Who was the Father of Petroleum?
A Galician Mystery

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In March 1884, Hugo Warmholz (1842-1909), a journalist from Vienna, travelled to Lemberg, the capital of Galicia. He made an excursion to the village of Borysław, ‘the petroleum and earth wax paradise’, to fulfill his long held curiosity to see oil and wax gush out of the earth.¹ There, he met the director of the Gartenberg, Lauterbach, Goldhammer refinery, the Belgian chemist Emil van Haecht (d. 1884), and listened to his outburst about the American claim that the petroleum industry began in Pennsylvania. ‘With great animation he [van Haecht] cried out, “I will introduce you to the father of petroleum, a man who has suffered an injustice that cries out to heaven, for it is he who achieved the first petroleum through distillation and was the first to market it.”’ Warmholz wrote that a Jew from Borysław in his early seventies, arrived ‘in tattered, but clean Sabbath clothes, scars furrowing his typical Galician Jewish face … With tears in his eyes the old man showed me the official documents which affirmed that in 1853 he was the first to produce and sell petroleum for illumination.’ But, Warmholz declared, the man, who had rendered a service not only to Galicia but to all humanity, lived in obscurity, unrecognized for his accomplishments, and while others grew rich on his discovery, he was ‘nothing more than a beggar’.²

Warmholz’s article was published in 1884 in Vom Fels zum Meer, an elegantly-bound and illustrated periodical intended for German-speaking families, which published articles on a many subjects. Warmholz, who had a position with the Austrian railways, specialized in travel literature. He introduced his readers to interesting sites along the routes of two railways³ and exotic locations, like northern Norway,⁴ portraying the inhabitants and their customs, and places of interest. In his article about the oil and wax industries, he described the towns of Drohobycz and Borysław, their Jewish and Ukrainian inhabitants, and the industrial operations. However, his portrayal of the Jews who worked in the industry was remarkable.

We visited several pumping stations and distillation and refining works. The entrepreneurs were all Israelites … With most courteous willingness, they showed us everything that interested us. They generally speak German, as do all Jews throughout Galicia. It also appeared to me that they lived more in a German than Polish way; I felt much more comfortable with them, since in past days I had heard almost only Polish, because the Poles hate the German language, and indeed all things German.

Also a great many of the workers – possibly half – are Jews. As I watched them at the heavy flywheels, at drilling and pumping – these wild and filthy beings, wrapped

¹ Hugo Warmholz, ‘Petroleum und Erdwachs Revier von Borysław in Galizien,’ Vom Fels zum Meer, Spemanns Illustrierte Zeitschrift für das Deutsche Haus 1, Oktober bis März (1883): 216.
² Ibid., 227–9.
³ Hugo Warmholz, Führer an der Kaiser Ferdinands-Nordbahn (Vienna: Waldheim, 1885), and Warmholz, Führer an der Österreichische Nordwest-Bahn und Süd-Norddeutschen Verbindungsbahn (Vienna: Waldheim, 1883).
in rags, with heads looking just as if they were cut out of the painting of Pontius Pilate by Munkácsy⁵ – turning the wheels with energy and singing tunes in a monotone as they laboured, I thought of the suffering of this remarkable people in Egypt.⁶

Warmholz found Schreiner’s story compelling and accepted, without question, his account that he invented the first petroleum lamp by forming a ball of crude oil around a wick and lighting it and that after purchasing a pharmacist’s distilling apparatus, he succeeded in being the first to distil petroleum and sell it. However, after acknowledging that Schreiner’s product was murky and had a penetrating smell, Warmholz concluded that it was Herr Nikolausch [sic],⁷ the owner of a pharmacy in Lemberg (Lwów) to whom Schreiner sold his distillate, who refined crude oil into naphtha. Warmholz presented Schreiner’s story as one of human interest to elicit the sympathy of middle European readers. In 1883 this was not only unconventional, it was daring. Most of his contemporaries presented Jews in stereotypical and negative terms, and in particular, those who wrote about Galician Jews in the petroleum industry were often scathing in their attacks.⁸

Hugo Warmholz’s article was remarkable because it brought a new sensibility, forged in Vienna’s liberal and intellectual circles, to Galician life and Galician Jews. He was a baronet (Ritter) with an estate on the Baltic coast, where he had become a Freemason. When he moved to Vienna in the early 1870s,⁹ he joined the city’s oldest and largest Freemason’s lodge Humanitas, a bastion of liberal thought and charitable activity in social welfare and education. The lodge provided its members who were professors, professionals, and affluent businessmen – many of them Jews – with an alternative to the social establishment dominated by conservatives and the Roman Catholic Church, which strongly disapproved of Freemasonry. Warmholz, who served as master of the lodge from 1901-1904,¹⁰ seems to have been a man about town in Austria’s capital, a member of the board of directors of the city’s chess club,¹¹ and a writer for the periodical Wiener Schachzeitung. His association with Jewish intellectuals in Vienna would probably have influenced his portrayal of Abraham Schreiner. It is even possible that he visited Gartenberg, Goldhammer, Lauterbach and Company through his acquaintance with his fellow chess club board member, Joseph Kolischer, a wealthy businessman from Lemberg who was related to Lazar Gartenberg by marriage.¹²

Warmholz’s article was not the first time that Schreiner’s name had come to public attention. It appeared in 1873 in a pamphlet on the petroleum industry written by Heinrich Gintl,

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⁵ Mihály Munkácsy (1844-1900) was a Hungarian painter who lived in Paris. He was famous for his large scale Biblical paintings.
⁷ The pharmacy Pod Złotą Gwiazdą (Under the Golden Star) in Lemberg was owned by Piotr Mikolasz.
¹⁰ Ibid., 41.
¹² Wiener Schachzeitung 7, no. 1 (1904): 45.
inspector for the Emperor Ferdinand Northern Railway (Kaiser Ferdinands-Nordbahn).\textsuperscript{13}

Beginning his story with the discovery of naphtha, Gintl told how two Israelite businessmen\textsuperscript{14} from the region around Drohobycz brought a thick, oily, greenish-black fluid to a pharmacy in Lemberg and how naphtha was rectified from it in 1853. Having heard of the new fuel, A. Prokesch, the purchasing agent of the Northern Railway, immediately set out for Galicia hoping to find supplies to replace the costly hydrocarbur, distilled from shale, that the railway used as lamp fuel. Prokesch travelled along the northern slopes of the Carpathians as far as Bukowina. He consulted with Kleeberg, the mining director of the Stebnik salt works, who had managed to distil only a viscous liquid with which he illuminated the mines, and with Professor Pless at the University of Lemberg, who had experimented with crude oil, but had neither the ambition nor funding to pursue its practical application. Only in Drohobycz was Prokesch able to find suppliers: Abraham Schreiner and his partner L. Stiermann,\textsuperscript{15} ‘two Israelite businessmen’ who were already in the business of ‘cooking bitumen’. Gintl did not make a connection between the businessmen, who brought their oily liquid to Lemberg, and the entrepreneurs from Drohobycz. They agreed to supply 200 centner of their product to the Northern Railway, although it was less than half the amount needed. In 1854, Schreiner and Steuermann managed to deliver 300 centners\textsuperscript{16} to Vienna. Since the oil had to be shipped for thirty miles by oxen and seventy miles by rail, Gintl considered that its price of 29 florins per centner, as opposed to 43 florins per centner for hydrocarbur, indicated the low cost of production and the appetite for risk on the part of the entrepreneurs.

It was hardly common for the names of two small Jewish tradesmen from a provincial city to be recorded by a railway official. It is likely that their names were already known outside of Drohobycz and that Gintl wanted to clarify their role in the history of naphtha. He affirms that Schreiner and his partner were the first to sell crude oil distillate in quantity but identifies Ignaz Łukasiewicz (1822-1882), a temporary employee in the apothecary of P. Mikolasz in Lemberg, as the one who recognized that the thick, oily, greenish-black fluid brought by the two anonymous Jews was not a distillate but crude oil and concludes that it was Łukasiewicz who rectified naphtha. In passing, he also remarked that P. Zeh [sic] also a temporary employee of Mikolasz, worked with him.

Gintl published his pamphlet around the time of the World Exhibition in Vienna in 1873 to accompany the Austrian petroleum exhibits. As the Central Director of the Lemberg-Czernowitz-Jassy Railway, his views were closely aligned with the policies of his employers and the government in Vienna, and his text reveals that his main contacts within the oil industry were the members of a fledgling group of noble landowners in western Galicia, who were mining

\textsuperscript{13} Heinrich E. Gintl, \textit{Zur Geschichte des galizischen Petroleums} (Vienna: Carl Fromme, 1873).

\textsuperscript{14} In the nineteenth century, the adjective \textit{israelitische} had the connotation of being more courteous than \textit{jüdisch}.

\textsuperscript{15} Stiermann is probably a misspelling of Steuermann, a common Jewish family name in Drohobycz. The orthography probably represents the Galician pronunciation Stayermann.

\textsuperscript{16} 50 centner is equal to 1 metric ton or 7.4 modern barrels of crude oil. Therefore, according to Gintl, Schreiner delivered 6 metric tons or 44.4 barrels of his distillate to Mikolasz’s pharmacy. Jan Zeh claimed that Schreiner delivered 10,000 kilograms, which would be the equivalent of 10 tons or 74 barrels. Zeh. ‘’Pierwsze objawy przemysłu naftowego w Galicji,’ (The First Appearance of the Naphtha Industry in Galicia),’ \textit{Czasopismo Towarzystwo Aptekarskiego} 13, no. 12 (1880): 204.
crude oil on their estates. The group was established later as the Galician Provincial Petroleum Association. Ignacy Łukasiewicz, who left Mikołasz’s pharmacy sometime in 1854 to settle in the area around Gorlice in western Galicia, was an influential member of this group. After working at first in a pharmacy, Łukasiewicz later joined several of the local estate owners, who were digging for oil, to advise them about their oil operations and refining. In publications of the 1870s, Łukasiewicz is usually described as the owner of an estate and a refinery in Polanka who made important contributions to the oil industry. Eduard Windakiewicz, Austria’s chief mining commissioner, who conducted a thorough review of the oil and wax enterprises in Galicia in 1873, described only Łukasiewicz’s activity in mining crude oil and refining. In his book on the Galician economy, Adolf Lipp, who appears to have relied on Heinrich Gintl for much of his information on the oil industry, also makes no mention of Łukasiewicz’s involvement in the fractional distillation of naphtha.

Gintl appears to have been the first to publish the claim that Łukasiewicz was the first to rectify naphtha and probably based it on information supplied by his contacts in the western Galician oil industry. His pamphlet was the main source of information about the early history of petroleum in Galicia for several decades. By the late 1870s, several publications had repeated the claim that Łukasiewicz was responsible for naphtha, as the Viennese newspaper Die Presse did on the industry’s twenty-fifth anniversary in 1878. This article mentioned Łukasiewicz’s colleague and collaborator P. Zeh [sic], but in other publications the latter’s name was omitted. By the time of Łukasiewicz’s death in 1882, he was revered not only as a founder of and mentor to the oil industry, but also the first to have refined naphtha, and by the end of the century, his claim seemed incontrovertible.

On the other hand, some Austrian publications found Schreiner’s story poignant and published versions of Warmholz’s article. In October 1883, the Viennese paper Die Neuzeit published a long article on the father of petroleum, drawn from Warmholz’s story. It emphasized the pathos and injustice of Schreiner’s career with the addition of an interesting footnote:

We ask our readers in Galicia to share with us, when possible, particulars about this person, Abraham Schreiner, this innovator in the petroleum industry, and hope that the story of this man can be spread to his brothers in faith so that they might help support him.

Two months later, a Moravian newspaper published a long article on the history of lighting, incorporating Warmholz’s story of Schreiner. In 1887 his article was summarized in

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17 Many claims were made in the last twenty years of the nineteenth century and later for Łukasiewicz’s acting as a consultant about refineries to Tytus Trzecieski, Karol Klobassa, Mauryce Brunicki, and the Zieliński brothers, however, there are no documents to verify this before 1870. Z. Bielski, ‘W sprawie pracy starszeństwa przemysłu naftowego (On the Matter of Precedence of the Petroleum Industry),’ Przemysł Naftowy 17, no. 4 (1932): 652.
18 Agaton Giller, Polska na Wystawie Powszechnej w Wiedniu 1873 (Poland at the Universal Exhibition in Vienna) (Lwów: nakładem autora, 1873), 153.
19 Eduard Windakiewicz, Das Erdöl und Erdwachs in Galizien (Vienna: Alfred Hölder, 1875), 69, 71–2.
21 Die Presse, 9 August 1878, 6–7.
22 ‘Der Vater des Petroleums,’ Die Neuzeit, 26 October 1883, 417–8.
23 Moritz Linder, ‘Kienspan bis zur Glühlamp,’ Znaimer Wochenblatt, 1 December 1883, 1–4.
Bibliothek der Unterhaltung und des Wissens, and in 1889, the Jewish journal Israelit and Jeschurun. When the twenty-fifth anniversary of the first American petroleum refinery was celebrated in 1884, newspapers in Bohemia and Prague repeated Schreiner’s story. When Adolf Schreiner, the son of the ‘Petroleum King’, described as a a pedlar of matches and a drunkard, died in a Viennese hospital in 1887, it provided an occasion for some Austrian newspapers to remember the story of his father. These publications gave Schreiner celebrity status and established him as an important actor in the history of petroleum.

Surprisingly, no one questioned how an uneducated man like Schreiner could have undertaken the difficult process of fractional distillation, the separation and classification of the chemical compounds in a mixture by their various boiling points. Also no one explained why the patent for naphtha was not owned by Ignacy Łukasiewicz. Remarkably, neither Gintl in 1873, nor Warmholz, nor van Haecht in 1883 appear to have been aware that the man who achieved the first fractional distillation of naphtha to create a pure, relatively inexpensive lamp fuel was living quietly in Borysław, where he had been the town pharmacist since 1876. He was Jan Zeh (1817-1897), who had received his master’s degree in pharmacy sometime before 1847 and worked in Piotr Mikołasz’s pharmacy probably from 1850 to 1854. Ignacy Łukasiewicz, who finished his professional studies in Vienna 1852, had been his junior assistant. Zeh was granted the patent for the fractional distillation of naphtha in 1853.

The news of Zeh’s patent was greeted with silence. The obligatory, brief announcements of his patents, awarded and renewed, appeared in official journals, but the scientific and mining journals of the day ignored his achievement. The Northern Railway’s Prokesch did not seek him out when he was searching for supplies of naphtha, nor did other industrialists. His erstwhile colleague Łukasiewicz never explained his role in the fractional distillation of crude oil, and Jan Zeh himself waited for thirty-five years to correct the record. With Schreiner’s sale to the Northern Railway, many began to dig for oil refine it, but for the next twenty years nothing was written about the new industry, except for a few reports by mining engineers and geologists. Into this void, contradictory claims surfaced.

25 Israelit and Jeschurun, 25 July 1889, 1009.
26 Prager Tagblatt, 11 June 1884, 7, and Warnsdorfer Volkszeitung, 14 June 1884, 6.
27 ‘Der Sohn des Petroleum Königs im Spitale gestorben,’ (Neuigkeits) Welt Blatt, 3 June 1887, 3, and Drosten-Zeitung 8 July 1887, 300.
28 Tadeusz Estreicher wrote that Zeh received permission to operate a pharmacy in Borysław on 21 August 1875; he opened it in March 1876. Tadeusz Estreicher, Jan Zeh: zapomniany pionier przemysłu naftowego (Jan Zeh: Forgotten Pioneer of the Oil Industry) (Warsaw: F. Herod, 1945), 26.
29 Jan Zeh, Magister der Pharmacie appears in a list of names of members of the society for the prevention of cruelty to animals. Wiener Zeitung, 23 June, 1847, 1378.
31 The few earlier works about the Galician oil and wax industries that appeared were mainly technical articles by engineers and geologists. See Fr[jedrich]Emler, ‘Das Bergtheer in Galizien vom Standpunkte des Bergregales,’ Österreichische Zeitschrift für Berg- und Hüttenwesen 8 (1860): 237–9; Wachtel, ‘Die Naphtha und deren Industrie in Ostgalizien vom Standpunkte des
Fortunately, the two main actors in the story of the first fractional distillation of naphtha left personal memoirs, although long after the events. According to Tadeusz Estreicher, Jan Zeh agreed reluctantly to publish his recollections in 1889 at the urging of the editor of the journal of the Galician pharmaceutical association. In 1883, about a month after Warmholz’s article appeared, Abraham Schreiner was inspired to write the preface for a booklet that would explain that Borysław was ‘the cradle of oil and wax … before any American knew of its existence’, and that he [Schreiner] was ‘the first to undertake the distillation of crude oil and the first to bring petroleum to the market’. The first part of the booklet was completed and published in 1886 by Aron Żupnik (1848-1917), a printer, publisher, and prominent intellectual in Drohobycz’s Jewish community. It is likely that Żupnik was the ghost writer of the memoir. Schreiner’s basic education in a Jewish cheder would not have equipped him to write in German.

Zeh began his article by recalling that crude oil had been collected and used for centuries on the northern slopes of the Carpathian Mountains and other places throughout the world. Wherever seeps were found, oil was collected from ditches and shallow wells and processed to make lubricant, grease for water-proofing, or medications, mainly for skin ailments in animals. Its flammability was recognized, and since ancient times, attempts were made to distil it so that it could be burned effectively in lamps. In Galicia, lubricant was made in cottage industries, some of which was exported for the Russian tanning industry. In 1831, twenty oil wells in the Drohobycz area were active, and in 1841, the Galician business directory recorded the

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34 Schreiner’s booklet ended with an announcement that a second part would appear. It has not been discovered.
35 Since Schreiner mentions a school friend in his booklet, he probably attended a cheder, where Jewish boys received religious instruction and learned to read and write Hebrew and Yiddish until the age of thirteen.
36 Georg Gottlieb Pusch, author of a geological survey of the northern Carpathian Mountains in 1821, noted that Galicia and Moldavia produced 12,000 cubic feet, or over 2,000 barrels per year, and that the collection and processing of petroleum was part of the local economy. Georg Gottlieb Pusch, Geognostische Beschreibung von Polen so wie der übrigen Nord-Karpathen Länder (Stuttgart: J.G. Cotta’schen Buchhandlung, 1883) 2: 119–20.
37 This was reported by I. Micusti from the authorizations for the mining of hydrocarbons issued by the Drohobycz Mining Office in 1843. Singer, Die Technologie des Erdöls und seine Produkte (Leipzig: S. Hirzel, 1911), 42.
exploitation of crude oil as an industry in the villages of Stara Sol and Tyrawa Solna near Sanok.\textsuperscript{38}

These enterprises would have been operated by \textit{lepaks}\textsuperscript{39}, the local Ruthenian peasants and lower classes of Jews. Jewish \textit{lepaks} would not have owned the land where they excavated oil and would have rented a concession from the landowner, after paying a fee that was said to be 2 florins and 50 kreuzers for each hole excavated.\textsuperscript{40} Before 1848, Jews were forbidden by Austrian law to work in mines,\textsuperscript{41} but since liquid hydrocarbons were not considered as imperial property and not taxed after 1810, no concession would have been required to collect oil from ditches and shallow shafts. Abraham Schreiner was very likely one of the \textit{lepaks} who collected crude oil and sometimes ‘cooked’ it in primitive attempts at refining. Schreiner was born around 1812, the eldest of seven recorded children of Hillel Schreiner and Reisle Händel, who were bakers in Drohobycz.\textsuperscript{42} In 1852 when Schreiner brought his distillate to Lemberg, he would have been about forty years old. Because he was able to produce six metric tons (42 barrels) of distillate in 1853 for the Northern Railway, it seems likely that he had considerable knowledge and experience about mining crude oil and processing it. He may also have been an associate of Jozef Kornhaber (1804-1884), his contemporary, who is recorded as a dealer in lubricant for wagons \textit{(wagontherhändler)},\textsuperscript{43} and whose daughter later married Schreiner’s son.\textsuperscript{44}

Zeh remembered that in 1852, A. Schreiner and L. Steuermann (Stiermann) brought a few barrels of their distillate, green and dark brown in colour, to Piotr Mikołasz’s pharmacy in Lemberg where he worked and describes how he conducted the fractional distillation in his laboratory at night for several weeks, enduring headaches from the unpleasant vapours.

I began to clean and classify this particularly foul-smelling distillate. Since I myself was a pharmacist, I intended to produce Italian rock oil \textit{(oleum petrae album)}, which we used

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\begin{itemize}
\item \textsuperscript{38} Grosses Adressbuch der Kaufleute, Fabrikanten und handelnden Gewerbsleuten von Europa und den Hauptplätzen der fremden Welttheile (Nürnberg: S. Leuchs and Co., 1844), 12:139 and 151.
\item \textsuperscript{39} \textit{Lepak}, sometimes spelled \textit{lebak}, and the related word \textit{lapaczki}, meaning oil snares, may have been derived from the verb \textit{lapać}, meaning to catch.
\item \textsuperscript{42} Abraham Schreiner’ death notice records that he was eighty-six years old at the time of his death on March 4, 1898. Archiwum Główne Akt Dawnych (AGAD), \textit{Księgi metrykalne gmin wyznania mojżeszowego z terenów tzw. zabużańskich 1789-1943}, sign. 1976, 80. \url{http://jri-poland.org/}, accessed 10 Nov. 2015.
\item \textsuperscript{43} Abraham Schreiner’s son Chaim Wolf married Chaje, the daughter of Józef Israel Kornhaber and Gitel Eidmann in 1890 in Borystaw. AGAD, \textit{Księgi metrykalne}, sign. 2253, 241. \url{http://jri-poland.org/}, accessed 23 Nov. 2015.
\item \textsuperscript{44} The birth record for Feiwel Schreiner, son of Chaya Kornaber and Chaim Wolf Schreiner. AGAD, \textit{Księgi metrykalne}, sign. 142, 14. \url{http://jri-poland.org/}, accessed 23 Nov. 2015.
\end{itemize}
to import from abroad and which was very expensive. I managed to overcome considerable obstacles (not only because of the horrible smell of the raw product but also because of inadequate laboratory equipment). I finally succeeded in cleansing the distillate and classifying it so that my product (which in comparison to the original liquid was odourless) was an exceptionally good material for lighting and was able to compete with the best Italian rock oil.\(^{45}\)

Schreiner’s booklet clarifies Gintl’s and Zeh’s story of the initial delivery of his distillate to Lemberg. He testifies that in 1852 he came alone – not with L. Steuermann – to Lemberg to sell the first barrel of his distillate. In March of the following year, Schreiner relates that Herr Ceh [sic]\(^{46}\) visited him to purchase 10 centners more. But because the profit from his first sale to Mikolasz had not been sufficient to continue production of his distillate in large quantities, Schreiner had not been able to produce a supply. Zeh could offer only half of the 20 florins per centner that Schreiner demanded. When, a few days later, Mikolasz agreed to the price, Schreiner entered into partnership with Steuermann to help with production and delivered 10 centner four weeks later.\(^{47}\) Zeh’s work must have been finished within a few weeks, since he applied for a patent for rectified naphtha on 27 May 1853.\(^{48}\) On 2 December 1853 a patent for two years was awarded; Zeh renewed it in 1855 for four more years until 1859.

In Lemberg, practical uses for naphtha were immediately implemented. Zeh describes how a local tinsmith, Adam Bratkowski, designed a wall lamp for the Mikolasz pharmacy, constructed household lamps that allowed the wick to be raised, and modified the imported lamps that Mikolasz sold in his shop. Bratkowski also designed the lamps that lit the general hospital in Lemberg with naphtha in July 1853.

While still employed at Mikolasz’s pharmacy in 1854, Zeh placed two advertisements in a Viennese newspaper\(^{49}\) to advertise his new k.k. ausschliesslich privilegierte Steinölfabrik (imperial, royal, exclusively privileged crude oil refinery).\(^{50}\) At first, from his factory in Hubicz near Borysław he produced a lubricant for the mail carts in Lemberg but could not compete with a more cheaply priced Belgian product. Until 1858, he supplied Lemberg with all the naphtha it needed for illumination and produced spot remover and other products from the lighter hydrocarbons.\(^{51}\) In 1856, Zeh received a patent for Steinfett, described as an inexpensive and

\(^{45}\) Zeh, ‘Pierwsze objawy przemysłu naftowego,’ 203.

\(^{46}\) It is apparent that Aron Župnik had no knowledge of Jan Zeh when he transliterated Schreiner’s pronunciation of his name in Polish orthography as Ceh – neither that someone with this name had accomplished the fractional distillation of crude oil nor that the pharmacist in Borysław was the same man. His transliteration indicates that the name was pronounced in the German way and would indicate that Zeh’s parents, Jan Ludwig Zeh and Krystyna Liebherr, who lived in Łanicut, were likely polonized Germans. Nuances of national origin were often significant in Galician society. Estreicher, Jan Zeh: zapomniany pionier przemysłu naftowego, 9.

\(^{47}\) Schreiner, Borysław und seine Produkte, 8–9.

\(^{48}\) Jahrbuch des kaiserlich-königlichen geologischen Reichanstalt (Vienna: k.k. Hof- und Staats-Druckerei, 1854), 236.


\(^{50}\) k.k. privilegierte was a designation awarded by the monarchy to businesses considered to have national significance. Wiener Zeitung, 21 January, 1854, 44; 28 January, 1854, 61.

\(^{51}\) Zeh, ‘Pierwsze objawy przemysłu naftowego,’ 205–6.
good lubricant for carts and machines. In 1860, he owned a camphene refinery that had two distilling apparatuses, four vats, and four workers, and in 1861, official documents noted his business in benzene, lamp fuel, lubricant for leather, and unprocessed and purified crude oil. At the International Exhibition in London in 1862, Zeh exhibited benzene, and leather and cart grease. After this date there seem to be no further references to Zeh’s involvement in the naphtha industry.

Both Zeh’s and Schreiner’s accounts describe the chaotic beginnings of the oil industry in the Drohobycz area. Zeh wrote that in 1853, naphtha distilleries began to appear like mushrooms after a rain and that by 1854, workers in the Stebnik salt mines were distilling the same malodorous distillate that Schreiner and his partners produced. Local Jews and peasants began to collect oil, scooping the oil from ditches or skimming it from water with rushes which they later squeezed out. With these primitive methods, it was not possible for each entrepreneur to collect more than about three barrels per week, and even for these small amounts they found no market. Schreiner, finding that he was unable to obtain a sufficient supply of crude oil to produce his distillate for the Northern Railway, moved his factory to Romania, where it was more plentiful. Schreiner relates that few had the means or desire to invest substantially in these operations. He had difficulty with his partners and Zeh was never able to find an investor.

The businesses of both Schreiner and Zeh were devastated by fire, the omnipresent peril of early refining. Schreiner suffered burns in one of the three conflagrations that destroyed his factories. After the last fire destroyed his business, he retired to become a publican in a tavern he had purchased in Borysław. Zeh’s experience was more disastrous. In 1858, a pedestrian dropped a lit match into naphtha leaking from a barrel outside Zeh’s shop, which was managed by his wife and her sister. Both died in the resulting explosion. It is not known if Zeh was able to rebuild his shop in Lemberg.

One of the strangest aspects of the first few years of refining naphtha in Galicia is that almost no one, other than the pharmacists in Mikoláš’s pharmacy, seems to have grasped the concept of fractional distillation of naphtha. Until about 1860, or even later, it appears that Zeh was the only one who produced pure naphtha. The Northern Railway was satisfied with Schreiner’s inferior but inexpensive distillate, but when it became obvious that it was not a properly refined fuel, the company had to enlist the help of the Viennese chemist J. B. Heindl to remove the unpleasant smell. In 1859, Heindl was given official credit for purifying naphtha, much to the chagrin of Zeh who protested that the fuel he supplied to the city of Lemberg was pure. Zeh acknowledged that neither Schreiner nor his imitators understood the process of refining naphtha. Schreiner himself confessed that he had great difficulty shipping his distillate
to Vienna from Romania, because of its penetrating, foul smell. At the end of his booklet, Schreiner credits Joseph H. Altmann, who with his partner Isaac Gottlieb opened a large refinery in Drohobycz around 1860, with improving the smell and colour of his product.60

Those working with Ignacy Łukasiewicz in western Galicia were also unaware of Zeh’s achievement. In an article in an 1881 issue of a mining journal, the author, ‘F.’ – possibly Albert Fauck, an engineer who worked in western Galicia and contributed articles to the journal – recalled that Baronet Zieliński opened a refinery in Klęczany in 1859 with the help of Łukasiewicz, ‘the first to exploit crude oil through distillation’. He mentions that Heindl in Vienna was not able to purchase Zieliński’s naphtha, obviously unaware that Heindl bought Schreiner’s distillate and refined it further.61

Austria’s early history with crude oil is one of lost opportunities. By being the first to distill crude oil to make naphtha for lamp fuel, Jan Zeh triggered an industry that transformed the world’s economy. However, Austria was unable to turn a scientific and technological advance into economic advantage. The empire’s response to the industrial revolution that was transforming other parts of Europe was tardy and disorganized. Britain, where the industrial revolution began in the last years of the eighteenth century, and some of Austria’s neighbours were much further ahead in technological innovations, such as steam and water power, chemical manufacturing, iron production, or the construction of railways. In Britain, experiments in methods of illumination had been actively pursued since the latter decades of the eighteenth century. The Swiss inventor Aimé Argand manufactured his lamp in Britain in the 1780s, and William Murdoch invented the first gas lamp in the following decade. In 1802, Humphrey Davy created the first incandescent light, and in 1815, made the Davy lamp for use in mines.

In 1816, a new development in this field occurred in Austria. The Ministry for the Mint and the Mining Industry in Vienna tested and approved a new lamp fuel that had been created from crude oil by Joseph Hecker, a salt mine inspector in Galicia, and the city of Prague ordered a large amount as fuel for its street lamps. But as Hecker later explained, the source of the thin crude oil he found near Truskawiec near Borysław, which yielded 40 percent naphtha as opposed to 16 percent from other sources, ran dry. He was unable to fulfil the contract and forced to pay a heavy penalty.62 Since Hecker described his distillate as light yellow in colour and having the odour of coal tar, it was probably not pure naphtha. Nevertheless, the promise of an effective lamp fuel from a relatively cheap source, which would have been greeted with enthusiasm in Britain, aroused no curiosity in Austria.

Scientific organizations like the Royal Society in Britain or the academies of science in Paris and Berlin had been founded in the seventeenth century and in several smaller European centres in the eighteenth. They sponsored journals and lectures and ignited public interest in

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60 J. Altmann, in partnership with Isaac Gottlieb, built a more advanced refinery in Drohobycz, possibly in the late 1850s or around 1860. It is not clear if it produced pure naphtha. The refinery was sold to Lazar Gartenberg in 1863. Schreiner, Boryslaw und seine Produkte, 14.
natural science, though to a lesser extent in technological innovation. There were none in Austria. In the nineteenth century, Emperor Francis II, whose long reign extended from 1804 to 1835, opposed free competition, which had spurred British innovation, as well as government intervention to promote technological innovation. In Vienna, instruction in science and technology began only in 1815 with the founding of the Polytechnic Institute of Vienna. Even then, its director, Joseph Johann von Prechtl (1778-1854) was criticized by Franz Josef Gerstner (1756-1832), director of the Polytechnic in Prague, founded in 1806, who considered Prechtl’s program little more than that of a trade school.

In 1820, Prechtl published the article Hecker wrote about his experiment with naphtha in the Polytechnical Institute’s yearbook. Brief summaries were published in the Allgemeine Handels- Zeitung of Nürnberg and in French and English journals. In 1825, Professor Aloys Wehrle of the mining academy in Schemnitz in northern Hungary published a response to Hecker’s article in Prechtl’s journal, but none of these journals paid attention to the promise inherent a new, inexpensive lighting fuel that could replace tallow candles or costly, less efficient lamp oil; they discussed only the use of naphtha in mines. Had Hecker’s article been published in a more practical and popular periodical with a wider audience, such as Dingler’s Polytechnisches Journal, it might have attracted more attention. However, Johan Gottfried Dingler’s publication first appeared only in 1820. It’s tempting to speculate that had Hecker made his discovery in England, the petroleum era might have begun forty years earlier.

Jan Zeh’s achievement did not receive even the small amount of attention that Hecker’s did; it was ignored altogether by the scientific journals of his day. In 1847, a few years before Zeh’s patent for naphtha was awarded, James Young, a Scottish chemist, distilled lamp oil from a small oil seep in Derbyshire. When this source dried up, Young created a lucrative business in fuel produced from shale and coal. While Zeh was forgotten, James Young became wealthy, was made a Fellow of the Royal Society, and given numerous other honours.

In 1870s, twenty years after it began, the Galician oil entrepreneurs realized that their struggling enterprises had little prestige. Like van Haecht, they were irked by the American claim of precedence. In America it was commonly assumed that the petroleum industry had originated there. In 1871, two years before Gintl’s booklet appeared, the American Journal of Science and Arts asserted that Professor Silliman’s ‘extended investigation made in the spring of 1855 [was] undoubtedly the earliest investigative record of any chemical research in the

64 Hermann Freudenberger, Lost Momentum: Austrian Economic Development 1750s-1830s (Vienna: Böhlau Verlag, 2003), 92.
66 Freudenberger, Lost Momentum, 110.
69 Freudenberger, Lost Momentum, 53.
distillations of this petroleum.  

Emil van Haecht could have heard the American boasts of precedence in the oil industry in person, since he may have been present at the International Exhibition in Philadelphia in 1876, where his model of an apparatus for working up fat residues won recognition.  

In his booklet, Gintl expressed his own embarrassment for his country’s poor reputation:

I am always aggrieved when, from all sides, only the marvel of the American, and recently the Russian and even the Romanian industry, is expressed definitively and with almost fanciful embellishments in the spoken and written word. My patriotic feelings bristle when our own, highly estimable industry is discussed with spiteful sneers or ironic remarks.

The American industry, had put the Galician enterprises to shame. Like the Russian and Romanian industries, it had started a little later, and like them, it had leaped ahead. In 1861, when the price of oil dropped because of overproduction and the disruption of the Civil War, American oil was shipped to European markets, where it undercut the Galician product. By 1880, the first year for which comparative figures are available, Galicia produced only 3.5 percent of the total American production. The enthusiasm that Americans displayed for their petroleum industry had no parallel in Galicia. Hundreds flocked to the Pennsylvania oil fields to find work, and ancillary businesses multiplied – transportation, pipeline construction, cooperages, and refineries. In Austria, few businessmen with ambition, experience, or capital explored the possibilities of naphtha or related industries. Contemporary observers had great hope in Robert Doms, a Lemberg industrialist who found ozokerite in 1854 and in 1856 sank a 200 metre shaft for crude oil in Borysław. Discouraged by the inconsistency of the ozokerite deposits, the technological difficulties of drilling, and Austrian government’s changing policy on the ownership of hydrocarbons, Doms abandoned his efforts. Doms also appears to have distilled naphtha from crude oil in 1860, but strangely, he made no contact with Jan Zeh who lived in the same city.

By the 1870s, the Austrian administration and even the emperor were showing interest in the new industry. From 1861 to 1865, the Lemberg Chamber of Commerce conducted a review

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72 Gintl, Zur Geschichte des galizischen Petroleums, 27.


74 The United States produced 3,601,182 metric tons to Galicia’s 131,373. Ibid., 141.

75 Ozokerite, composed mainly of paraffin, is found in vein-like deposits within rock fissures and crevices. It is formed by the slow evaporation and oxidation of liquid petroleum.

76 Joseph Muck, Der Erdwachsbergbau in Borysław (Berlin: Julius Springer, 1903), 192

of the larger refineries in Galicia. In 1873, Austria had the opportunity to mount exhibits related to its petroleum industry at the World Exhibition in Vienna. In the same year, Eduard Windakiewicz, Austria’s chief mining commissioner, was commissioned to review the oil and wax industries; he published his detailed report in 1875. To promote the industry in government and financial circles, the western Galician oilmen formally established their organization as the Galician Provincial Petroleum Association (Krajowe Towarzystwo Naftowe) in 1879. Its dominant members were Polish nobles who had large estates in the area around Gorlice, southeast of Cracow on which they drilled for oil. The numerous entrepreneurs in the petroleum-rich Drohobycz-Borysław area in eastern Galicia, who were mainly Jews, were not included in the group. While touring Galicia in 1880, Emperor Franz Joseph gave the oil industry imperial exposure when he made an official visit to the oil fields of Borysław, where a new well was named in his honour.

With this increasing recognition of the value of the petroleum industry, Polish oil magnates must have realized that they needed a founder. Ignacy Łukasiewicz was an ideal choice. He had been in Mikolasz’s pharmacy when naphtha was refined; he had proved to be a close colleague and advisor to the western Galician oil magnates; and he was Polish – indeed a Polish patriot. Imprisoned for participating in a Polish irredentist uprising in Cracow in 1846, Łukasiewicz was seen as a suitable hero for the Polish ruling elite in the last two decades of the century, when growing nationalist sentiment was being expressed in the press and in the new Polish political parties that were gaining in strength.

But the majority of oil and ozokerite enterprises in Galicia were owned by Jews. There was an ethnic divide within the industry between the western and eastern oil regions: the wealthy noble oilmen, dominant in the Galician Provincial Petroleum Association, and the mainly Jewish entrepreneurs in the Drohobycz-Borysław area. Among the western pioneers, some had been educated in technical academies and were able to introduce modern technology. They dug for oil on their own estates and used their former serfs as labourers. In eastern Galicia, the local estate owners did not enter the petroleum industry in the early years. Instead hundreds of poor, uneducated Jews and some peasants sank single shafts on tiny parcels of land. Their methods of mining were inefficient and rapacious, dangerous for workers and disastrous for the environment, but neither the Galician nor Austrian mining authorities offered guidance through regulation. After 1861, the hydrocarbon enterprises in the two regions were further divided. When the price of oil dropped because of American competition, the entrepreneurs in the Drohobycz region switched to mining ozokerite, which commanded a high price on the market. Ozokerite was plentiful in the Borysław area, but not in western Galicia.

In 1881, the Polish geologist Władysław Szajnocha wrote the first of many scathing reports on the deplorable state of the oil and wax industries, focussing his criticism on the poorly

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78 Bericht der Lemberger Handels- und Gewerbekammer über den Handel und die Industrie, so wie deren Beförderungsmittel in ihrem kammerbezirke für die Jahre 1861-1865 (Lemberg: Aerarial-Staats-Druckerei, 1867).
79 Writing about the Galician Provincial Petroleum Association, W. Biechoński wrote: I am not going to discuss the issues in Borysław since they had no particular character, were not representative of the industry, and I did not know anything about the entrepreneurs there. W. Biechoński, ‘Pierwsze lata działalności Krajowego T-wa Naftowego (The First Years of the Galician Provincial Petroleum Asssociation),’ Przemysł Naftowy 4, June (1929): 300.
80 Joseph Muck, Der Erdwachsbergbau in Borysław, 186.
managed operations in Borysław.\textsuperscript{81} Several of his colleague’s reports were coloured with overtones of antisemitism.\textsuperscript{82} These sentiments began creep into the articles about Schreiner’s claim to the title of father of petroleum. In 1881 Heinrich Walter, the chief mining commissioner in Cracow, wrote historical sketches of the naphtha industry in the Austrian mining journal \textit{Österreichische Zeitschrift für Berg- und Hüttenwesen}. He made Schreiner appear unpleasantly cunning as the Jew who enticed a peasant’s widow to reveal her late husband’s secret of ‘cooking’ crude oil. Walter wrote, ‘The Jew, who knew what lucrative business could be made in the making of alcohol, got the idea that he might make whisky in this way.’ Walter claimed that when the pharmacists in Lemberg showed him how to distil crude oil, they bought him a distilling apparatus and turned the whisky maker into a refiner.\textsuperscript{83} These tales were repeated in other publications. In 1932, on the fortieth anniversary of Łukasiewicz’s death, the engineering professor Zygmunt Bielski repeated the story about Schneider’s [sic] being a propinator, or distiller of spirits;\textsuperscript{84} the story has reappeared in a more recent publication about the Polish petroleum industry.\textsuperscript{85}

Nevertheless, Schreiner’s claim had many supporters. In the tales told in the Drohobycz area, he was credited with many unlikely accomplishments: he was said to be the first to learn how to remove the impurities from ozokerite in the making of candles, the first to discover petroleum, and the first to make naphtha. It is said that his gravestone in Drohobycz was engraved with the citation that he was the first to make petroleum [sic] and market it.\textsuperscript{86} In 1905, some of Warmholz’s story was reprinted in the \textit{Allgemeine Zeitung des Judenthums}\textsuperscript{87} and became the source for Schreiner’s entry in the \textit{Jewish Encyclopaedia} in 1906.\textsuperscript{88} In 1913, the Galician novelist Hermann Blumenthal wrote a novel in which Schreiner appears as a character\textsuperscript{89} and in 1922, he published an imaginative but fictional version of Schreiner’s discovery, relating that Schreiner had an oil seep in his cellar and on a cold winter’s night when he had no light, he created the first naphtha lamp with a ball of cloth soaked in crude oil.\textsuperscript{90} In 1933, an exhibition at a fair in Vienna, which presented an illustrated history of the early days of the Austrian oil

\textsuperscript{81} Władysław Szajnocha, \textit{Górnictwo naftowe w Galicyi} (Mining Oil in Galicia) (Cracow: Nakładem redakcyj Muzeum, 1881).

\textsuperscript{82} A more comprehensive account the Galician wax industry can be found chapter six of in Valerie Schatzker, \textit{The Jewish Oil Magnates of Galicia}, part 1 (Montreal: McGill-Queens University Press, 2015), 68–94.

\textsuperscript{83} With this suggestion, Walter associated Abraham Schreiner with the figure of the Jewish publican, commonly despised in Galicia, because he was blamed for the prevalent alcoholism of the peasantry. Heinrich Walter, ‘Geschichtliche Skizzen der Petroleum-Industrie Galiziens,’ \textit{Österreichische Zeitschrift für Berg- und Hüttenwesen} 29, no. 23 (1881): 303.

\textsuperscript{84} Bielski, ‘W sprawie pracy starszeństwa przemysłu naftowego,’ 651-2.

\textsuperscript{85} Leszek Mazan, \textit{Dawno temu w Karpatach} ((Long Ago in the Carpathians), (Cracow: Poszukiwania nafty i gazu, 2006), 12.


\textsuperscript{87} ‘Der Erfinder des Petroleum,’ \textit{Allgemeine Zeitung des Judenthums} 69, no. 6 (1905), 69–70.


\textsuperscript{89} Hermann Blumenthal, \textit{Der Weg zum Reichthum}, (Berlin: Felix Lehmann, 1913).

\textsuperscript{90} Blumenthal, ‘Zur Geschichte des galizischen Petroleum,’ 393.
industry, gave Schreiner credit for the first naphtha lamp. The author of a history of Drohobycz, published in 1935, embraced him as the father of petroleum, and after the Second World War, Jews from the area who wrote about Schreiner added many fanciful embellishments to the story.

It must be noted, however, that even as the proponents for Schreiner or Łukasiewicz pressed their cases, official publications of the Austrian government and professional associations were careful to cleave to documented statements. The acclaim for Schreiner or Łukasiewicz existed in the popular press or in mining and technological journals, which were often politically partisan. Official documents concerning Łukasiewicz were more careful. When the monarchy bestowed the Order of the Iron Crown on him in 1877, he was described only as the owner of an estate. When he died in 1882, obituaries in official and professional publications made no mention of his being the first to refine naphtha. The Wiener Zeitung, the official organ of the Austrian monarchy, paid tribute to him as a member of the Galician Diet, and as the oldest, most distinguished entrepreneur in the Galician oil industry, as did the pharmacy journal. But Polish newspapers in Galicia were more effusive. When the Second Polish Republic was born at the end of the First World War, Łukasiewicz became an even more important hero for the new country. To this day, he is recognized in official publications as the first to refine naphtha, the inventor of the naphtha lamp, and the founder of the Polish oil industry.

As Łukasiewicz’s star rose near the turn of the century, Zeh’s pharmaceutical colleagues entered the fray when Wincenty Jablonowski, editor of the pharmaceutical journal, commissioned Zeh’s memoir in 1889. The article, in which Zeh told his story in an unequivocal but modest way, seems to have made little impression on the public. When Zeh died in 1897, in the same week as his colleague Jablonowski, only one Polish newspaper in Galicia printed a death notice – a single line: ‘In Borysław, Jan Zeh, pharmacist.’ But a careful study also makes it clear that Zeh’s achievements were briefly but correctly noted in official documents, and Nafta, the journal of the Galician Provincial Petroleum Association, generously acknowledged Zeh’s achievement in its obituary. It gave full him credit for the first fractional distillation of

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91 In der Wiener Messe, Das interessante Blatt 52, no. 12 (1933): 14.
94 Wiener Zeitung, 30 December 1877.
95 Wiener Zeitung, 8 January 1882, 9.
96 ‘Wspomnienia pośmiertne (Recollections after Death),’ Czasopismo Towarzystwa Aptekarskiego (1882): 51.
97 ‘Ignacy Łukasiewicz,’ Gazeta Narodowa 10 January 1882, 1–2, and ‘Ignacy Łukasiewicz, Gazeta Lwowska, 10 January 1882, 4.
98 Kuryer Lwowski, 29 January 1898, 4.
crude oil, noting that Łukasiewicz, who had been pursuing his studies in Cracow and Lwów at the time, found that the work had been accomplished when he returned.⁹⁹

If there was a father of petroleum it was Jan Zeh. His retreat from the naphtha business could be seen as mysterious, but the final sentences of his death notice provide an explanation. Fate was not kind. Fire consumed all his fortunes and in the fire, he lost his wife and daughter [sic]¹⁰⁰ who burned alive. Broken by his lack of success and particularly by the tragedy, he returned to pharmacy and moved to Borysław, where held in high esteem, he spent the rest of his life.¹⁰¹

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¹⁰⁰ The journal erred in identifying the victims of the fire, who were Zeh’s wife and sister-in-law.
¹⁰¹ Ibid., 29.