EARLY OIL DEVELOPMENT IN CALIFORNIA[1]

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California has always been a land of romance. The events of its history are like the acts of a drama. Even before its definite discovery, it so stirred the imagination of men, that in his novel, published in Madrid in 1510, Ordonez de Montalvo gave the name "California" to a mythical island in the Pacific lying "to the right of the Indies and very near the quarter of the terrestrial Paradise." Therefore, in 1542, when the hardy *conquistadores*, under Cabrillo, turned their prows to the northwest, they were searching for this prophesied El Dorado, this "Land of Heart's Desire."

Following Cabrillo, whose bones still moulder in one of our Channel Islands, came the Padres under Junipero Serra. The story of their devotion to the cause of Christ in a heathen land is written in California's noblest heritage, the Missions, which, like a string of jewels, lie along the state from San Diego to San Francisco.

The glamor of romance still lingers in the later settlement of California by the Spanish Dons, which culminated in the "Splendid Idle Forties." Then came the dramatic discovery of gold at Marshall's Mill in 1848, which so excited the cupidity of men of every nation and clime, that by ship, by oxcart, and on foot, they crowded to search for this hidden treasure.

In this connection, it is interesting to note that as early as 1833, Don Abel Stearns, a pioneer of Los Angeles County, whose name is perpetuated in the "Stearns Lease" of the Union Oil Company of California, made a discovery of gold in the hills near Newhall. The gold discovered was sent to the mint at Philadelphia where it was coined and then returned to the discoverer.

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With the waning of the gold excitement and the exhaustion of the mines, the treasure seekers were on the lookout for other forms of wealth in this "Land of Promise."

About this time Colonel Drake had drilled his first well in Pennsylvania and found oil, "the black gold of commerce," in paying quantities. Once more the imagination of the adventurous within her borders was aroused by the hope that California should again prove the bountiful mother and be "oil-bearing" as well as "gold-bearing." There was a reason for this hope because the number and extent of the oil seepages and brea beds in Ventura and Los Angeles counties had become a matter of common knowledge.

The California Indians knew well the location and extent of the brea beds and oil seepages. Hard asphalt was used by them in mending mortars and pestles, and for cementing basket work on top of shallow mortars to increase their capacity. It was also used in fastening the arrow and spear heads to their wooden shafts and for making impervious to moisture the jars used for water and the large baskets utilized as granaries for the storage of food and seed.

When the Portola Expedition left San Diego on their march over land to San Francisco, at a point a few miles below Santa Barbara they found Indians making wooden boats, "pitching them within and without" with asphalt. This place Portola named "Carpinteria," meaning in Spanish "the carpenter's shop."

The Indians used the light oil from the seepages for coughs and colds, and for cuts and burns. This oil was highly prized, and was an article of commerce between the Coast tribes and the Indians of the interior, who were remote from the source of supply.

Likewise, the early Spanish Dons of California, the Padres and their vaqueros and Indians, knew of the existence and location of these same oil seepages and brea beds. There is a legend from the San Fernando Mission to the effect that in 1855 General Andreas Pico and his nephew, Romulo Pico, took oil for experimental and refining purposes from the seepages and hand-dug pits in the canyon near Newhall which bears their name. This is the first reference in the history of California where an attempt was made to utilize crude petroleum.

However, in the early sixties a merchant by the name of Gilbert had a small refinery in the town of Ventura in the Ojai Valley. The oil he used came from hand-dug pits and from natural seepages which abound in the vicinity of Sulphur Mountain. In the early part of 1864, Professor Silliman of Philadelphia, while traveling on the Pacific Coast, met Mr. Gilbert and was much impressed with the oil possibilities of Ventura County. Professor Silliman was so enthusiastic over the prospects that he immediately wrote a letter to Thomas Scott of Philadelphia, a man of ability and considerable means, who was then associated with the Pennsylvania Railway System. An extract from Professor Silliman's letter, referring to the Ojai Ranch, reads as follows:

> The property covers an area of 18,000 acres of land in one body, on which there are twenty natural oil wells, some of them of the very largest size. The oil is struggling to the surface at every available point and is running away down the rivers for miles. Artesian wells will be fruitful along a double line of thirteen miles, say for about twenty-five miles in linear extent. The ranch is an old Spanish grant of four leagues of land, lately confirmed and of perfect title. It has, as I stated, 18,000 acres of the finest land, watered by four rivers, and measures in a straight line, in all, nearly thirteen miles. But its great value is in its almost fabulous wealth in the best oil.

Thomas Scott soon succeeded in interesting some of his friends, and a syndicate was formed which purchased the Ojai Ranch and other properties in Ventura County. In the early part of 1865 they secured in New York City the first drilling equipment ever sent to California. This consisted of three boilers, three engines, casing and drilling tools, a refining furnace, retort, and wooden barrels in which to handle the oil. A barrel of oil in those days meant just that: a wooden container having a capacity of forty-two gallons.

Thomas Scott had two young nephews whom he sent to California to look after his interests. One of these was Thomas R. Bard, who was later so great a factor in the development of the state, and for whom the town of Bardsdale, in Ventura County, was named. Mr. Bard was for a long time President of the Union Oil Company of California, and was a large landholder. He also represented California at Washington as United States Senator.

Scott's syndicate selected a location for its first well near the tar beds, on the east bank of San Antonio Creek (Ventura River), about five miles from the town of Ventura, which well was completed in 1866 at a depth of 500 feet. Some tarry oil, which formed the brea bed, was encountered, but the well was not a success. No. 2 was located five miles farther up the creek. It was drilled to 520 feet and found some oil, though in small quantities. No. 3 was drilled twenty miles from Ventura on Sisar Creek, near the outcrop of the oil measures. It was intended to drill this well to a depth of 1,500 feet, but upon the advice of Jackson and Torrey, two celebrated chemists of New York, the well was abandoned at a depth of 320 feet, as was also No. 4, located near No. 3, at a depth of 300 feet. Upon the advice of Jackson and Torrey, No. 5 was located on a big seepage in the same locality. This well was drilled with a spring pole. Between 80 and 100 feet oil was struck which filled six of the wooden barrels daily by pumping. No. 6 was drilled near by with the machinery from New York, and was the best well of all. It was 550 feet deep and produced daily from fifteen to twenty barrels of good grade oil. This well was a consistent producer for many years. The property was later named the "Silver Thread."

This development took four years' time and an expenditure of $200,000 in money, which was considered lost, because, although success had been attained in finding oil, there was only a very limited market, and it would take many years to repay, from profits, the large sum of money expended to that date.

Simultaneously with the drilling of Ojai No. 1, Leland Stanford, in furtherance of his railroad project with Huntington and Crocker, was attracted by the seepages and brea beds in Ventura County, and, miner-like, decided to drill a tunnel in the south slope of Sulphur Mountain, so located as to intercept the steep dipping oil sands outcropping at its base, which oil sands created a line of seepages some sixteen miles in length. The tunnel was completed in 1866. It was eighty feet in length, with the floor so inclined to the mouth that the oil flowed by gravity into tanks just a little lower in elevation. This tunnel showed the practicability of this method of producing oil, and for twenty-five years tunneling for

oil was carried on intermittently. In all, thirty-one tunnels were drilled into the face of Sulphur Mountain, ranging in length from 80 to 1,600 feet, with production ranging from one to twenty barrels per day of good oil.

The first oil well in Pico Canyon was drilled in 1875 with a spring pole by C. A. Mentre. This well was located on the very axis of a steeply dipping anticline, and showed two barrels of 32 gravity oil at 30 feet. This well was deepened to 75 feet, where it produced five or six barrels per day. No. 2 was also drilled with a spring pole, with about the same production; but No. 3 was a dry hole. No. 4 produced 150 barrels at a depth of 600 feet.

The showings in these three wells soon attracted attention, and in 1875 Ex-Mayor Bryant of San Francisco became interested in the field. In 1876 Messrs. Bryant and Scofield organized the California Star Oil Company, and Mr. Mentre assigned his lease to this corporation. In 1879 Mr. McPherson and C. M. Felton came into the field, and in that year organized the Pacific Coast Oil Company, which some years ago was absorbed by the Standard Oil Company of California, and became the nucleus of the Standard's holdings in California.

In 1883, Lyman Stewart and W. L. Hardison, who had already been identified with the oil industry in Pennsylvania, arrived in California and drilled four wells on Christian Hill, just east of Pico Canyon. These wells were all dry holes. A fifth well, which was a good producer, was drilled to the west of Pico Canyon. This well was sold to the Pacific Coast Oil Company for enough money to reimburse Messrs. Stewart and Hardison for their previous drilling losses on Christian Hill, and is still producing after forty years. Messrs. Stewart and Hardison then moved to Santa Paula, Ventura County, and soon after expanded their operations, which were successful, making that county the principal center of the industry. The characteristic perseverance and faith of these two oil pioneers, which led them to drill a fifth well after four failures, later laid the foundation of the Union Oil Company of California.

During the twenty years that this development of oil was taking place, some attempts were made to refine the crude oil obtained. However, it was not until 1876 that the first practical refinery

was built at Newhall by D. C. Scott and a Mr. Wood. This refinery was located near the old cemetery, one mile east of the town on the present highway. The capacity of the refinery was twenty barrels per day, and the oil was put in wooden barrels and hauled by teams from the wells. The layout of this plant can be recognized from the roads, grades, and the position of the stills as located by the remains of the old bricks.

In 1879 a new and up-to-date refinery was built by J. A. Scott and Mr. Morrison near the present Southern Pacific Railroad, one-half mile east of Newhall. This plant is still standing, and shows very clearly the arrangement and method of refining.

In 1878 E. A. Edwards built a refinery, with a daily capacity of twenty barrels, at the mouth of the Little Sespe, in Ventura County. He sold his kerosene in Los Angeles, and the lubricating oil to A. C. Dietz of San Francisco, and to Allen & White, who were connected with Leland Stanford of the Southern Pacific Railroad Company.

Thus, little by little, the oil business progressed. The records at the Port of Wilmington show that ninety-seven barrels of crude oil were exported for the year 1873. Today this harbor is the largest oil export port in the world.

During the early and middle seventies oil development in Los Angeles and Ventura counties was being prosecuted in several places. In 1876 E. A. Edwards drilled a well for Adams and Thayer in what is known as Adams Canyon in Rancho Ex-Mision de San Buenaventura. This well, which was known as Old Adams No. 1, was drilled on a large seepage which covered some 2 acres of ground. It was 80 feet deep and produced some two or three barrels of heavy oil. Later on, Adams No. 1 was drilled by D. C. Scott. It was located 100 feet south of Old Adams No. 1, and was a fairly good producer. In 1884 Hardison and Stewart drilled Adams No. 2, located about 100 feet south of Adams No. 1. No. 2 was put on the pump and drained all the oil out of Adams No. 1; and likewise Adams No. 3, drilled 100 feet south of No. 2, drained Adams No. 2, making both No. 1 and No. 2 unproductive. No. 3 was pumped for a great many years.

In 1876 the Los Angeles Oil Company was formed to develop some 800 acres of government land located in the Little Sespe

district in Ventura County. This locality abounded in oil seepages, but was exceedingly rough and inaccessible. Expensive roads were built, and finally in 1877 the first oil well was completed in this district. Mr. Edwards' refinery, located at the mouth of the Sespe, was completed in 1878, and drew its source of refining crude from this well.

The first pipe line for transporting oil was laid in 1879 from the Pico field to the second refinery built near Newhall on the Southern Pacific Railroad. The pipe line was 2 inches in diameter and 5 miles in length. The oil flowed by gravity.

In 1884 and 1885 pipe lines were built from the Little Sespe wells, from the Silver Thread wells, and from Adams Canyon into Santa Paula. C. A. Burrows laid the first oil pipe line on the Pacific Coast, carrying oil to tidewater. The line was 4 inches in diameter and 16 miles in length, extending from Santa Paula to the town of San Buenaventura. The oil was run by gravity, and though parts of the pipe line have had to be replaced, most of the original line is still in existence and doing efficient work. Mr. Burrows also laid many other pipe lines, among which was the first line laid from Brea Canyon to San Pedro Bay. This line is still in operation. Storage tanks were erected at San Buenaventura for the storage of crude, and dock facilities were arranged for loading oil for transhipment by sea. Two wooden steamers, with inserted steel tanks, were constructed at San Francisco and put into service in 1888. They were sister-ships, one called the "W. L. Hardison," and the other the "George Loomis." These boats had a carrying capacity of 6,500 barrels each, which in those days was considered a large quantity of oil, and represented two full train loads of the small tank cars then in use which carried only 120 barrels each. Water transportation was much more economical than railroad shipment to San Francisco Bay points. As soon as these tankers were in service, the rail rate from Santa Paula to San Francisco Bay points was reduced from $1.00 per barrel to fifty cents per barrel, a rate which was maintained for many years.

The "W. L. Hardison" caught fire while standing at the wharf at Ventura and burned to the water's edge. The fire originated in the woodwork behind the overheated kitchen stove, and the inexperienced Chinese cook and crew, believing that oil tankers

were exceedingly dangerous and liable to explode in case of fire, left the boat and let it burn. The cook could have put out the fire with a bucket of water, thereby removing all danger to the crew or ship. The steel tanks which were inserted in the ship were later raised and used at the Santa Paula Refinery for storage purposes.

The "George Loomis," after an active and eventful thirty-seven years of service, is still afloat, and is now used as a barge in San Francisco Bay.

In the year 1885 Hardison and Stewart had so organized their partnership that they were getting ready to run several strings of tools, and were in need of a general superintendent of experience. John Irwin, of Pennsylvania, was invited to take the position, and accepted. He was an efficient and untiring worker. He was a good geologist and no place was too far or too inaccessible for him to go in search of prospective oil territory. Mr. Irwin held the position of field superintendent for twenty-six years, when he retired on account of his advancing age. In those days practically all of the drillers were brought out from Pennsylvania, so that California might have the benefit of their experience.

Oil wells that flowed more or less have been characteristic of the California oil fields for more than twenty-five years, but it is only in the last twelve or fifteen years that "gushers" have been developed with sufficient volume of oil to attract the attention of the world.

In February, 1892, Well No. 28, Adams Canyon, came in with an initial flow approximating 1,500 barrels per day. This was the first big well in the state, so no preparations had been made for taking care of so large a production. Before arrangements could be made to control the flow and provide sufficient tankage, the oil had run down Adams Canyon to Santa Clara River, and thence to the sea. This well produced 40,000 barrels before it ceased flowing, and was considered a phenomenal well.

In 1898 and 1899 some phenomenal gushers were developed on Section 20, T. 19 S., R. 15 E., in the Coalinga field. Prior to that time several wells had been drilled on this section, and some of them flowed, but it was not until the Home Oil Company developed its famous "Blue Goose" well that this district was looked upon

as real gusher territory. This well came in with an initial flow of 1,500 to 2,000 barrels per day. It flowed for many months, though the average production was considerably less than the initial flow. Other wells of the Home Oil Company and the Chanslor and Canfield interests were gushers of considerable size, but none of them equaled the Blue Goose well in volume of production or staying qualities.

In December, 1904, the Union Oil Company of California's Hartnell No. 1 well, located in the Santa Maria field in Santa Barbara County, began to flow a solid stream of oil through 8-inch casing. The initial flow was many times in excess of anything that had been developed previously in the state, and was the most wonderful fountain California produced until the opening of the big gushers in the Midway field in 1910. The gas pressure of this well was tremendous. The volume of oil was measured in weir boxes by a number of engineers. The actual flow of the well was 33 miner's inches, or approximately 12,000 barrels per day, this flow being maintained for about ninety days without apparent diminution. The well flowed vigorously for over two years, and produced approximately 3,000,000 barrels of oil before being put on the pump.

During the next few years several other gushers were developed in other parts of the Santa Maria field, some of which had a capacity nearly or quite equal to that of Hartnell No. 1. During the years 1909 and 1910 many wonderful gushers were developed in the San Joaquin Valley fields, particularly in the Coalinga field, and Midway district. Many of these gushers had an initial production of 15,000 to 30,000 barrels.

The largest and most spectacular well California has ever produced was Lakeview No. 1 at Maricopa. It came in with an initial production of 15,000 barrels on March 15, 1910, the production gradually increasing until May 18, when it reached 68,000 barrels. An average of 48,000 barrels per day was maintained until July 12, when the well began to decline. This well went wild, the oil was caught in open ditches, and measured through a weir. The total volume of its output was 9,000,000 barrels for a flowing period of eighteen months. After reaching its maximum daily

production of 68,000 barrels, the well gradually declined to 18,000 barrels per day. On account of the large quantities of sand which came out with the oil, the casing finally was worn through, and suddenly the hole caved in, and the greatest gusher California ever produced was dead. Though the well was redrilled it was never brought back.

Stewart and McFarland drilled, in 1888, a well near the Brea beds on the Hancock Ranch, located near the westerly limits of the city of Los Angeles. This well was a failure. The well was located on the edge of the largest Brea bed in that locality. Some years later the writer went to the Hancock Ranch to study the geology of the neighborhood, and if possible discover the cause of the failure. In examining in detail the Brea beds he discovered, on the surface of the asphalt, a mosaic of beautiful white bones, uniform in shape, lying in an exact pattern. The pattern covered an area of about 16 inches in diameter. The white weathered bones made a beautiful contrast with the black surface of the hard asphaltum. After considerable work a portion of the specimen was removed, and a search for other specimens was undertaken. Within the next day or two several skulls, many bones and vertebrae of prehistoric animals were discovered and removed. These were kept for a period of several years. Finally, after displaying the treasures to F. C. Anderson, a classmate of the writer's at college, it was decided to give the specimens to Stanford University for identification, and for display in the paleontological department. Professor J. C. Smith, in charge of the department, suggested that Professor John C. Merriam was very much interested in this class of material, which was exceedingly rare. No specimens of the kind had previously been found in the United States. Professor Merriam was extremely interested, and came to Los Angeles immediately to examine the fossils and see the place from which they were taken. He was delighted beyond measure, and his enthusiasm for further research in the Brea beds was unbounded. He secured from the Hancock estate a lease on 2 acres of ground, and soon began his excavations. In a short time, news of the discovery spread throughout the United States and Europe, and within three months, through the courtesy of Allen

Hancock, more than a dozen different institutions were working to uncover other specimens. Mr. Hancock very wisely allotted to each institution a particular area which it might explore. The entire area of the Brea bed, comprising some 20 acres, was divided up into several parcels resembling the claims in the early day gold-mining district. This work was carried on persistently for about two years, and the amount of material taken out was very large.

About three hundred complete skeletons of saber tooth tigers, many mastodons, elephants, bison, horses, wolves, foxes, condors, turkeys, peacocks, and innumerable smaller animals were recovered. The Brea beds proved to be the richest find of material of this kind ever uncovered in the world. The preserving qualities of the asphaltum kept the bones from weathering, and all the remains were found in a perfect state of preservation. A very complete display of these prehistoric and extinct animals may be seen in the museum at Exposition Park, in Los Angeles. Many others were taken to the Smithsonian Institute and to the University of California.

Romance had not yet gone from California. In 1893 E. L. Doheny, with his own hands, made hand-dug pits in what is now known as the Los Angeles oil field, from which he produced commercial oil. After the demonstration by Mr. Doheny, shallow wells were soon drilled, and in a period of two or three years several hundred wells had been drilled, and there was an overproduction in this vicinity. This oil was of heavy character and fit only for fuel. The discovery of this field by Mr. Doheny, which resulted in the first big overproduction, was really the beginning of the fuel oil business. The price for this kind of oil soon dropped to twenty-five cents per barrel, and the only way to dispose of this fuel oil was to build up enterprises which would use it. Oil-burning apparatus was introduced into the stationary power plants in the city. An endeavor was made to induce the railroad companies to put fuel oil on the locomotives, but the railroad companies were skeptical and doubted whether oil could be used successfully. If the railroad companies could be induced to use it on all their locomotives it was believed by the oil operators that a constant demand for the oil would be created.

The Union Oil Company of California was first to undertake the work of demonstrating the desirability of liquid fuel for locomotives. It arranged with the Santa Fe Railroad to remodel one of its engines. An oil tank was placed on the tender, and an oil burner was installed. Trial trips were made on the branch line running from Saugus to Santa Barbara, but the first installation was not a success. Finally, E. A. Edwards was called in and installed a forced feed burner with a steam jet. The flame soon put a blister on the boiler, this difficulty being finally overcome by building up baffle walls of fireproof material. After six months' trial it was found to be entirely successful, and soon after the Santa Fe and Southern Pacific Railway companies installed apparatus for burning fuel oil. The demand for Los Angeles crude was greatly increased, and the project declared an unqualified success. Improvements in the oil burners have been made from time to time, but the original principle of the burner has remained very much the same.

Mr. Doheny was the real discoverer and developer of both the Los Angeles field and the Olinda pool in Orange County. He also played a very important part in the early history of the Kern River and other fields in San Joaquin Valley. His greatest successes were attained during the past twenty years in the development of his Mexican properties, which have been the wonder and admiration of the world. By reason of his perseverance and foresight he is one of the outstanding figures in the history of oil today.

Although the production of oil is today the greatest industry on the Pacific Coast, and one of the essential industries of the world, whether at peace or war, it has arrived at its present gigantic proportions through many vicissitudes. In the period up to 1900, there were many dark days for the oil men of California, Markets were poor, public interest was faint, pioneering was expensive, and financially the oil business had not yet arrived. Only the vision, the courage, and the sacrifices of the "oil pioneers" which enabled them to "carry on" in the face of discouragement and hardships, which would have daunted men of weaker breed, saved the oil industry for this generation.