high viscosity, and salt water content from the asphaltic-based Ebano crude further delayed the conversion process.81

For more than 5 years inadequate production resulted in piecemeal conversion and reconversions thus failing to compete with foreign coal.82 Shortly after the lucrative fuel contract with the Mexican Central, Doheny notified the Interocceanic Railway of the impossibility to furnish other systems with oil fuel. Consequently, the Interocceanic abandoned preliminary work on the conversion of its power units. The Mexican Central, moreover, converted fewer than 50 engines by the end of 1905.83 The following year, conversion also moved at the same retarded rate with 100 of the 500 engines changing to oil fuel. The Mexican Central even purchased 10 engines from the American Locomotive Company

81 Failure to properly distill the exact portion of lighter fractions from the crude petroleum caused numerous accidents. Viscosity measures the internal fluid resistance of a substance, caused by molecular attraction, which make it resist a tendency to flow. "Not Enough Ebano Oil," MH (Sept. 13, 1905), 2; "Two Expected to Die," MH (Jan. 27, 1906), 2; and "Mexican Railroads Give Up Fuel Oil," NP. News, Vol. 1, No. 7 (Sept., 1909), 19.
83 "Not Enough Ebano Oil," MH (Sept. 13, 1905), 2; "Oil Burning Engines," MH (Sept. 18, 1905), 2; "Using Oil Burners," MH (Oct. 27, 1905), 2; "Oil Man is Coming," MH (Oct. 31, 1901), 2; "Use of Oil Being Extended," MH (Nov. 6, 1905), 2; "Oil Burning Equipment," MH (Dec. 27, 1901), 2.

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in the United States still equipped for the use of coal as fuel. Undaunted by the tardy schedule in fuel substitution, the Railway promised complete conversion by the middle of 1907. With only a slight increase in production at Ebano, however, Doheny barely furnished 4,000 barrels daily to the Mexican Central which managed but 70 conversions in 1907 and only 30 more in 1908.

Operating as part of the National Railways of Mexico in 1909, the Mexican Central again failed to receive the minimum delivery from the Mexican Petroleum Company. Actually, a high percentage of salt water in the Ebano crude, in addition to a decline in production, caused the Mexican Central to refuse shipments and revert to the use of coal as fuel. At the same time, the Railway began to change some of its 269 fuel oil locomotives back to stoking coal. Receiving less than 4,000 barrels daily for the demands of 25,000 barrels per day on the entire system in 1909, reconversions back to coal continued. Hard pressed at Ebano to supply the needs of Mexican railroads, Doheny eventually constructed a pipe line from the newly discovered Juan Casiano pool in

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the Golden Lane to the Río Pánuco and the line of the Mexican Central. The Huateca Petroleum Company thus made up the deficiencies of the Mexican Petroleum Company at Ébano. Nevertheless, despite quantitative production by September, 1910, Doheny hedged on delivering more than the contract amount to the National Railways of Mexico. Based on a lucrative contract with Waters-Pierce in October for 2,500,000 barrels at 92.5 cents (US.CY.), the American developer held out for more than the standard 55 cents (US.CY.) from the government railroads. Not until December, 1910, did the National Railways of Mexico finally receive additional fuel in the amount of 12,000 barrels per day.

Similar to developments at Ébano, San Luis Potosí, production from fields in Tabasco, Chiapas, Northern Veracruz, and the Isthmus of Tehuantepec by Weetman Pearson fell short in supplying the needs of the Tehuantepec National, the Mexican, the Vera Cruz & Pacific, and later, the National Railways of Mexico. The Tehuantepec National Railway, however, first created demands for petroleum as fuel. Sharing risks and profits with the Mexican government in a partnership enterprise as contractor and manager, Pearson transformed the Tehuantepec National into a first rate line with punctual and efficient service by 1907. From the very beginning of operations in 1903, the Tehuantepec

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92 Powell, The Railroads of Mexico, p. 152; Spencer, pp. 27, 110, 113, 120, 122; and Young, pp. 42, 103, 195.
National exclusively burned crude petroleum as fuel imported from Texas ports on the Gulf of Mexico.\textsuperscript{94}

Without precedent, this decision by Pearson to utilize oil rather than coal as fuel on a Mexican railroad originated both from past experiments as well as future expectations of Mexican production. As regards cost of operations and heat producing value, preliminary trials proved beyond a doubt the superior efficiency of oil over coal even at import prices. More significant, however, Pearson believed in the ultimate certainty of domestic production and the conversion to petroleum fuel by all railways in Mexico.\textsuperscript{95} Nevertheless, given the lack of domestic production, growing importations of relatively cheap Texas crude under contract with the Mexican government entered free from tariff. As early as 1905, shipments from Texas ports to Coatzacoalcos reached 89,636 barrels. Contracting crude from The Texas Company, the Sun Oil Company, and the Higgins Oil and Fuel Company, the Tehuantepec National initially imported all of its oil fuel.\textsuperscript{96}

With his fuel needs supplied from abroad, Pearson vigorously turned to the exploitation of petroleum in Mexico. By December, 1905, the San Cristóbal and Capoacan fields produced sufficiently to justify plans for expansion into refining but did not, however, satisfy demands of the Tehuantepec National Railway.\textsuperscript{97} Moreover, containing a greater pro-


\textsuperscript{97} "Must Be Efficient," MH (July 28, 1905), 2; Oliphant, "Petroleum: Mexico," MR (1904), 730; Spender, p. 151; and Young, pp. 124-125.
portion of lighter fractions than Ebano crude, Isthmus production required distillation before usage as railroad fuel. When the new refinery at Minatitlán began operations in January of 1908, the production in the Isthmus Basin still did not fully meet railroad requirements. Together with the failure to discover new deposits, production at San Cristóbal and Capoacan declined considerably. Furthermore, in order to escape from larger imports, Pearson mistakenly began to consider developments at Pichucalco, Chiapas and at Furbero, Veracruz for possible substantial supplies. The spectacular blowout of the great Dos Bocas Num. 4 well on the San Diego de la Mar Hacienda in Northern Veracruz as well as the partial destruction of the refinery at Minatitlán by fire further handicapped operations. Finally, with Macuspana and the Isthmus fields declining precipitously in 1909, Pearson became more a marketer of imports than producer of petroleum for the Tehuantepec National Railway.

Because of the failure to increase production, expansion by Pearson in the marketing of fuel in England and Mexico—as well as the entry into the domestic retail trade for refined products in competition with Pierce—resulted in overcommitments which reached crisis proportions in 1909. Specifically, S. Pearson & Son (Limited) secured a contract in 1907 with the Mexican Railway Company for 16,000 barrels per month to supply engines between Veracruz and Mexico City. Converting 30 engines to oil fuel on the expectations of sufficient supply and

101 "Efforts to Develop Oil Resources of Mexico," OIJ, Vol. 6, No. 9 (Oct. 5, 1907), 22; Young, p. 125; and Spender, pp. 156-157.
103 Young, p. 125; and Spender, p. 166.
refining capacity at Minatitlán, the Mexican Railway limited imports of British coal. Nevertheless, in October, 1909, Pearson failed to supply the stipulated amount and began, at his expense, the reconversion of 23 engines back to coal. According to the contract, moreover, Pearson assumed the difference in cost (on the basis of 5 barrels to 1 ton) between oil and coal. Failure to supply the petroleum fuel also cost Pearson $200,000 (US.C.Y.) a month in penalties. Running a mere 6 engines continually on oil fuel in February, 1910, the Mexican Railway scrapped plans for the expansion of storage facilities and drastically reduced orders for railroad tank cars. Consequently, inadequate domestic supplies also thwarted preparations to extend the usage of fuel oil on the Vera Cruz & Pacific Railway, connecting with the Tehuantepec National at Santa Lucrecia, and eventually, over the entire National Railways of Mexico.

By July, 1909, limited domestic production vis á vis overexpansion in the marketing sphere necessitated vast importations of crude petroleum from the Gulf Coast and Mid-Continent oil fields in the United States. By February, 1910, importations of crude, mainly from The Texas Company and the Gulf Refining Company at Port Arthur, reached the figure of 462,088 barrels — nearly one-third consigned to the Tehuantepec National Railway. With the bulk of the imports refined at Minatitlán

107 Based on promises by Pearson to furnish petroleum from The Oil Fields of Mexico at Furbero, the Mexican Railway did not enforce the penalty until March, 1910. “History of the World’s Greatest Cut-rate War,” OIJ, Vol. 8, No. 19 (Mar. 6, 1910), 30, 32; “Exploitation in Mexico,” O&GJ, Vol. 9, No. 6 (July 21, 1910), 8; and “The Great Oil War in Mexico,” OIJ, Vol. 8, No. 22 (Ap. 20, 1910), 16.
for re-export, tariff free to C. T. Bowring and Company and the Anglo-Mexican Petroleum Products Company (Limited) in Britain, the balance entered the domestic retail market in competition with Waters-Pierce. Pearson, however, had moved to free himself from foreign imports. Under contract since 1907, shipments of Furbero crude finally reached Minatitlán in May, 1910, by way of Túxpan. Despite the pronouncements of no further imports from the United States, Percy N. Furber of the Oil Fields of Mexico failed to furnish after the month of July the minimum of 2,000 barrels per day as stated in the Pearson contract. Not until the great Potrero del Llano Num. 4 gusher in December could Pearson guarantee consistent supplies of petroleum fuel for the Mexican railways. For nearly a decade, inadequate production within the area of greatest potential by the two largest petroleum companies retarded the adaptation of a new energy source to the Mexican transportation sector.

New industrial and transportation demands as well as domestic fuel shortages led to the exploration for petroleum outside the Gulf Coastal Plain. In Chihuahua, Sonora, and Sinaloa, companies and interest groups focused attention on favorable geological indications of petroleum in order to obtain a cheap and substantial supply of fuel for Mexican smelters and railways. In 1906, the William R. Hearst and James B. Keene Syndicate of New York discovered petroleum north of the Conchos River near Ojinaga and began to drill a series of wells. Shortly after,
other landowning interests in Chihuahua began to drill and lease—including General Luis Terrazas, his son Alberto, as well as his son-in-law Governor Enrique C. Creel. Under construction since 1900 between Chihuahua City and Ojinaga by way of the Río Conchos, the Kansas City, Mexico & Orient Railway hoped to utilize as fuel the production from the region.

Unfortunately, after three years of intermittent activity, the discoveries had produced only a small quantity of petroleum which did not contain an asphalt base necessary for consumption as fuel. Rather, the oil comprised a paraffin base with a high percentage of volatile elements best adaptable for illumination and lubricating purposes. By 1909, lack of sufficient production not only failed to supply railway requirements but negated pipe line and refinery construction. Landowners, promoters, and railway officials thus became frustrated in their plans to use crude from Chihuahua as oil fuel.
Even earlier on the Pacific Coast, the Sonora Railway of E. H. Harriman indicated the need for domestic fuel in 1902. Even earlier on the Pacific Coast, the Sonora Railway of E. H. Harriman indicated the need for domestic fuel in 1902. Despite minor and remote deposits of anthracite coal in Sonora, the extension of the railway down the coast, further away from fuel supplies in the United States, prompted Harriman to explore for oil. Beginning in 1905 with the extension south from Guaymas to Guadalajara, subsurface exploration in Northwest Mexico, on lease-lands adjacent to railway lines, continued to the end of the decade. Particularly near the Cananea, Yaqui River & Pacific Railway, favorable geological indications led to belief in petroleum deposits. Concerned solely with procuring an abundance of cheap petroleum fuel for Southern Pacific railroad subsidiaries, rather than the entry into integrated petroleum development, Harriman failed to discover a single field adjacent to his railway lines.

Undiscouraged on the Pacific Coast, Harriman turned back to the Gulf Coastal Plain where he planned a San Antonio-City of Mexico railway to tap every major field and port in the Tampico-Tuxpan Basin. Purchasing lands early in 1909 within San Luis Potosí and Veracruz, A. H. McKay immediately began to drill for oil in several districts for the Harriman interest, prior to railway construction, in order to achieve sufficient supplies of fuel. Nevertheless, with the death of

117 “To Prospect For Oil,” MH (Aug. 6, 1903), 2.
118 “Oil Will Be Discovered,” MH (Aug. 16, 1903), 2; and “Efforts to Develop Oil Resources of Mexico,” OIJ, Vol. 6, No. 9 (Oct. 3, 1907), 22.
Harriman later in 1909, construction surveys and exploitation developments suffered delays and, consequently, petroleum fuel in Mexico did not materialize by 1910 despite efforts by the Southern Pacific.  

During the final decade of the Porfiriato, the domestic petroleum industry failed to supply the fuel necessary for maximum economic growth in Mexico. Specifically, limited production fell short of expectations to meet the expanding demand for petroleum as a cheap and efficient energy source in the new industrial and transportation technology. With no assurance of any long-term supply, Mexican railways (with the exception of the Tehuantepec National) initially balked at suggestions to convert to oil fuel.  

With an increase in production in 1908 to 3.9 million barrels, the railways expanded facilities in anticipation of greater supplies. Unfortunately, production declined the following year to only 2.7 million barrels and precipitated shortages of fuel for railroads, smelter, and factory operations. Consequently, prior conversions to oil resulted in reconversions to coal and wood charcoal. Confiscations by the railways, in a war of searches and seizures for fuel, affected adversely metallurgical and manufacturing industries.  

Depending on petroleum fuel as an energy source for prior conversions to modern technology, shortages retarded growth and resulted in shut downs of Mexican industries. Hard pressed to extract a total of 10,000 barrels daily by 1910, Doheny and Pearson sold nearly all production to the National Railways of Mexico for fuel consumption only on divisions with the steeper elevations. Producing but 3.6 million barrels in 1910, the petroleum industry in Mexico did not keep pace with industrial and transportation expansion.

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Because of the protection policies of Díaz, moreover, the fuel situation reached crisis proportions. Deficiencies in coal and petroleum production, tariffs on imports, higher prices, and new industrial technology caused critical shortages of fuel and finally forced Díaz in June of 1908 to modify restrictions on importations. Reluctantly, the President winked at domestic protection while permitting the free entry of California, Texas, and Oklahoma fuel oil, initially on concession bases, into Northern Mexico for metallurgical purposes. Temporarily shut down for want of a cheap source of fuel, the Cananea Consolidated Copper Company immediately secured a 2 year contract with The Texas Company for 35,000 barrels of oil fuel per month. Distilled in Dallas, petroleum from Oklahoma thus moved in railroad tank cars to Cananea, Sonora. In 1909, the California field became the leading producer, yielding 72 per cent of all fuel oil in the United States at bottom prices. Such spectacular overproduction consequently resulted in plans to furnish California fuel on a massive scale to railway as well as metallurgical consumers in Mexico. By 1910, possibilities even developed for gigantic contracts between California producers and the National Railways of Mexico. Securing 27 per cent of California production, the Southern Pacific especially pushed for free entry of oil fuel for its Mexican subsidiary lines on the Pacific Coast. Organizing the California-Arizona Pipe Line Company, the Mexican Petroleum Company of Edward L. No. 1 (July 3, 1909), 11; and U. S. Senate, Petroleum Fields of Mexico, 61st Cong., 1st sess., Sen. Doc. No. 79, 3.


Doheny joined with major producers in California to expend $8,000,000 (US.CY.) for an 8 inch pipe line along the Atchison, Topeka & Santa Fe Railway — conveying 10,000 barrels daily for consumers from Kern County to Cananea. Nevertheless, despite elaborate schemes to supply the entire needs of the Mexican Republic, the first shipment of California crude to Cananea over existing rail facilities did not arrive until December, 1910. Moreover, restricted to fuel oil concessions for metallurgical industries, free importations of petroleum failed to satisfy other sectoral demands thus creating indecision as to energy sources for present operations and future planning. Finally, because of high railroad rates in the United States, exportations of fuel oil by most independent producers in the California, Mid-Continent, and Gulf Coast fields — lacking pipe line facilities and powers of rebate— negated much of the savings in the price of oil over coal or coke.

Essentially, importation concessions for metallurgical industries failed to satisfy the bulk of Mexican demands, and additional pressures developed to further modify or eliminate the Mexican tariff. Initially maintained for the sake of revenue in the nineteenth century, the tariff schedule for petroleum imports levied a duty of $1.83 per barrel on crude and $5.57 per barrel on refined products (US.CY.). Specifically levied on American petroleum imports, the duty in turn automatically activated a countervailing duty on exports of Mexican petroleum to the United States as provided by the Dingley Tariff of 1897.


133 The fuel oil concessions can be viewed as a test case in the effectiveness of lobbying between American metallurgical and petroleum-coal interests in Mexico, "Mexico: Sonora," Min. World, Vol. 33, No. 27 (Dec. 31, 1910), 1263-1264.


136 Upholding the principle of parity, the Dingley Tariff of 1897 essentially all-
Becoming a protection and security device since the turn of the century, the Mexican tariff by 1908 discouraged the entry of American oil necessary for industrial and consumer expansion. Satisfying the need for illuminating and lubricating oils in the domestic retail market, refiners in Mexico as Pierce and Pearson requested an end to tariff restrictions on imports of crude petroleum. In addition, while originally supporting the tariff, large-scale developers in Mexico as Doheny and Pearson, confident of quantitative production, reversed their attitudes on protection as greater possibilities for petroleum fuel in an export market became a reality. Based on parity with the Mexican tariff, American duties on petroleum imports to the United States especially caused concern to developers in Mexico as Edward L. Doheny. Finally, pointing to inadequate fuel production in Mexico, the railways joined the demands for free importation of American petroleum. For different reasons, major interests in several economic sectors simultaneously voiced agreement on tariff removals and free trade principle to achieve both immediate importations of American crude and future exportations of Mexican crude.

owed free importation (with 1 per cent ad valorem duty) if subsequently re-exported. "Report on Mexican Oil Fields Withheld," OP&DR, Vol. 75, No. 24 (June 14, 1909), 28E.


138 The Payne-Aldrich Tariff of 1909 reactivated debate on petroleum duties. American independent producers wanted a 50 per cent ad valorem duty. As a refiner, Standard Oil Company of New Jersey (Hereinafter cited as SO [NJ]) wanted free entry or the parity principle with the option of free importation if subsequently re-exported. As a Mexican producer for American markets after 1910, the interests of Doheny coincided with SO (NJ). The Payne-Aldrich Tariff provided for a countervailing duty, one-half parity (91.5 cents US.C.Y. per bbl. on crude) of the Mexican tariff. "Countervailing Duty is Voted By the Senate," NP. News, Vol. 1, No. 5 (July, 1909), 1; and "A Countervailing Duty for Crude Petroleum," OP&DR, Vol 76, No. 3 (July 19, 1909), 28D.


140 Fearing the power of refiners to dictate prices, small independent producers in Mexico (as in the U. S.) continued to support the Mexican tariff. "Hear That Crude Oil Is To Come In Free," MH (Nov. 7, 1909), 3; "Oil Men Are Excited Over the New Tariff Bill," MH (Oct. 22, 1909), 1-2; "Import Duty on Crude Petroleum in Mexico May Be Removed," OP&DR, Vol. 76, No. 17 (Oct. 25, 1909), 55; "Unique
The result of all anti-tariff proposals, however, took the form of only one major discriminatory change. In November of 1909, a raw materials law modified the tariff providing for the exemption of all duties on crude petroleum imports if refined in Mexico and re-exported within a year. Furthermore, the law provided for retroactive status beginning the first of June, 1909.\textsuperscript{141} Refining only for a domestic market in the Mexican Republic, Waters-Pierce vehemently opposed the change.\textsuperscript{142} Applicable to companies with sales contracts outside of Mexico and the United States or to companies holding railroad contracts with the Mexican government, only S. Pearson & Son (Limited) stood to gain from the tariff amendment. Díaz, moreover, did not solely enact the law to alleviate domestic fuel shortages. The change in the tariff not only permitted Pearson to satisfy demands of the Tehuantepec National Railway but also to fulfill contracts, through marketing subsidiaries in Great Britain, thus directly competing with Standard Oil (NJ) in Europe.\textsuperscript{143} The modification in the tariff further enabled Pearson to vigorously compete with Waters-Pierce in an escalating retail products rate war in Mexico. With crude petroleum from American Mid-Continent and Gulf Coast fields entering duty free to replace inadequate Mexican production, refining operations at Minatitlán prepared the crude for re-export abroad. Significantly, the diversity of fuel marketing by the Pearson firm in both Mexico and Great Britain cushion-


\textsuperscript{143} As with Mexico, Britain in 1910 also considered moves toward preferential tariff discriminations against SO (NJ) imports to the Anglo-American Oil Co. (Ltd.) in favor of Pearson. “Mexican Oil Fields,” E&MJ, Vol. 87, No. 25 (June 19, 1909), 1233; “Does Coming of Pierce Mean Merger or War?” MH (Oct. 22, 1910), 2; “Oil
ed the losses from price cuts on kerosene in the battle royal of domestic retail rates. 146

Caught between the policy of balanced foreign investment within the infant petroleum sector and the immediate demands for American fuel oil from an increasing number of domestic consumers, the Porfiriato contained—then retarded—development in other sectors of the Mexican economy for the sake of petroleum development. Too little and too late, importations from the United States by means of a tariff modification and fuel oil concessions failed to satisfy industrial consumption. Nor did the protective policy of the Porfiriato solve the need for domestic production. From whatever source, demand exceeded the supply of oil fuel, and by 1910, the Mexican economy faced an energy crisis reported as “decidedly serious.” 147

The strong desire of the Porfiriato to encourage foreign capital through legal incentives did not discriminate against domestic investment. 148 The President especially wished foreign capitalists to join with wealthy Mexicans in co-operative enterprise. 149 Domestic capital accu-


147 Owning and exploring for petroleum on several million acres in the Tampico-Túxpan Basin and in the Soto la Marina area in East-Central Tamaulipas, wealthy Mexicans included Guido Moebius (Compañía Petrolera de Monterrey), Gral. Manuel Sán-

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mulation was negligible, however, and most Mexicans had not acquired the habit of corporate investment. Furthermore, investment within the complex petroleum sector required huge capital outlays and involved substantial risks. Finally, official government surveys reported that Mexico did not possess commercially profitable deposits of petroleum. These factors inhibited Mexican investment which further facilitated the entry of foreign capital.

The report issued by the Instituto Geológico Nacional in 1902 was of pivotal importance. Under orders from Díaz, Secretary of Hacienda Limantour had set up a geological commission to investigate the Ebano, San Luis Potosí area for petroleum prospects which might be developed for both fuel and illumination purposes. Unlike A. A. Robinson of the Mexican Central Railway, however, the Instituto reported unfavorably on the potential existence of petroleum subsurface deposits. During February of 1902, every participating geologist except Ezequiel Ordóñez ruled against the possibility of commercially exploitable deposits in the region. Both Limantour and the Director of the Instituto, José María Aguilera, upheld the negative report prepared by Juan N. Villarello and discredited the lone dissenting opinion.

Consequently, one reason for the lack of restrictions and taxation on the petroleum industry originated from the Villarello report. Although precedents had been set by mining and petroleum laws, the geological decision of 1902 discouraged the Department of Fomento, from establishing comprehensive policies of regulation and conservation.\textsuperscript{152} The decision also influenced the Department of Hacienda not to develop a fiscal program based on petroleum resources. Even after indications of quantitative, future production were clearly apparent from the blowout of the great Dos Bocas Num. 4 well in 1908, most Mexican jurists held the opinion that oil, within the subsoil or in surface possession, should be neither the property of the nation nor the basis for revenue. Mexican geologists, therefore, not only discouraged investment from domestic sources but also helped to preclude the full exploitation of tax resources.\textsuperscript{153}

Furthermore, the few Mexicans who did retain the desire to invest in petroleum development bolted at the staggering outlays of liquid capital, necessary even before actual exploitation, and by the concomitant risks of loss or failure.\textsuperscript{154} Enormous parcels of land, held in tracts ranging from 100,000 to 3,000,000 acres in size, required substantial capital accumulation to purchase or lease. The Mexican Petroleum Company, for example, secured the 1,000,000 acre Rancho Limón in Southern Tamaulipas on the Mexican Central Railway for $2,500,000 (US.CY.).\textsuperscript{155}


\textsuperscript{152} Conservation aims for optimum economic exploitation with the best technical methods of production. This results in the maximum total recovery of petroleum with a minimum of waste. It presupposes regulation and is a fundamental criterion for a fully integrated industry. NA-RDS (Enclosure: Abstract of Argument to be Presented by Mr. Harold Walker...), 812.6363/6, July 18, 1912; and Bermúdez, pp. 39, 53-54.

\textsuperscript{153} PEMEX-RECOPI\textsuperscript{152}ACION, pp. 13-14; and Calvert, p. 285.


\textsuperscript{155} Developments in Mexican Oil Industry,” OIJ, Vol. 7, No. 12 (Nov. 20, 1908), 21; “Mexico’s Rosy Oil Prospects,” OIJ, Vol. 7, No. 8 (Sept. 20, 1908), 20; “Past Year Witnessed Much Progress in Mexican Oil Industry,” OIJ, Vol. 6, No. 16 (Jan.
initial exploration to final marketing, the industry required large-scale capital investment in each stage of operations. In 1910, for example, exploratory wells cost from $100,000 to $250,000 (US.CY.) each—many ending up as dry holes. A hydraulic rotary drilling rig of 254,000 pounds with casing cost $13,500 (US.CY.) factory list, and $21,000 (US.C.Y.) shipped to the Mexican fields (without concession). The cost of pipe at factory list amounted to $900 (US.C.Y.) per mile with 9,500 pounds per mile to ship as freight. Moreover, the laying and painting of pipe in the fields cost the investor $528 (US.C.Y.) for every mile. Total operating expenditures per month for a drilling rig working one shift amounted to $870 (US.C.Y.) without salaries for local managers. Finally, completion time for drilling took from 3 to 4 months. In addition to sizeable capital, each stage of operations depended on the successful functioning of the entire industry. Failure of one segment thus threatened the whole complex structure of the industry. Consequently, investment was especially speculative in an infant, semi-integrated, competitive sector. Complex industrial organization, uncertainty as to success, cost of development, and multiple risks thus frightened away most Mexicans with large capital holdings.


After actual discovery of deposits, supply and demand in production and marketing best emphasized the uncertainty associated with Mexican petroleum development. Initially, producers in Mexico could not supply growing domestic demands. After quantitative production, however, producers scanned the horizons for markets abroad to dump their crude as fuel.\footnote{Practically all petroleum from the Northern Zone was asphaltic-based containing relatively low percentages of volatile elements and therefore adaptable as oil fuel. “Report on Mexican Oil Fields Withheld,” OP&DR, Vol. 75, No. 24 (Jun. 14, 1909), 28F; and Griffith, “Petroleum in France, Mexico and Siam,” p. 16. See ILLUSTRATION I.} As most Mexican railways, foreign industrial and household consumers did not undertake conversion from coal to oil until assured of a continuous, future supply. Furthermore, sufficient production for foreign markets brought lower prices in competition with foreign crudes. During the last decade of the Porfiriato, foreign demand for Mexican crude was not a reality but merely a potential or infant market. Therefore, the interplay of supply and demand in petroleum development—especially a problem from 1909 to 1911—entailed great risks for investment capital.\footnote{A foreign market for Mexican producers meant selling in a world market with price fluctuations based on production, tariffs, and competitive price wars. Small producers in Mexico, limited in capital resources or lacking vertically integrated operations, were especially vulnerable to overproduction. NA-RDS (Enclosure: Abstract of Argument to be Presented by Mr. Harold Walker...), 812.6363/6, July 18, 1912; López-Portillo, “Primera Década...,” p. 96; and “The Mexican Petroleum Industry,” P. Review, Vol. 20 (Ap. 10, 1909), 230. See ILLUSTRATION II.}

Notwithstanding the hazards of supply and demand, positivist doctrine, stressing exports of raw materials as essential to foreign investment and material progress, encouraged foreign market locations for Mexican production. This philosophy of exporting to foreign markets, together with the uncertainty in supply and demand, further discouraged the investment of Mexican capital in the petroleum sector. As dominant features of Porfirismo, both foreign investment and exportation helped to preclude even a minimal Mexican participation in the use of petroleum resources. Given the excessive protection by Díaz to the infant petroleum industry at the expense of the Mexican economy, other industrial sectors did not achieve the maximum growth possible during the first decade of the twentieth century. Tragically, the Mexican government failed to properly manipulate the tariff in order to stimulate material progress.
In retarding the expansion of demand for oil as fuel in a new industrial age of energy, the Porfiriato constricted the economy in terms of both actual and potential growth—especially as regards future linkage effects with the petroleum sector. Consequently, Porfirian philosophy and protection policies geared the petroleum resources of Mexico primarily to foreign markets.\(^{160}\)

Concerning growth in the petroleum sector, however, it was nevertheless essential that capital investment from foreign sources be retained on a permanent basis. Specifically, this depended on the confidence shared by investors in the political and financial stability of the Mexican government. Under the Porfiriato, political peace and stability became a reality which enjoyed favorable international reputation. The Mexican government repeatedly promised protection under Porfirián laws to foreign investors. Decrees from the President, for example, warned the offender of the severe penalties for molesting foreigners.\(^{161}\) The decrees, moreover, indicated that authority in Mexico emanated from the central government, primarily in the hands of Díaz. To a large extent, executive procedures supplanted elective, legislative, and judicial machinery. Consequently, personal government became he means to achieve complete political control in Mexico. The cabinet, congress, and state governors were bound to the dictator while similar ties existed between municipal presidents, *jefes políticos*,\(^{162}\) and governors. The entire machinery of


\(^{161}\) One such decree from Díaz, printed on circulars and placed in plazas, read: “Any Mexican found guilty of raising a disturbance with Americans... the penalty will be death.” IMA, I, 1726. Testimony of William A. Horton; and Walter N. Breymann, “The Científicos: Critics of the Díaz Regime, 1892-1903,” *Arkansas Academy of Science Proceedings*, Vol. 7 (1955), 95.

\(^{162}\) *Jefes políticos* were political chiefs having jurisdiction over territorial units (called *jeñaturas políticas*) within states. Prior to the Constitution of 1917, these units were called cantons in Veracruz, districts in Tamaulipas and San Luis Potosí, and departments in Tabasco. After 1917, political division was made by municipalities. See ILLUSTRATION I.
local, provincial, and national government became dependent upon the will of Díaz.\(^\text{163}\)

Actually, the President harmonized both personal interests and politics—bestowing concessions, monopolies, and positions of prestige. Each beneficiary of the Porfirian system became an ardent supporter of order, and therefore, maintained the dictatorship. Obsessed with the desire to preserve the existing order, the científicos especially recognized their vested interest in the Díaz regime.\(^\text{164}\) A new national army, moreover, functioned almost exclusively as an internal police force in urban and mining areas and provided the order necessary for economic development. In the country, a mounted federal constabulary corps (rurales), made up largely of former bandits, acted as policemen. As with the national origin of foreign capital, the dictator played Mexican group against group thereby eliminating concentrations of political power, and crushed all manifest opposition ruthlessly. The Porfiriato thus achieved order by means of bread-or-the-stick (pan o palo) tactics—imposed by the President himself. Consequently, the positivist requisites of political peace and stability first attracted then retained the foreign capital so vital for industrial petroleum development.\(^\text{165}\)

Ideologically rooted in positivism, favorable Mexican conditions attracted foreign investment in the formation of a petroleum sector. In a series of laws, property and exploitation rights to potential subsoil deposits of petroleum and gas reverted from the Mexican nation to surface property owners. A variety of special concessions granted rights of exploitation and expropriation to both public and private lands as well as commercial and fiscal exemptions. Its reputation internationally

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secure, the Porfiriato provided political and financial stability, thus security for foreign investment. Consequently, a large-scale accumulation of foreign capital and technology appeared in Mexico to form an infant, integrated petroleum industry. The Porfiriato, however, balanced investment in terms of national origin, specifically by means of concessions and tariffs. Economic monopoly in industrial sectors meant political influence without control—a challenge to Mexican national security. Therefore, restrictions operated for political rather than for economic objectives. As regards the petroleum sector, the Waters-Pierce Oil Company seemed the logical choice to develop the Mexican industry. Nevertheless, suspicious of Waters-Pierce as an arm of the Standard Oil (NJ) Trust, Porfirio Díaz attracted capital from non-affiliated American, British, and Dutch concerns.  

Stressing internal economic development through industrialization, positivismo ran counter to imports unfavorable to the Mexican balance of trade. Both the high costs of foreign coal and the growing demands for a cheap, domestic fuel dictated the need for petroleum development. In encouraging an infant petroleum industry, the Porfiriato consistently enforced protection rather than free trade policies, thus retarding other sectors of the Mexican economy. Modifications of the tariff, moreover, took the form of concessions—also granted primarily for strategic rather than economic objectives. Furthermore, the philosophy of positivism worked for exports rather than imports of raw materials for industrialization.  

After quantitative production of petroleum, the Mexican economy essentially failed to utilize the mineral resource as energy for industrial purposes. Asphaltic-based and adapted to fuel consumption, Mexican petroleum contained relatively small amounts of volatile elements of value to domestic-consumer retail markets. Because of the Villarello report, the Mexican government also failed to utilize petroleum as a tax resource for revenue—even on crude exported abroad. Ignorance of geology, economic policies, and the philosophy of the Porfiriato contributed to the alienation of the subsoil as well as the petroleum resources and revenues of Mexico. These contradictions and misconceptions result-
ed in a foreign oriented petroleum sector with the sacrifice of Mexican internal development. The tradition of nineteenth century foreign domination in commercial endeavors thus carried into the twentieth century. The infant petroleum industry failed to become an integral part of the Porfirian economy (sectorial and geographical) as a source of energy for the industrialization of Mexico. \(^\text{188}\)

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THE ANGLO-DUTCH-AMERICAN PETROLEUM INDUSTRY IN MEXICO: 
THE FORMATIVE YEARS DURING THE PORFIRIATO, 1900-1910

A. Foreign Capital investment

1. Philosophical justification for foreign capital investment (Mexican positivism) — emphasis on industry for self sufficiency.
2. Political-legal objectives: (means) (Legislative enactments — all laws — to encourage foreign capital investment to achieve reality of economic liberalism).
   b) New Industry concessions Law of 1887 (one year after Pierce refinery).
   c) Commercial, land, and tax concessions Laws of 1887 and 1901.
      1) Exploitation on or purchase of public lands.
      2) Expropriation (easement or purchase) of private lands.
   d) Free exploitation (production) without concessions Laws of 1892 and 1909.
   c) Incorporation-corporation.
3. Laxity in restrictions and taxation partly due to legal system itself (chaos).
4. Laxity in restrictions and taxation partly due to policy of Díaz (conscious).
5. Foreign pressure and involvement in the enactment of Mexican legislation.
6. Promotion of petroleum development through internal (coastal) improvements.

a) Frontera, Tabasco.
b) Soto la Marina, Tamaulipas.
c) Tuxpan, Veracruz.
d) Tampico-Tuxpan canal (Lage Tamiahua).

7. Promotion (advertisement) of favorable conditions by Díaz outside of Mexico.

8. Implementation of laws through concessions: to secure capital and to prevent monopolies (pivotal policy of Díaz to create and maintain equilibrium in foreign investment—to balance American and British interests within the petroleum sector.

a) Doheny.
b) Pierce (Standard Oil of New Jersey).
c) Pearson.
d) Furber.

9. Economic Objectives: (ends) (Legislative enactments — all laws — to achieve a cheap, efficient, and sufficient supply (domestic) of petroleum fuel for transportation, metallurgical, and manufacturing sectors with a favorable balance of trade).

a) Problem of coal imports.
   1) Against philosophy of exports to foreign markets.
   2) Increase in demands.
   3) Failure of infant industry to expand.
   4) Protective tariff on coal imports.

b) Demands for end to tariff on petroleum imports (railroad, smelting, and manufacturing industries vs. Díaz policy of protection).
   1) Greater efficiency of fuel oil.
   2) Lower costs of fuel oil.
   3) American Coal Strike of 1906 — critical shortages (test case).

c) Doheny and the Mexican Central Railway — slow conversion 1905-1910.
   1) Inadequate production.
   2) Importations from Mid-Continent and Gulf Coast fields in the U. S.
   3) Importations and possibilities from Pichucalco and Furbero.

e) Explorations outside the Gulf Coast Plain (shortages of fuel).
1) William R. Hearst and James B. Keene — Chihuahua (Kansas City, Mexico and Orient Railway).
2) E. H. Harriman — Sonora and Sinaloa (Southern Pacific subsidiaries) (back to the Gulf Coast — San Antonio-City of Mexico Railway).

f) Petroleum industry not keep pace with industrial and transportation expansion in Mexico (supply vs. demands).
g) Critical shortages of fuel — demands exceed supply ratio growing.

1) Modify tariff through concessions to import fuel oil (metallurgical sector) Cananea Consolidated Copper Company.
2) Modify tariff on crude oil imports if refined in Mexico and re-exported (raw materials law).

   a. Helps Pearson compete in Mexico and Britain (also meet Mexican government contracts for railway fuel).
   b. Hinders Pierce monopoly in Mexican market (refineries operate exclusively for a Mexican market).
   c. Enables Díaz to balance investments in petroleum sector.

3) Porfiriato does not solve the problem of domestic demands for petroleum fuel nor solve need for domestic production.

B. Domestic (Mexican Capital Investment)

1. Strong desire of Díaz to encourage foreign capital did not discriminate against Mexican capital (Mexican also receive concessions).
2. Dearth of Mexican capital investment created vacuum and further stimulated entry of foreign investment.

   a) Mexican habit of family rather than corporate investment.
   b) Geological Survey (Instituto) — reports adversely on deposits (the Villarelo report of 1902).

   1) Influences Fomento (lack of regulation and conservation policies).
   2) Influences Hacienda (lack of fiscal program including petroleum).

   **3) Results: Not emphasize tax resources from petroleum revenue (tax concessions for foreign capital—upheld by judiciary).

   c) Complex nature of petroleum industry (costs and risks).

   1) Large capital investment necessary prior to production (land and operation — cost of equipment and importation of industrial technology).
2) Exploration to marketing operations — integration necessary.

3) International market organization — exportation (especially discourage Mexican capital investment).

   a. Supply-demand markets (uncertain).
   b. Location of markets (certain) outside Mexico.

d) Ideology and protection policies of Porfiriato hinder domestic capital investment.

1) Exports as criterion for material progress and foreign investment.

** 2) Results: Not Emphasize domestic consumption — not use natural resources of petroleum (less than minimal—constriction of economy for infant petroleum industry eliminates future linkage effect).

C. The Requisite of Political Stability in Mexico Essential to Foreign Capital Investment (early 20th century)

1. Necessity of investment on a permanent basis.
2. Dependence on confidence in political and financial stability.

   a) Personal dictatorship — centralized control.
   b) Harmony of politics and personal interests.

      1) Científicos.
      2) National Army.
      3) Rurales.

   c) Divide and conquer/pan o palo tactics (balance domestic rivals as foreign American and British interests) for peace and political stability to maintain status quo — application of policy in domestic sphere to foreign sphere and vice versa.

D. Summary of themes — foreign capital investment in the petroleum sector stimulated by:

1. Mexican conditions favorable (political and economic) — basis of infant petroleum industry in Mexico.

   a) Philosophical principles of Mexican positivism.
   b) Security and Economic objectives.
   c) Protection principles vis a vis material progress in the economy (contradiction in philosophy and economics).
d) Failure to utilize petroleum as natural mineral or tax resource (contradiction of departmental policies).

e) Resulted in lack of linkage of infant petroleum industry sector with the Mexican economy as a new energy source for industrialization.

f) Tradition of 19th century foreign domination sustained and continued.

I # ILLUSTRATION "Principal Petroleum Production Areas Within the Mexican Gulf Coastal Plain".

II # ILLUSTRATION "World Production of Crude Petroleum—By Countries".

A

B

C

ILLUSTRATION I

PRINCIPAL PETROLEUM PRODUCTION AREAS WITHIN THE MEXICAN GULF COASTAL PLAIN

SIERRA DE TAMAULIPAS

<table>
<thead>
<tr>
<th>Zones and Basins/Provinces</th>
<th>Political* Divisions</th>
<th>Directional Districts</th>
<th>Main Production Districts/Fields</th>
<th>Main Production Pools (Wells)</th>
</tr>
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<tbody>
<tr>
<td>South District</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Tamaulipas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valles District</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>(San Luis Potosí)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ozuluama Canton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Veracruz)</td>
<td></td>
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</tbody>
</table>

(Tampico-Túxpan Basin/Province)

Tantoyuca Canton
(Veracruz)

SIERRITAS DE TANTIMA-OTONTEPEC

NORTHERN ZONE

(Tampico-Túxpan Basin/Province)

Túxpan Canton
(Veracruz)

Ozuluama Canton
(Veracruz)

San Diego de la Mar (Dos Bocas)
Chinampa
Juan Casiano
Los Naranjos

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**SIERRA DE LOS TUXTLAS**

<table>
<thead>
<tr>
<th>Canton</th>
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<tbody>
<tr>
<td>Los Tuxtlas Canton (Veracruz)</td>
<td>San Cristóbal</td>
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<tr>
<td>Acayucan Canton</td>
<td>West Saline</td>
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<tr>
<td>Minatitlán Canton (Veracruz)</td>
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*(Isthmus of Tehuantepec Basin/Province)*

**SOUTHERN ZONE**

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<thead>
<tr>
<th>Basin/Province</th>
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<tbody>
<tr>
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<tr>
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<tr>
<td>Macuspana</td>
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<tr>
<td>Tabasco (Eastern)</td>
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</tr>
</tbody>
</table>

* Prior to the Constitution of 1917.
The Anglo-Dutch-American Petroleum Industry...

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Russia</th>
<th>United Arab Emirates</th>
<th>Austria-Hungary, Poland (GDR)</th>
<th>Mexico</th>
<th>United States percentage</th>
<th>Mexican percentage</th>
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<tr>
<td>1977</td>
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<td>0.1</td>
<td>612</td>
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<td>612</td>
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<tr>
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<td>2.4</td>
<td>0.7</td>
<td>0.3</td>
<td>612</td>
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</table>

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ILLUSTRATION II

World Production of Crude Petroleum—by Countries
(millions of 42-Gallon Barrels)