THE BIRTH AND GROWTH OF THE OIL INDUSTRY

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It has been said that the historian is primarily interested in who we are and how we got here. I am assuming that this is what interests you; I know it interests me. I have also been told that you wanted to make this trip to Oil City and the neighboring oil communities so that you could see and inspect a refinery. If these two suppositions are correct, it is a happy circumstance for me, because I am interested and because I am a refiner. I hope you will forgive me if the remarks that I make tonight seem to place emphasis on refining. I shall make them not because I wish to neglect the other important phases of the petroleum industry but because refining has played such a large part in the development of the industry and is destined to take an even more important role in the future.

To return to the historian's premise for a moment, I am sure that you see here, in Oil City, a community that is vastly different from what it would have been without petroleum. In its broadest sense, this statement is true of communities throughout the nation. You drove up here today in a few hours, but you could not have done it without petroleum. If this section or some other section had not given the world petroleum, it would have taken you a whole day or longer to make the journey by horse and carriage. Thanks to this liquid gold—petroleum—your journey was quick, easy, comfortable, and, I trust, pleasant. Petroleum furnished the power in the form of gasoline to propel you over the countryside; petro-

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leum, in another form—lubricating oil—oiled your motor and made it run smoothly—a veritable film cushion between the metal parts of your automobile; petroleum, in still another form—asphalt—was used in the paving of some of the highways over which you traveled and aided in keeping you out of the dust or the mud. If you smoked on the way, petroleum, in still another form, furnished the fuel for the pocket lighter you may have used, or the wax for impregnating the match.

These are only a few uses to which petroleum products are put—obvious uses familiar to you in the simple process of driving from Pittsburgh to Oil City. I shall not attempt to list all the uses, but suffice it to say that there are many products and by-products of petroleum upon which we are dependent for our existence in this modern and complex civilization; and we are only at the beginning of the chapter. Today, after seventy-seven years of research on the part of organic chemists and petroleum technologists, we can definitely identify only some six or seven of the chemical compounds in petroleum. After we have found out exactly what this substance, petroleum, is, I have no doubt that the present vast uses of its products will be multiplied by hundreds.

These few remarks, I trust, have made it clear that the refinery is an invaluable fixture in modern civilization. So much for one half of the historian’s objective: that of discovering who we are. Now, if I can, I will try to fill in the other half of the picture and tell how we got here.

Oddly enough, the refinery antedated the drilling of the first oil well, the Drake well near Titusville, by some years. Refining is an old art. The ancients used oil in various forms: there is evidence that the Egyptians used it to preserve mummies, that the wooden wheels of their carts were greased with oil, and that the streets of Babylon were paved with asphalt. It follows that these ancient peoples must have learned how to separate or refine crude oil into various parts or fractions. Whatever these secrets of refining were, they were lost long before the comparatively recent age of the art as practiced in the middle of the last century was reached.

In 1850 an Englishman obtained a patent on a process for refining oil from bituminous coal. A few years later the shale oil industry was established in Scotland. A kind of illuminating oil was produced through these
processes. On this side of the Atlantic, development was parallel. Coal oil was produced in a place now known as Blissville on Long Island, New York, in 1854. Within five years, or by 1859, which was the year of the Drake well drilling, there were fifty-six works in the United States in which oil was being refined from coal, and I would here remark that while we now know lamp oil as kerosene, originally kerosene was a brand name for illuminating oil. Kerosene found a ready market, since it opened up a new field of industry—illumination. It is easy to see, therefore, that the world was ready and waiting for the discovery of petroleum when Colonel Drake struck oil in August, 1859. The demand for a product was already created, and cheap raw material was all that was needed to send a new industry booming into prosperity.

What probably can be called the first refinery built for the purpose of processing crude petroleum was built in Pittsburgh by Samuel M. Kier. Kier submitted some samples of petroleum, which had come from salt wells near Tarentum, to a Philadelphia chemist named Booth. Booth reported that the petroleum could easily be distilled and an excellent illuminating oil produced. Kier had some difficulties with his product and equipment at first, but in 1855 he built a larger still on Seventh Avenue near Grant Street. This time he was more successful, and petroleum refining as an industry was launched. If Kier was troubled about a source of supply, he did not have long to wait. He is reported to have been the first big buyer of Colonel Drake's crude oil, for which he paid fifty cents a gallon.

It is obvious that Kier could not long have a monopoly on the refining industry, particularly since he was some distance down the river at Pittsburgh. Early in the next year, 1860, stills began to spring up rapidly, and, naturally, the most convenient locations were those near an oil well. Wells were drilled much faster than stills could be erected, however, and no doubt there was soon less need for an equal number of stills. We who are accustomed to seeing huge centralized processing plants located far from the source of supply would naturally think the thing to have done was to have built a few large refineries at a convenient spot and to have transported the oil from scattered wells. No doubt this idea occurred to
some of the far-sighted pioneers of the industry in 1859 and 1860, but adequate transportation facilities were not available at first.

Right here I want to digress for a few minutes and mention one branch of the industry that has become one of the most important. That branch is, of course, transportation. A whole shelf of histories could no doubt be written on the subject, but time does not permit more than a brief outline here. The first means of transporting oil was the one immediately at hand—the team and wagon. Oil, caught in barrels at the well, was loaded on a wagon and hauled to a still or to the banks of Oil Creek or the Allegheny River. The nearest railway point was Union City, twenty miles distant, not at all conveniently located to care for a new industry. Creek and river barges were the first transport agencies to handle large amounts of the newly found product.

The story of this mushroom river industry is a history in itself. Rival carriers fought with all the vigor and ferocity of present-day gangster-racketeers, if we are to believe the legends of the period, to get their cargoes down to Pittsburgh—for the moment the world outlet. Tales of upset barrels on the barges, jams in the river narrows, fires lighted by rival carriers, and hand-to-hand encounters among the crews are numerous. When the railways finally got in to the well sites, the battle was renewed, and the rival river crews joined to fight a new and common enemy. Still later, the ingenuity of the oil men precipitated a new and bitterer fight. Someone conceived the idea of transporting the oil by means of pipe lines, which, after all, proved to be the cheapest and most satisfactory method. This method of transportation is today universal but it did not win its position without a struggle. Teamsters, barges, and railways immediately sensed that this new carrier would put everything else out of business. Pipe-line crews had to fight these rivals before they could lean over to pick up a shovel. It seems probable that the diggers used the shovels and picks as weapons first and then turned to the business of digging their trenches.

Like any other progressive innovation in industry, however, the pipe line was established and came to stay. It is today the chief carrier for petroleum and gasoline. There are lines running from mid-continent
and Texas fields to the Atlantic seaboard and to scores of points between. Crisscrossing these lines are others that extend from Louisiana to the Great Lakes and from Michigan southward to the Ohio Valley; the Oil City region is a center of a great system of gathering lines, as is every other oil community. If you were to examine a map showing these underground carriers, you could not fail to notice the similarity between this system and the country's railway network—a general concentration in the industrial East and other population centers. The business of directing the flow of this precious crude oil is as fascinating and intricate as any conceivable type of transportation operation. Bulk shipments in tank steamers and barges, equally low in cost, came later, but the transportation of oil via pipe line is truly a miracle of ingenuity.

Kier's refinery in Pittsburgh and others nearer the oil fields were merely the forerunners of a great industry. Within a few years, by 1865 or 1866, there were more than thirty refineries in Cleveland, the same number in Erie, and twice as many in Pittsburgh. By the same time there were about twenty on the Atlantic seaboard. Marketers of the products available from crude oil were quick to see that their sales outlets for this new "burning oil" were in and near the largest cities, which accounts for the growth of the industry in cities such as Cleveland and Pittsburgh.

These early refineries would be considered extremely crude today, but apparently they were efficient enough to refine the products then salable. They consisted chiefly of a still, usually in the shape of a cheese box, made of boiler plate and set over a furnace and ranging in capacity from ten to one hundred barrels. Vapor pipes carried off the distilled vapors. These pipes, immersed in a tank of cold water, provided the means for condensing the distillate. In most instances the necessary heat was supplied by coal. That is all there was to the process—a simple separation of the various parts, or fractions, by means of heat, and a treatment of the kerosene distillate with sulphuric acid. That is all there is to it today, although modern methods are much more efficient and capable of better control; in fact, the process is almost precisely controlled and as efficiently operated as most of our modern chemical manufacturing creations.
The first refinery built in the Oil Creek region was constructed during 1860 and 1861. It was located on the banks of Oil Creek about a mile below Titusville. The fires were lighted under the still on January 22, 1861. The first lot of crude oil that went into the still cost ten dollars per barrel, and before it could be placed on the market, the price had dropped to two and a half dollars per barrel. This is merely one instance of the difficulties this new industry faced at the outset. Nevertheless, this particular refinery, which cost fifteen thousand dollars to build, was sold along with some adjacent oil property about three years later for fifty thousand dollars.

On the whole the operations of those days were probably uneconomic. Certainly the day of the small still handling the output of a few wells within a stone’s throw of each other could not last long. With the development of the pipe-line transportation system, concentration of operations was inevitable. In another decade, or by 1874, this particular branch of the industry had become fairly well established. A tabulation of refineries for the entire country in that year lists 101 refineries with a total capacity of forty-seven thousand barrels daily. Titusville had 11 of these plants; Cleveland’s 30 plants of a few years before had dwindled to 6; there were 3 in Oil City; Pittsburgh was still the leader with 22 plants; Philadelphia had 12, and Baltimore 8. Buffalo, Portland, Jamestown, and Binghamton appear in this list. The industry was spreading.

In 1876 the first refinery to be constructed at a point distant from the mother Pennsylvania fields was built in California. It is significant that two Titusville men were engaged to go out to California to build this refinery. This fact is typical of the Pennsylvania industry. If there is anything that Pennsylvania takes pride in, more than being the mother state of the oil industry, it is the fact that her oil men have gone to the far corners of the world to show other men how to drill for oil and how to refine it. There is not an oil field anywhere in the world that some Pennsylvania-region oil man has not visited as a missionary or settled in as a permanent resident, there to ply his trade and carry on Pennsylvania tradition. Some have been kind enough to say that the best product of the Pennsylvania oil fields is Pennsylvania oil men.
Not all the men, however, left for other parts to make good in traditional fashion. Many of them stayed in the region to carry on the industry that their fathers and grandfathers had worked hard to establish. There are families living here today on properties that were acquired several generations ago. There is one family whose son, now grown, will be the sixth in the line to operate the same property. This family settled here long before oil was discovered, and it is to this family and many others like it that Oil City and the surrounding community owe their existence.

I do not mean to say that the door has been closed to outsiders. Many came from other parts to seek their fortunes, were successful, and remained, but liberally sprinkled among the population are families that have been on the ground for more than a century.

After three-quarters of a century as an oil community, the Oil City of today is in the front rank of the industry. There are in the city and the adjacent towns of Rouseville and Reno six refineries, the successors of the tiny plants that dotted the banks of the creek in the sixties, and they are worthy successors, too. In them the most modern equipment is available, much of it developed right here on the ground, for processing and refining this complex substance, petroleum. The Pennsylvania industry has kept pace with scientific development elsewhere. From the time when kerosene was the sole commercial product obtained from crude oil until today when a great many products are produced, the Pennsylvania industry has led in the search for new ones and devised new uses for products that seemed to have no value.

The first of these present-day refineries was the plant now known as the Wolverine Empire, which began operation under Abel L. Confer and Samuel Y. Ramage in 1878. The Independent Refining Company, now operated by Quaker State, was established in 1884; the Continental Refining Company in 1885; and the Crystal Oil Refining Company and Pennzoil’s No. 2 plant in 1886. The plant that you will visit tomorrow, Pennzoil Plant No. 1, was established as the Non-Pareil Refining Company by one John Davis in 1888.

My association with this company dates back a good many years, and there is a temptation to recall to mind those days that were packed full of
interest and romance for this group of refiners and others located in the Pennsylvania region. Much could be said, if time permitted, concerning the construction of the first pipe line by the independent oil producers and refiners of this section to assure the former a market and the latter a supply of crude oil; the difficulties encountered in the building of the United States pipe line, which transported kerosene from Oil City to the seashore, also a joint operation of the producers and refiners; and the trying period during the panic in the early nineties when these plants were small and comparatively weak financially. Those who may be interested in the development of the industry should not fail to read some of the books that have been written about those early days. To a noted industrialist is attributed the remark that "history is the bunk." I cannot agree with that, but rather do I believe that if those of us engaged in the industry thoroughly studied its history—its beginnings and development up to the present time—we would be impelled to alter our views somewhat, and such a study would better prepare us for working out our future course of action.

A brief sketch of the refinery developments since the discovery of petroleum must suffice here. Refining processes, in the main, always have been and still are processes of distillation, and the improvements in that part of refining have been due to the change in the character and construction of the plants and to the introduction of steam in the distillation process and of pressure and vacuum in refining, as well as to the increased use of chemicals.

When oil was first refined, the Pennsylvania oil refineries were very simply constructed, but they produced the only product that was salable at that time—kerosene. After the distillation had been carried on to a point where the distillate became too heavy and dark in color and unfit for illuminating purposes, the distillation was stopped, and the residual oil remaining in the still, considered worthless, was usually allowed to run away or was destroyed. There were no oil burners at the time, and the material was not regarded as containing any kind of lubricating oil. Later on, however, stills were built for the purpose of distilling the residual oil, and this distillation yielded a product that contained paraffin
wax and machine lubricating oils. This product was chilled with ice and pressed in heavy cotton duck bags, a process that separated the paraffin wax from the oil. The oil was again distilled, and the heavier distillate and the residual oil were found to have very good lubricating qualities for certain purposes. Still later it was found that through the introduction of steam in the still during the distillation, oils of different character were produced. The residual oil, instead of being a heavy, tarry product, came out green in color and of excellent lubricating qualities—so good, in fact, that it soon supplanted whale oil and tallow oil in the lubrication of steam engines and various kinds of machinery. The distillate produced also contained wax in crystalline form and an oil that upon further refining yielded light oils useful in lubricating machinery, much superior to the oils recovered in the distillation without steam.

These are the products that are being produced today, in a very much improved fashion of course, and from them are made the superior motor lubricants for which Pennsylvania is known. Modern stills are very unlike the original. They are now a series of tubes set in a furnace. The process is a continuous one. There are tall cylindrical towers through which the vapors pass, are condensed, and come out in continuous streams; the paraffin wax is now separated from the oil in filter presses; and petrolatum (vaseline) is separated from the residual oil by means of centrifugal separators. This last process at the same time is the important step in the manufacture of low cold-test motor and cylinder oils.

Chemists and chemical engineers now control the manufacture of petroleum products more than ever and bid fair to play an even more important part in the future. The demand for gasoline, occasioned by the development of the internal combustion engine, was a problem that the industry met promptly, and ways have been found to convert practically all the crude oil into gasoline if necessary. This process, which involves distillation at high pressures, is very interesting.

A certain chemical engineer, while discussing the refining of petroleum, remarked that modern methods are still brutal and indicated that some way would be found to obviate the necessity of the present high pressures and temperatures in the refining of oil. He is probably right,
and it is possible that in a few years products now unthought of will be made from petroleum, in the same way in which the manufacture of many different products from coal has been developed by the chemists. Doubtless petroleum intrinsically is very much more valuable than it is regarded today, and the time may come when the people of today will wish they had been more conservative in their consumption of this irreplaceable asset. Conservation of petroleum should be the watchword of every oil man.

I hope that this necessarily sketchy description of what has taken place in the last half century will answer the question as to how we got here. The fact remains that we are here, and I predict that we will stay. No one of us knows what new development tomorrow may revolutionize an industry that has been evolving daily since it began three-quarters of a century ago, but the Pennsylvania industry has always been able to meet and adjust itself to these changes, and I am confident that it will continue to do so.

I do not want to close without saying just a word to you as fellow Pennsylvanians about Pennsylvania-grade oil. It is a product of your native state and peculiar to this region. There are certain characteristics about it that are peculiar to Pennsylvania oil and to no other oil in the world. It so happens that this state and portions of the adjacent and sister states of New York, Ohio, and West Virginia were favored by nature in the formation of this crude oil. These characteristics and these natural favors have made Pennsylvania oils the standard for lubricants the world over. The name “Pennsylvania” on oil is something to take pride in, just as the state takes pride in its anthracite coal, its steel industry, and its manufactures.

Probably you have wondered how it is possible that there is still a Pennsylvania oil industry after seventy-seven years. Most people have the notion, and not without some basis for belief, that the life of an oil field is comparatively short and that the oil is soon drained out of the sands. When you go far enough away from the Pennsylvania fields, you will very likely be told that our field is nearly exhausted, that Pennsylvania oil will soon be a thing of the past, and that all that will be left is
history. This attitude is not justified. Two years ago a congressional committee was asked to make an investigation of the oil industry in the United States. One of the things it were instructed to do was to ascertain how much Pennsylvania oil was still available. A group of geologists, including Dr. George H. Ashley, the state geologist of Pennsylvania, was called upon to answer that question. Briefly, their report indicated that in the preceding seventy-five years, approximately one billion barrels of Pennsylvania-grade crude oil had been produced and that there is still left in the sands five and a half billion barrels—more than five times as much as has been taken out. Drillers may never be able to get all this oil out of the ground, it was reported, but they can and will, by present known means, recover at least another one billion barrels. The rest of it—four and a half billion barrels—will doubtless be recovered by some means yet to be discovered. At the present rate of production, one billion barrels will last some fifty to a hundred years; and geologists agree that the possibilities of finding deeper sands in the Pennsylvania region are excellent. If, a hundred years from tonight, another group of historians meets in Oil City for a similar occasion, I am confident that there will be Pennsylvania oil men here to greet them.