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Robert Foulis (1796-1866): New Brunswick Inventor, Entrepreneur and Geologist

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See table of contents

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Article abstract

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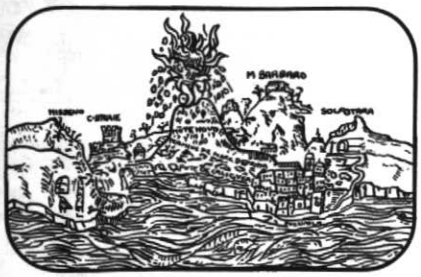

History of Geology

Robert Foulis (1796-1866): New Brunswick Inventor, Entrepreneur and Geologist

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Summary
Robert Foulis, like his contemporary Abraham Gesner, was an extraordinary man whose interest in natural science and invention led him down a rocky path. Unfortunately, both Foulis and Gesner met with frustration as they attempted to explore and exploit the geological riches of New Brunswick. The invention of an illuminating fuel distillation process and the right to mine albertite, a bitumen found at Albert Mines, New Brunswick, proved to be the bane of both men.

Introduction
In the story of early geological exploration in New Brunswick, one person has stood out as a brilliant, but beleaguered, man. Between 1838 and 1842, Abraham Gesner was employed as Provincial Geologist, the first such appointment in Canada. During this time, he published a series of reports (Gesner, 1839-1843) that documented the geology of the province in great detail. Zeller (1988) noted that Gesner's surveys were an inspiration to William Logan in his efforts to establish a Geological Survey for Canada. Gesner is also well known as the founder of the first public museum in Canada, which opened in 1842, and for his activities in the development of kerosene. He is hailed as the "inventor of the process of kerosene oil" on his tombstone, erected by Imperial Oil in 1933 (Barkhouse, 1980, p. 62). However, the Gesner story also includes a rather tragic tale of imprisonment for debt and legal battles which cost him his right to mine albertite, his source material for the production of kerosene. More recently, there has been evidence that Gesner was accused of plagiarism (Von Bitter, 1977) by C. Jackson concerning the publication of his *Remarks on the Geology and Mineralogy of Nova Scotia*.

While much of the Gesner story is known, many interesting questions remain unexplored. An interesting part of the Gesner story and of the early history of geological exploration in New Brunswick revolves around a relatively unknown contemporary of Gesner, Robert Foulis (Figure 1). Foulis and Gesner (Figure 2) had remarkably parallel careers in New Brunswick (Table 1) and their reported personalities certainly predisposed them to be adversaries. Both men had careers in Saint John where they pursued their geological interests in the midst of their other varied activities. Gesner and Foulis both lectured at the local Mechanics' Institute and were members of that society, both conducted geological surveys for the government, and both offered their services to mining companies as consultants.

Robert Foulis
Robert Foulis (pronounced Fowles) is an enigma. For over forty years, he was extensively involved with numerous commercial and scientific, including geological, activities in New Brunswick. Yet little is known, or understood, of his unique contribution to the early scientific and business development of the province. Like Gesner, Foulis died in poverty. Unlike Gesner, however, Foulis' many accomplishments have faded into obscurity.

Foulis was born in Glasgow, Scotland, on May 5, 1796, the son of Andrew Foulis. His grandfather Robert, and granduncle Andrew, were the founders of the famous Glasgow "Foulis Publishing House". Robert studied engineering under his aunt's son-in-law before moving to Belfast in 1816. He married Elizabeth Leatham, who died in childbirth in 1817. Distraught, he left his daughter Euphemia in the care of his aunt Euphemia, and set sail for North America, landing in Halifax in 1818 (MacKinnon, 1976).

Robert painted portraits and taught architectural drawing until he came to Saint John,

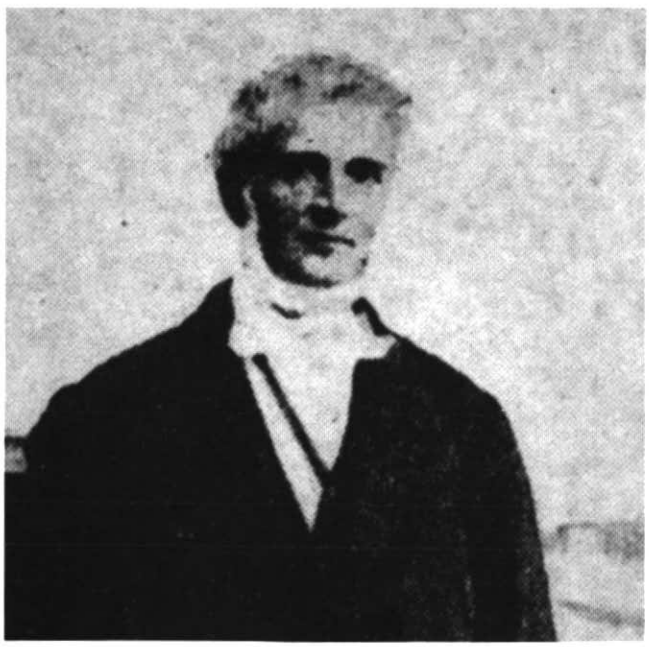

Figure 1 *Robert Foulis, 1796-1866, (Photo No. W5757a).*

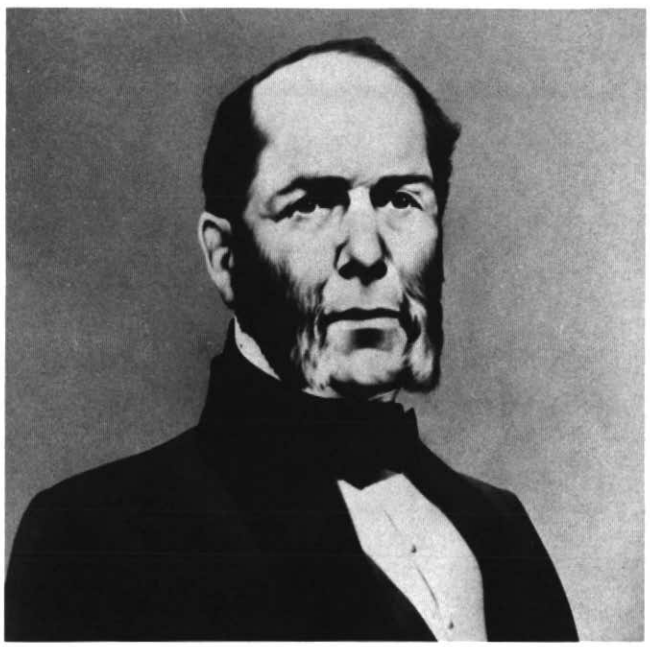

Figure 2 *Abraham Gesner, 1797-1864.*

in 1821, to solicit backers for his "Tide Machine" for saw mills. Although he indicated at this time that he was planning on returning to Halifax, Robert obviously saw enormous opportunities in Saint John for a man with his talents, energy and imagination. Foulis moved to Saint John the next year and lived there until his death on January 26, 1866.

A brief overview of his many career accomplishments will focus our blurred image of Foulis. In 1822, he was appointed a government land surveyor and, on behalf of the provincial government, surveyed land at the Negro Settlement at Black River in 1823. In 1826, he surveyed the upper reaches of the St. John River. Privately, he surveyed bridges and harbours, and was involved with chemical surveys for American and British companies. His survey of the St. John River must have sparked his interest in navigation, for he was involved with the construction of many of the early river steam boats, as well as the first Saint John Harbour ferry, the *Victoria*. He assisted in the design of the Sand Point Beacon Light, and he spent one year working as the engineer on the river steamer *Fredericton*. Foulis' greatest known achievement was his invention in 1859/60 of the world's first steam-operated fog alarm, situated on Partridge Island in Saint John Harbour. This invention resulted, in part, from his work with coal gas almost a decade earlier.

Robert Foulis' activities were not limited to solely navigation interests. He opened the Saint John Foundry in 1831. He also worked with R.C. Minnette in drawing plans for several Saint John streets in 1831. In 1838, he established a "School of Arts", which may or may not have led to the development of the Mechanics' Institute in Saint John. Certainly it helped to heighten the intellectual activity in the city, which led to the founding of the Mechanics' Institute (Hewitt, 1988) and perhaps also contributed to the later Natural History Society of New Brunswick (Miller and Buhay, 1988).

In 1846, he was partner in a daguerreotype studio and, in the same year, he exhibited "a splendid cockscomb" (*New Brunswick Courier*, Saint John, 29 August 1846) at the Horticultural Society Exhibition. He assisted in the painting of the Crystal Palace in the 1851 New Brunswick "Great Exhibition" and won first prize for his "basso - releivo" of James Watt (*The Morning News*, Saint John, 22 September 1851).

The list of activities goes on and on. Unfortunately, little physical evidence of Foulis' life has survived fires and family tragedies. Most of what is known of him has been extracted from newspaper reports and court documents. His daughter Euphemia sued him in 1862 for attempting to sell some of her property. Robert was always in debt for "He was constantly harassed by his creditors and sheriffs officers and constables were frequently at this house ... (Affidavit # 13, 22 Sept. 1862, Court of Equity Records, RG5, RS55, 1863, Provincial Archives of New Brunswick)". This could account for his varied business ventures, none of which seemed to have netted him much financial profit.

Foulis' Interest in Geology

In the course of his varied activities, this talented engineer, scientist and inventor made several contributions to geologic investigation in New Brunswick, beyond his obvious use of the mining industry to support his business enterprises. In 1826, Foulis surveyed the St. John River from Fredericton to Grand Falls for Sir Howard Douglas, lieutenant-governor of the province. While his report focussed on navigation, he included "a running summary of the chief kind of rocks, - gneiss, granite, trap, slate, limestone, etc., occurring along the river" (Ganong, unpub. manuscript, in prep.)

Surprisingly, there are only a few references to his interest in geology until late in his career, when he advertised that he could be "employed in examining by Chemical Analysis, or by Assaying, Mineral Ores, with a view to determine their economic value; also to make Geological Surveys of Localities where Mineral Deposits are supposed to exist... R.F. may be consulted at his Laboratory, Sydney-street, Queen's Square, where Mineral Specimens or Fossils may be left for examination." and "Gold-bearing quartz carefully examined, and the specific gravity of minerals determined" (Saint John Business Directory and Almanac for 1857, p. 210, published by C.A. Everett and Geo. W. Day, 1857).

Foulis also instituted a series of public lectures as early as 1823, with an emphasis on topics in chemistry. His own School of Arts highlighted "Mechanical and Experimental Philosophy" and his lectures at the Mechanics' Institute followed in the same vein.

> "Mechanics' Institute — Mr R. Foulis lectured last Monday evening, as previously announced, on *Terrestrial Magnetism*, and illustrated his subject with several experiments..." (New Brunswick Courier, Saint John, 1 January 1842).

Only one of his lectures at the Institute, given in 1852 and entitled "Geological Phenomena", dealt specifically with geology.

He undertook a geological survey of Five Islands in the Minas Basin of Nova Scotia for a London company and a survey of Grand Lake, New Brunswick for American speculators. He also did work for the Woodstock Iron Company and the Londonderry Mining Company in Nova Scotia. He advertised that he was a corresponding member of the Boston Society of Natural History and a member of the Royal Physical Society of Edinburgh, although he apparently did not publish results of his work in society journals.

In October 1861, Foulis won a "prize for ore of metals display and electrotyping" at the provincial exhibition (*The Morning News*, Saint John, 9 October, 1861). A year later, A.L. Spedon, in his travels through the province,

Table 1 Parallels in the careers of Robert Foulis and Abraham Gesner.

Career Profiles	
Robert Foulis	**Abraham Gesner**
• studied medicine	• studied medicine
• lived/worked in Halifax and NB	• lived/worked in Halifax and NB
• worked as a chemist	• worked as a chemist
• public lecturer	• public lecturer
• lecturer — Mechanics' Institute	• lecturer — Mechanics' Institute
• officer — Mechanics' Institute	• officer — Mechanics' Institute
• conducted geological surveys	• conducted geological surveys
• invented coal gas - patented	• invented coal gas - patented
• made gas for lighthouses	• made gas for lighthouses
• business interests in US	• business interests in US
• incorporated mining company with daughter	• incorporated mining company with son
• mining leases — Hillsborough	• mining leases — Hillsborough
• lost mining leases in Hillsborough	• lost mining leases in Hillsborough
• public criticized his work	• public criticized his work
• associated with Edward Allison — betrayed	• associated with Edward Allison — betrayed
• undertook court challenge — lost	• undertook court challenge — lost
• imprisoned for debt	• imprisoned for debt
• died in poverty	• died in poverty
• posthumously recognized as inventor	• posthumously recognized as inventor
• Historic Sites & Monuments Board recognition	• Historic Sites & Monuments Board recognition

spent an evening with Foulis and friend William Murdoch. Spedon described Robert as having a "peculiar taste and talent for geology and chemistry — a real palaeontologist...he led us into his scientific "*Sanctum Sanctorum*" — a sort of geological grotto — where lay shelved in accurate order innumerable specimens of an *ancient* antiquity; and their names he could rattle off as fast as did Burns' "Bauld Apothecary". Indeed I felt deeply interested in the geological comments that the old gentleman gave us, and, also, in the vast varieties of fossils and strangely-figured stones, &c., that he had carefully collected and treasured up; and with more than the fondness of a parent did he seem to foster these immortalized existences — the divine interpreters of an inhabited world, myriads of ages anterior to the Adamic era." (Spedon, 1863, p. 94). Unfortunately, Foulis' collection of "ancient antiquity" has not survived and a search is presently underway for any of his writings, especially on geological topics.

Foulis, Gesner and Albertite

While Foulis is known for his invention of the world's first steam-operated fog alarm (MacKinnon, 1976), it is this alarm that actually provides us with the clearest picture of his geological work. It also reveals a period in his life highlighted by business ventures, professional disappointments and conflicts with Abraham Gesner.

In 1850, Foulis purchased five mining leases in Hillsborough, Albert County, for the purpose of mining coal and albertite to use in his numerous projects. Over the next decade, his fortunes with these leases rose and fell. His daughter, Euphemia, also purchased a mining lease at Dorchester, Westmorland County, in 1855. Foulis' early interest in Albert County coal was for the manufacture of gas, which he patented in 1852 as his "Illuminating Gas Apparatus". He had demonstrated his invention the previous year:

> "Mechanics' Institute — Last evening, Mr Foulis delivered a highly interesting and instructive lecture on *Gas Illumination*, in which he lucidly explained the history, the principles, and productive process of that important modern utility; ... Mr F. introduced to the notice of his audience a simple, but very ingenious apparatus, invented by himself, for the *domestic manufacture* of gas; ..." (*The Weekly Observer*, Saint John, 8 April 1851).

He then converted the Partridge Island lighthouse in Saint John to gas and, in 1853, supervised the construction of his gas retort on the island. In 1854, he hired William Murdoch, lately arrived from Paisley, Scotland, to work as his gas maker.

While working at the gas plant, he conceived the idea of using a steam whistle as a fog alarm. His earlier work with river steamers was useful here. Although the steam fog alarm is outside the scope of this paper, it is a matter of record that Foulis' plans were pirated. The alarm was built by Vernon Smith and patented in the United States by a man named Dobell (Partridge Island Research Project, fog alarm file). Foulis gained recognition, but not financial reward, in 1864 when the New Brunswick Legislature recognized the validity of his claim.

It was this early work in Hillsborough that brought him into direct conflict with Abraham Gesner. In fact, Foulis went so far as to state in 1851 that "I tried the Hillsborough bitumen for the production of illuminating gas long before Dr. Gesner came into the Province!!!" (Gas Monopoly, Halifax, 1851, Public Archives of Nova Scotia). In 1846, Gesner had re-discovered albertite (Figure 3), a dark brown to black bitumen found in the Mississippian Albert Shale, and had begun to use it as a source for the production of kerosene (Barkhouse, 1980). Gesner has long been recognized as the inventor of the distillation process for the extraction of kerosene and for his use of albertite. In 1852, Gesner became embroiled in a famous legal battle against the Albert Mining Company over the right to mine albertite, a case which focussed partly on the nature of albertite. Gesner argued that albertite was not a coal and therefore not included in coal mining leases. Geologists and tradesmen lined up on both sides of the controversy. Some, like Dr. Benjamin Silliman of Yale, defended the view that albertite was coal while others, including Joseph Leidy, argued it was a bitumen. Gesner not only lost the court case, but the jury ruled in favour of albertite as a coal (Barkhouse, 1980).

Foulis' assertion of having used albertite more than ten years earlier creates questions concerning Gesner's "discovery" of albertite for use as an illuminating fuel. Gesner apparently knew of the Hillsborough bitumen when he first came to New Brunswick in 1837, but appears not to have remembered it, or realized its usefulness, until 1846, when he was called to identify a recent exposure of the material. Gesner had only just that year demonstrated kerosene to an audience in Charlottetown (Barkhouse, 1980).

Foulis was in partnership with Edward Allison, Alexander Wright and the Cairne brothers and played a significant role in Gesner's troubles with both the Halifax Gas Light Company and the court case of Gesner *versus* Cairnes and the Albert Mining Company in 1851. In his defence against the Halifax Gas Light Company, Gesner quoted from a series of handbills and placards written by "your scribbler and coadjutor "Robert Foulis" ". Gesner claimed the "statements put forth in your defamatory Foulis handbills to be untrue" and "Not the least significant of these means have been the publication, republication and distribution of scandalous slips of paper signed "Robert Foulis"". Gesner devoted considerable space in his publication, *Gas Monopoly* (*Gas Monopoly*, Halifax, 1851, Public Archives of Nova Scotia), to ridiculing Foulis and repudiating Foulis' claims.

While it is known that the Halifax Gas Light Company came out on the winning side, Foulis did not. He tried to mine his leases in Albert County until the late 1850s when he had a parting of ways with his partners Allison and Wright, a parting by means of "fisticuffs" (*Morning Freeman*, Saint John, 26 February 1859). Foulis lost this argument, and the next four years saw him leave the mining fields, go blind with cataracts and begin a tough fight to gain recognition for his fog alarm invention. He died in poverty in 1866 at the age of 71.

Very little information about the activities of Foulis is available, but ongoing research may resolve some of the questions regarding his claim concerning his early use of

Figure 3 *Specimen of Albertite, NBME 1113 (hammer handle 30 cm long).*

albertite. There is no doubt that the activities and interests of both Foulis and Gesner overlapped, and that the expertise of each might have led to the exploitation of albertite for illumination. While this would probably not change Gesner's status as the inventor of kerosene oil, it might shed additional light on the complex dealings surrounding the albertite "controversy". Gesner has long been an important figure in the history of the geological sciences in eastern Canada. Certainly, Robert Foulis must be counted among the significant influences guiding the development of this new science in early nineteenth-century New Brunswick.

Acknowledgements
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