Hypothetical 1859 North American Exploratory Program

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ABSTRACT

As the 1850s came to a close, the pre-modern oil industry was in a state of flux after the collapse in whale-oil production due to overharvesting. The manufacture of coal gas for municipal lighting and heating systems was a mature industry in North America and Europe, and efforts to maximize the by-product yield of liquid oils through modification of the retort process and the choice of raw materials had become a rapidly expanding focus. Thanks in large part to state and provincial governmental surveys, knowledge of North American geology was improving rapidly. By the end of the 1850s a few hundred scientific publications had documented the natural occurrence of hydrocarbons or rocks suitable for coal-oil manufacture in 29 American states and 5 Canadian provinces (using modern political boundaries), with natural flows of petroleum or carburetted hydrogen (methane) gas reported from wells in at least 13 of them. Commercial production of oil at Enniskillen in western Ontario was already underway, initially from surface excavation and hand-dug wells. Even in the absence of the 1859 Drake well at Titusville or the proprietary Silliman report upon which it was based, it is likely that a play concept for petroleum exploration using wellbores would have arisen in the near future.

A hypothetical approach for exploration would have been initial literature research to establish which geographic regions were most prospective, based on the distribution and type of hydrocarbon occurrences, the quality and availability of published descriptions, and market access to population centers. The initial high grading would later have been followed by field research to locate local prospect areas for leasing and drilling. This paper will arbitrarily focus on how exploration priorities would have developed within North America, with the understanding that areas in Europe, the Middle East, Asia, and South America might have had similar promise.

Using these criteria, New York State would have ranked at the top, with geological documentation of petroleum at more than 20 locations, and with transportation corridors to metropolitan markets already in place. Ontario already had production from hand-dug wells at Enniskillen and several other shows to the north of Lake Erie, and would have been regarded as a western extension of the New York play area. Next on the priority list would have been the Ohio - (West) Virginia boundary area along the Ohio River, plus other locations scattered across Ohio, where petroleum and carburetted hydrogen gas were commonly associated with brine wells used in the salt manufacturing industry. Hydrocarbon indications in Kentucky were as good or better than in Ohio, but market access would been less convenient. California would have completed the top five, with the most prolific surface indications of petroleum for any state, but commercial exploitation would have been hampered by the low quality of its heavy bitumen, and its location remote from major North American markets.

Petroleum seeps associated with earthquakes and volcanic eruptions on other continents had been described on numerous occasions in the European literature, and a search for analogous occurrences in North America would have been prudent. Although volcanoes and earthquakes were uncommon to the east of the Rocky Mountains, bitumen flows were known to respond to earthquakes near Santa Barbara, California, and

petroleum had already been found in six states in direct association with igneous rocks. Bitumen shows within the Hartford rift valley of Connecticut/Massachusetts were less impressive than in higher ranked states, but the metropolitan location would have justified serious examination. Likewise, the Gaspé Peninsula and other areas along the St. Lawrence Seaway in Quebec would have been of interest due to the availability of marine transportation. Oklahoma would have attracted attention as the most prospective inland region west of the Mississippi River, with reasonable proximity to military establishments and transcontinental travel routes.

Although hydrocarbons had been identified in many other areas, they were generally of minor scale, of isolated occurrence, or in remote geographic locations, and would not have merited serious consideration. Sour Lake was the only publicized seep within the state of Texas or the Gulf Coast Region. The seeps on Oil Creek near Titusville were well known, even though they had been completely ignored by the state geological survey, but a decision to perform a serious study of northwestern Pennsylvania would more likely have resulted from its immediate proximity to the more prospective states of New York and Ohio.