

Early History of the Natural Gas Industry, Fredonia, New York*

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Abstract

Gas shale plays have been the focus of much recent scientific and international media attention; yet it is important to bear in mind that the advent of the natural gas industry in the first half of the nineteenth century involved production from an Upper Devonian black shale and occurred in the village of Fredonia, New York. The first commercial well was drilled along the banks of Canadaway Creek, Fredonia, most likely in late spring/early summer of 1825 (rather than the oft erroneously cited 1821), by gunsmith William Aaron Hart. A contemporary account published in the Fredonia Censor declared that the “hole was drilled 27 feet into a slaty rock.” By August of 1825, several stores and a mill along the creek were illuminated by natural gas that Hart was accumulating in a crude gasometer. As Hart's wells declined, Preston Barmore of nearby Forestville, New York, who had attended Fredonia Academy, the forerunner of the State University of New York at Fredonia, from August 1847 until spring 1851, and was related to Hart by marriage, convinced several Fredonia businessmen to invest in the newly formed Fredonia gas Light and Water Works Company. During late summer 1857, the 26-year-old Barmore drilled two wells along the Canadaway Creek, less than a mile north of Hart's well location. Not satisfied with the gas flow from one of the wells, Barmore, who appears to have understood the importance of fractures as conduits of gas migration through shale, decided to induce artificial fractures as a means of stimulating the well. Barmore ignited eight pounds of gunpowder at a depth of 122 ft depth which, as the Censor put it, “was followed by a plentiful supply of gas.” In essence, Barmore had successfully fracture-stimulated a shale gas well. He used lead pipe to conduct gas from the well head to an eight-sided gasometer erected in the center of Fredonia. By December of 1858, the first of many gas burners had been placed in downtown Fredonia, and Barmore was contracted by the village to install a number of street lamp posts. Further, natural gas usage was being metered at this time at a cost of \$4.00 per

1000 CF. Preston Barmore passed away at the early age of 30, likely a victim of alcoholism. It is only recently that we have come to realize the advanced level of scientific and engineering thought that he applied in the nascent days of natural gas exploration.

EARLY HISTORY OF THE NATURAL GAS INDUSTRY, FREDONIA, NY

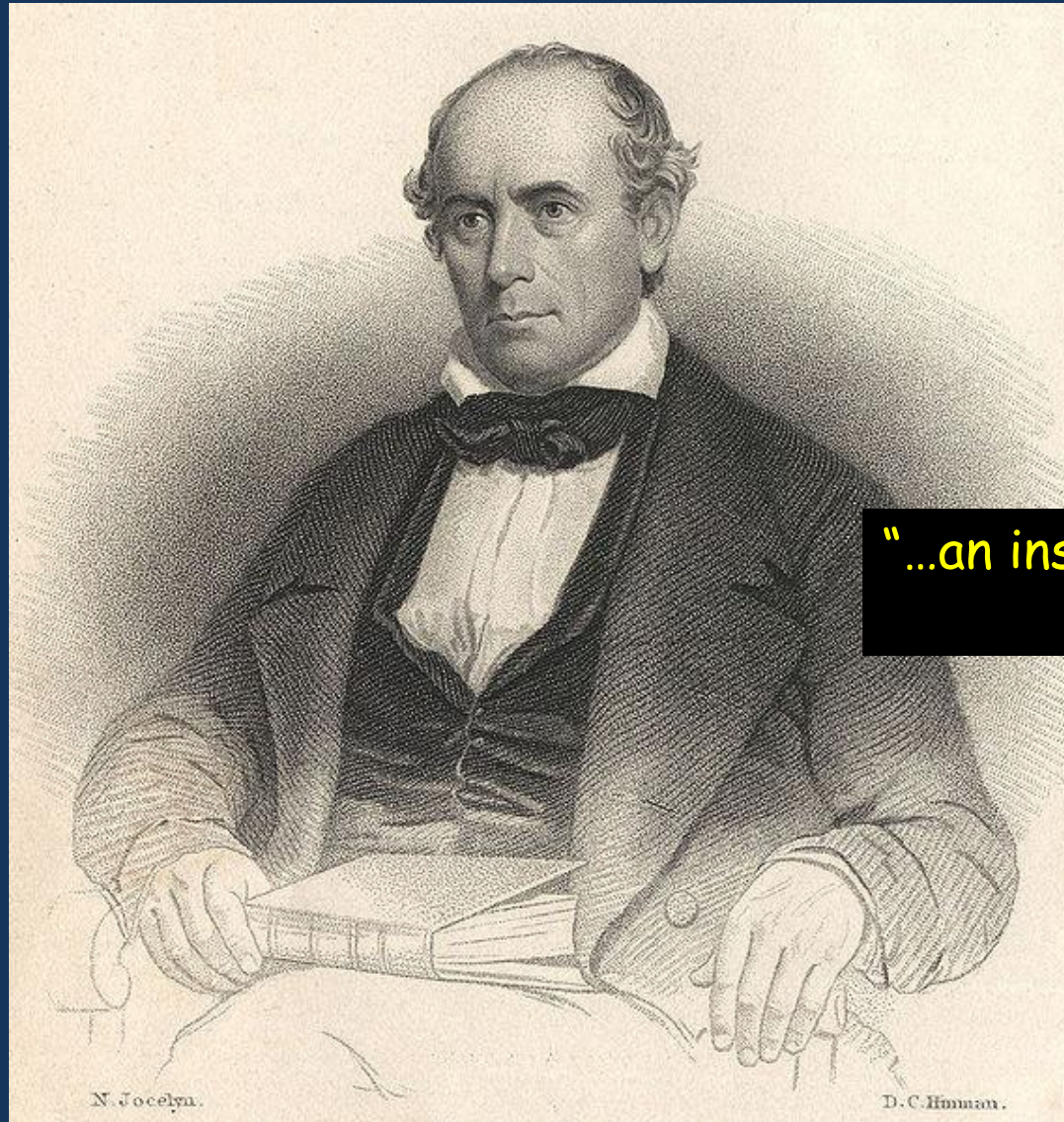
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SUNY Fredonia
Fredonia, NY, 14063



THIS SITE OF THE FIRST GAS WELD
IN THE UNITED STATES
LOCATED
BY ROBERT G. L. LAMBERTSON VISIT
FEB. 4, 1945
PLACED BY ROBERT G. LAMBERTSON
CAPTAIN OF THE AMERICAN EXPEDITION
TO THE ARCTIC

downtown Fredonia, NY

Elisha Mitchell



...geologist and chemist,
University of North
Carolina at Chapel Hill...

... studied under chemist
Benjamin Silliman at Yale...

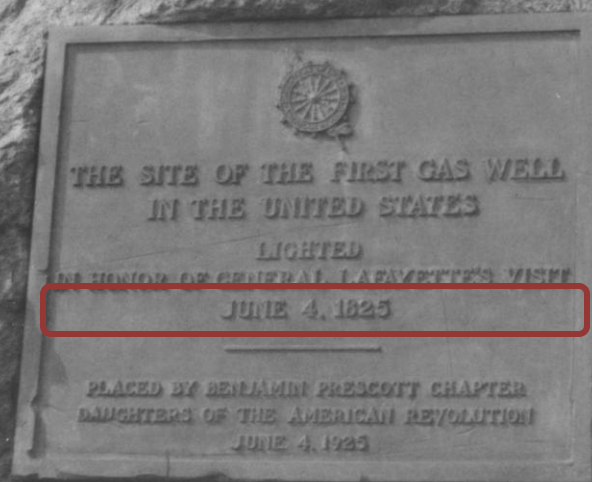
"...an instance unparalled on the face
of the globe..."

...site of first commercial gas well ... drilled by local businessman and entrepreneur **William Hart**...



...but when was it drilled?...





THE SITE OF THE FIRST GAS WELL
IN THE UNITED STATES

LIGHTED

IN HONOR OF GENERAL LAFAYETTE'S VISIT

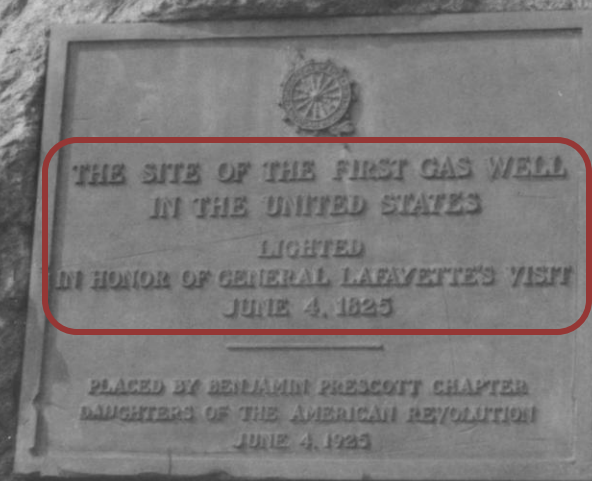
JUNE 4, 1825

PLACED BY BENJAMIN PRESCOTT CHAPTER
DAUGHTERS OF THE AMERICAN REVOLUTION
JUNE 4, 1925

June 4, 1825



...General Lafayette's 1825 passage through Fredonia was linked with the gas well...



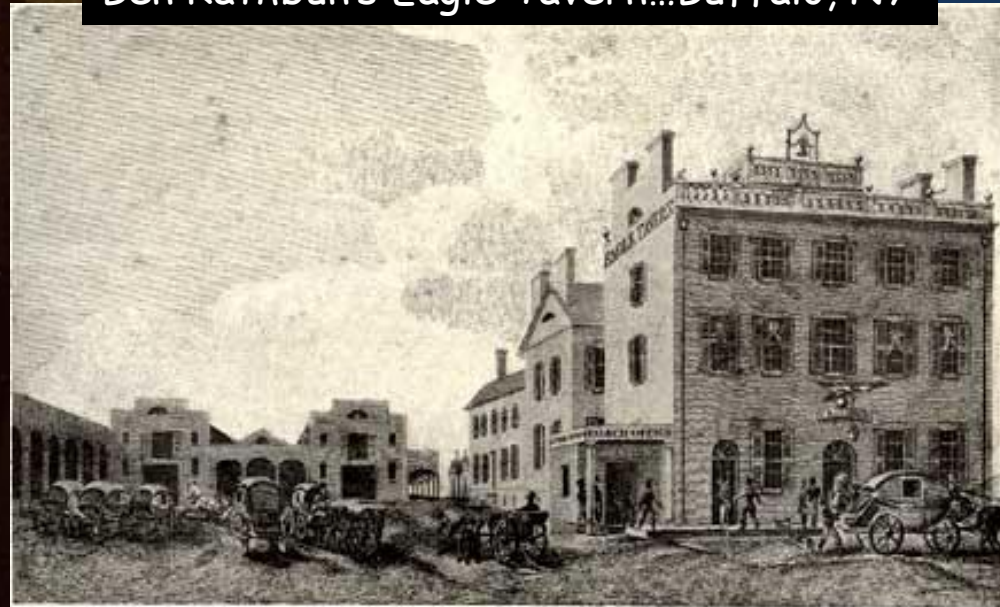
... a celebration of the centennial of General Lafayette's appearance
in Fredonia and the lighting of the gas well ...

... June 1925 ...



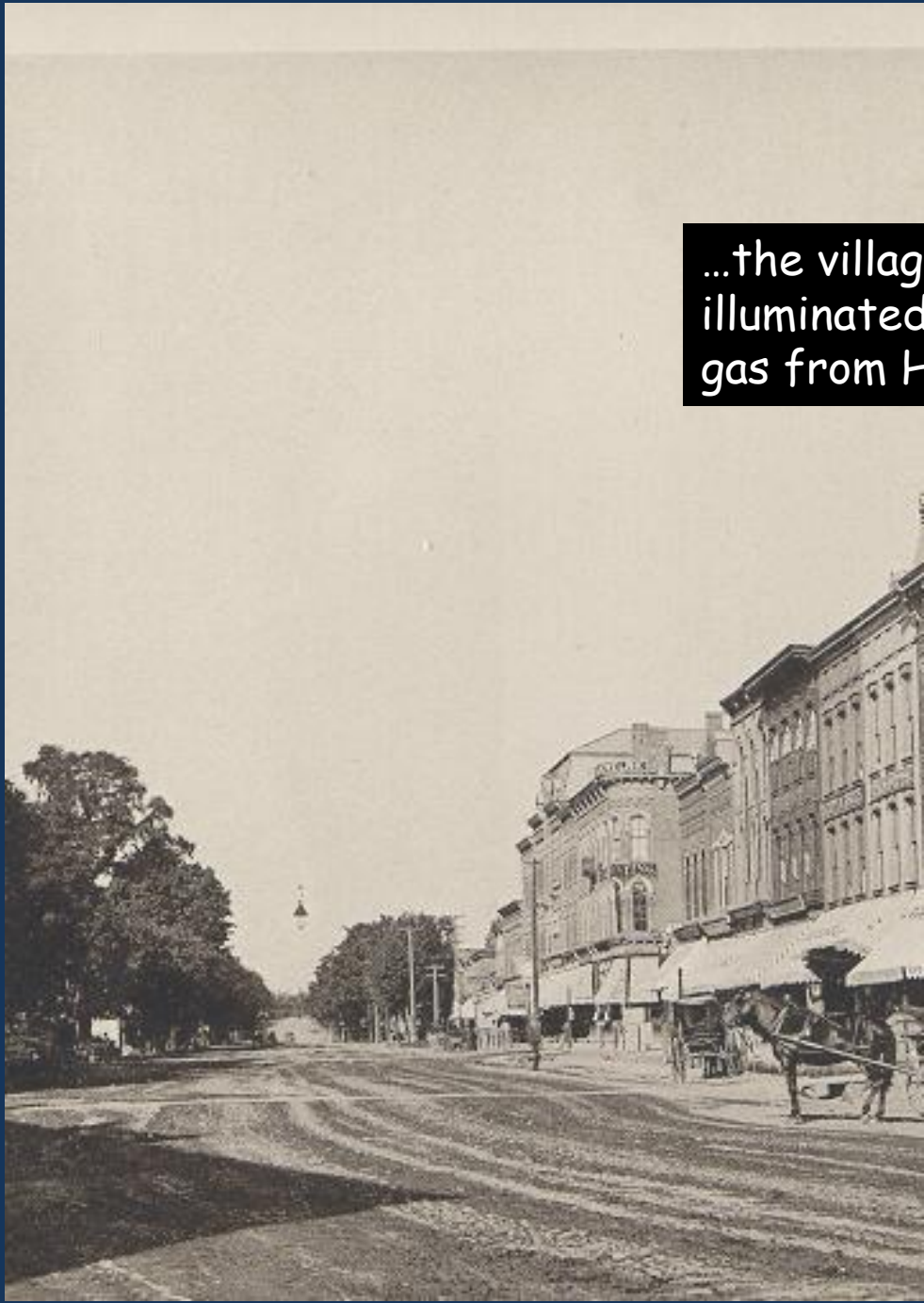
Marquis de La Fayette...visited Fredonia in the summer (June 2-3) of 1825 on his way to Buffalo...

Ben Rathbun's Eagle Tavern...Buffalo, NY



RATHBUN'S EAGLE TAVERN AS IT WAS IN 1825.

FROM AN ENGRAVING OF THAT DATE BY BARBON, CLARK & CO., ALBANY, AFTER A DRAWING BY GEORGE CATLIN.



...the village of Fredonia was allegedly illuminated by the light generated by natural gas from Hart's well...

...one problem...

...first documentation of Hart's well is found in the **August 31, 1825**, issue of the *Fredonia Censor* ...

...almost three months after Lafayette's visit to Fredonia...

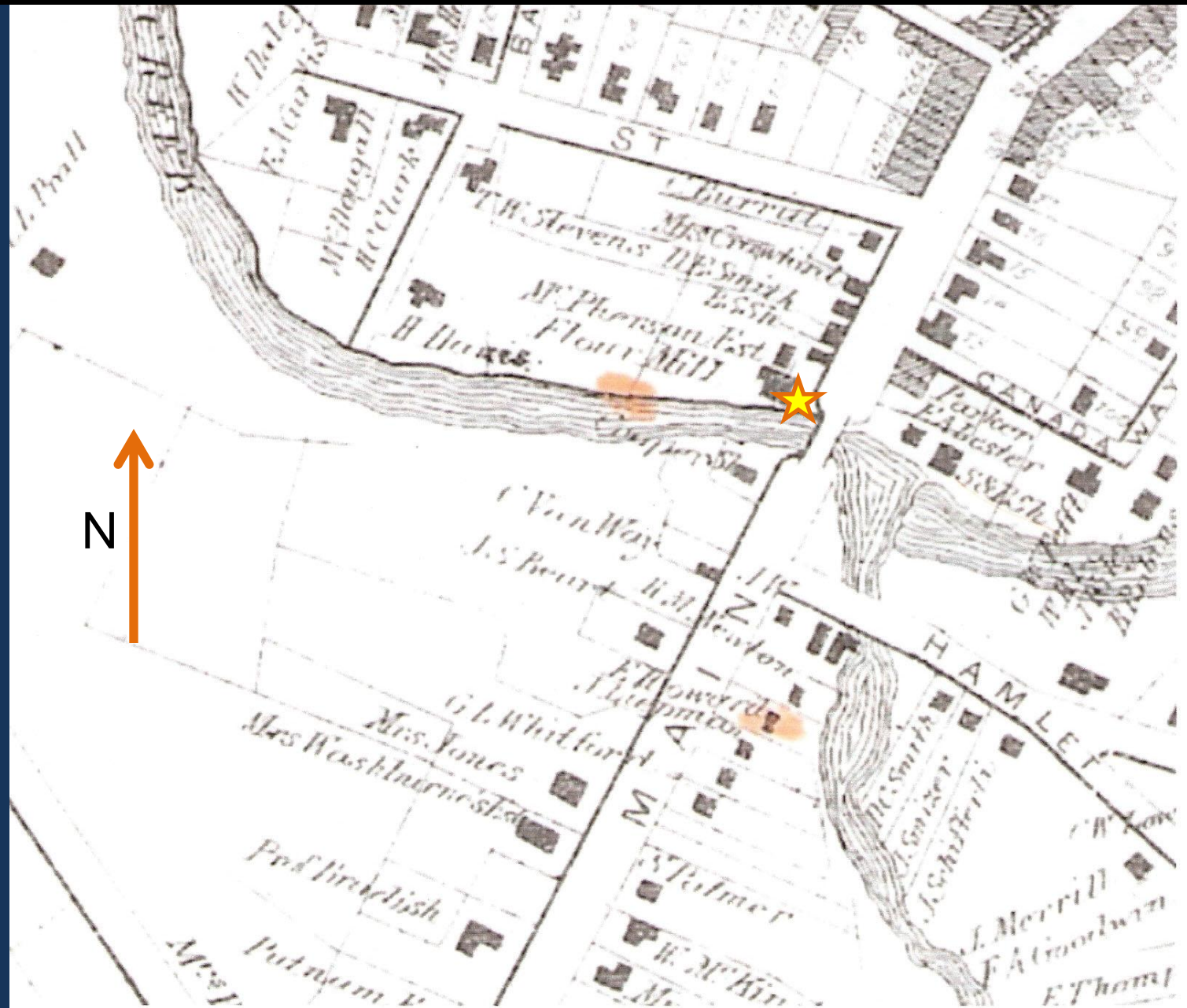


...northeast bank of Canadaway Creek...

...Hart "drilled" his well late in the summer of 1825...



...how did Hart know where along Canadaway Creek in Fredonia to drill the well?...





... Canadaway Creek ...

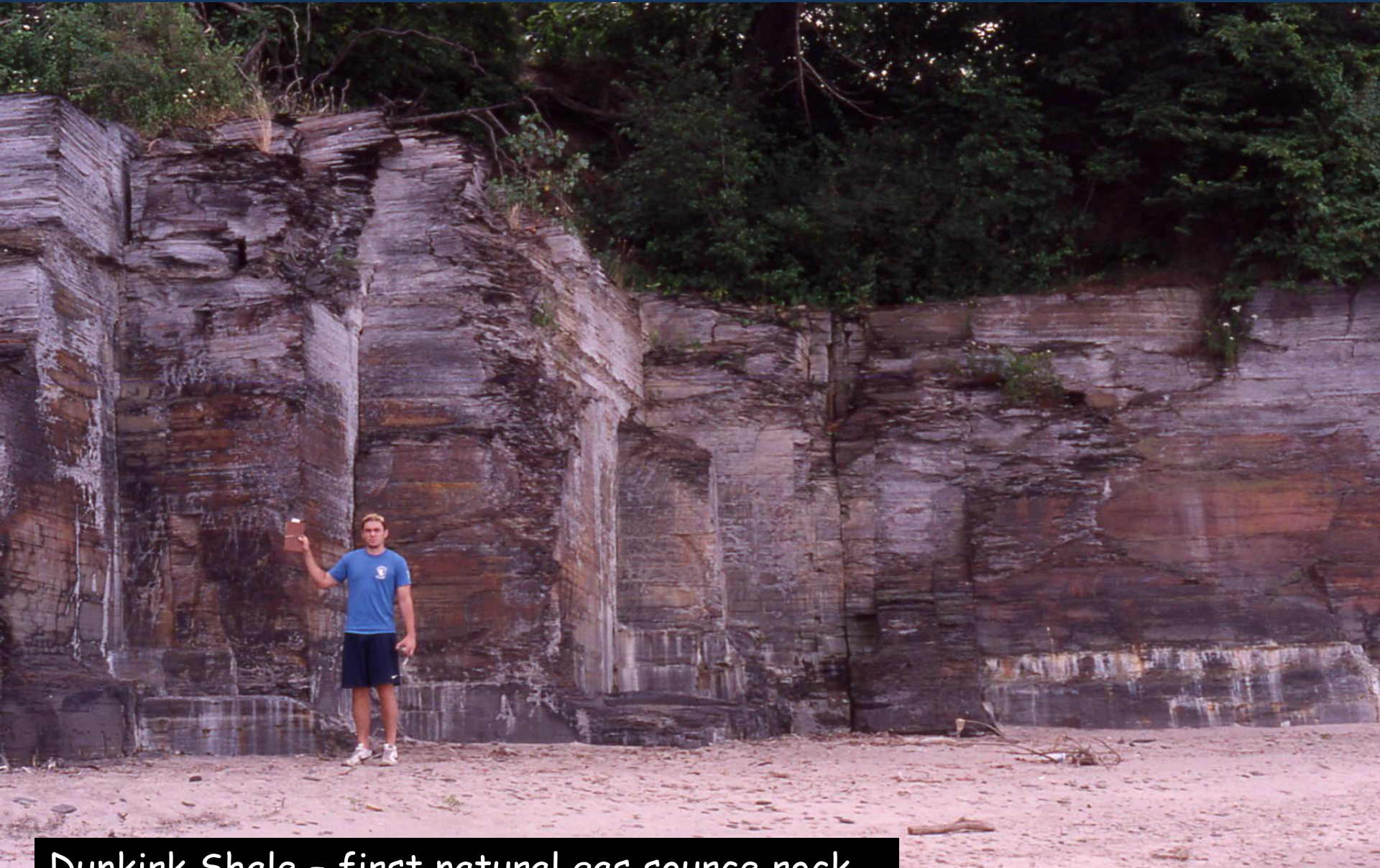
...gas seep...



...Eternal Flame - Boston, NY (Rhine Street Shale)...

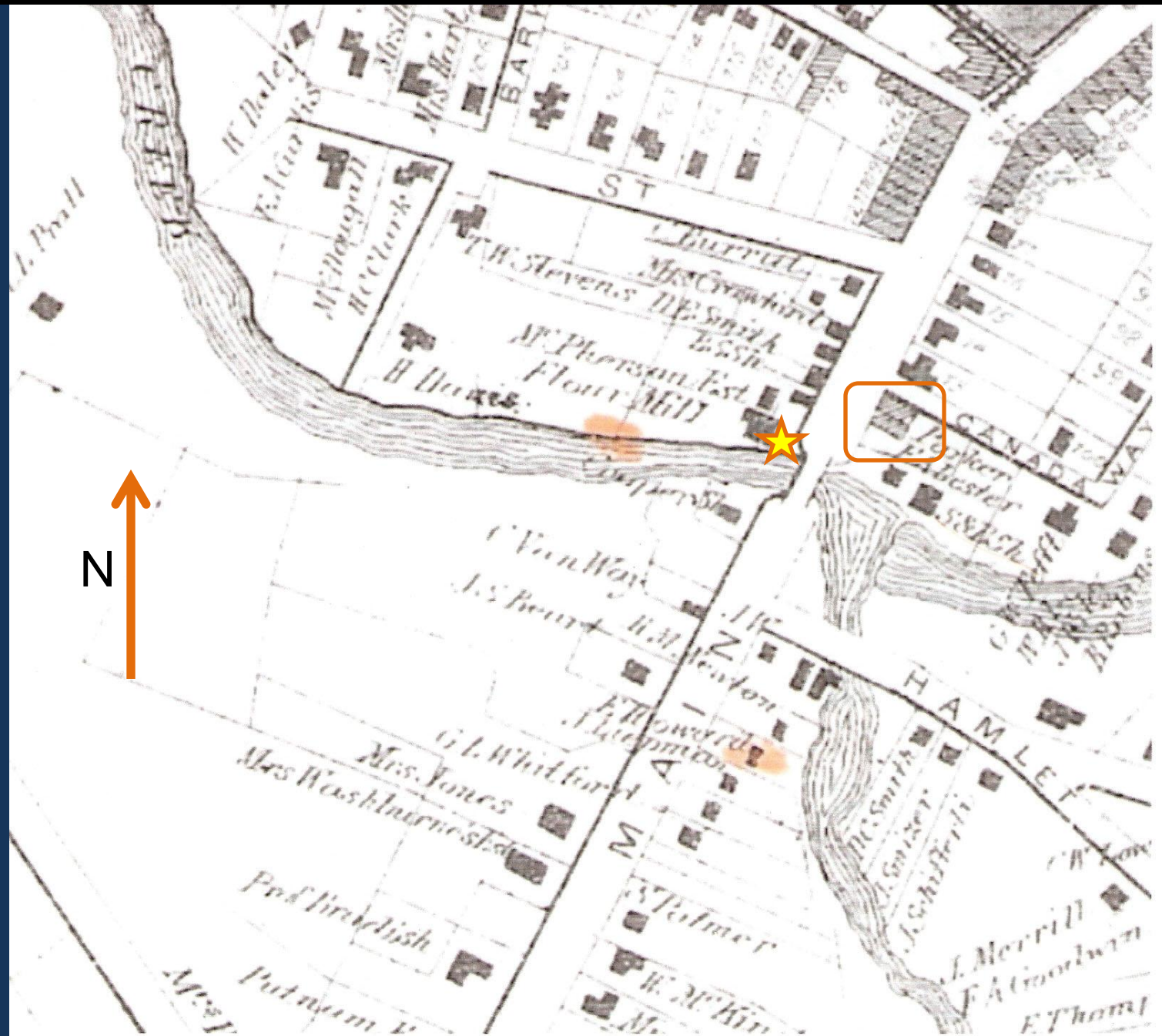


...Hart's well was drilled 27 feet into shale...

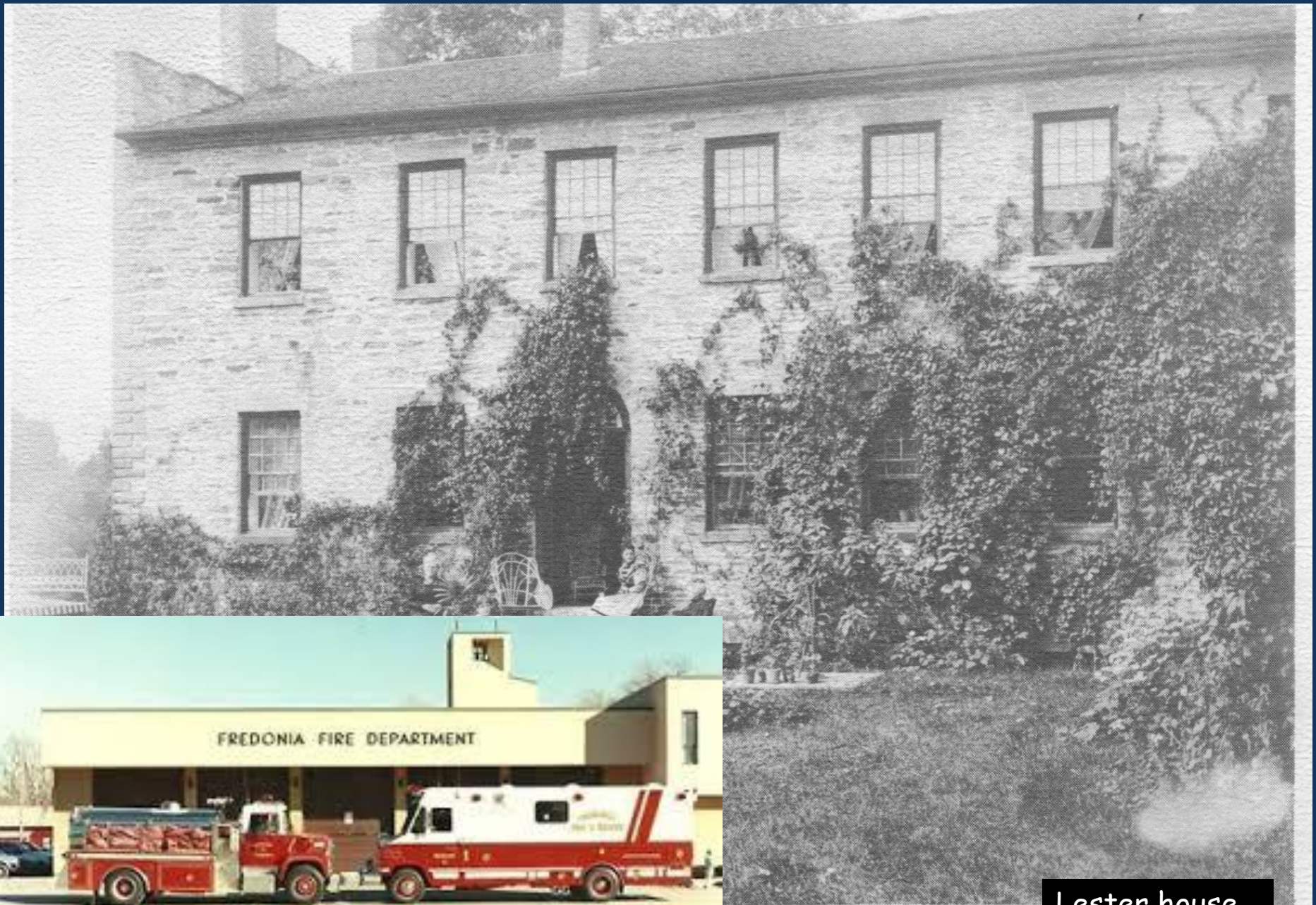


Dunkirk Shale - first natural gas source rock...

A historical map of a neighborhood in New York City, showing streets, buildings, and a river. A yellow star marks a location on the riverbank, and an orange square marks a location on a street. A north arrow is present on the left side. The map includes labels for streets such as "ST", "CANADA WAY", and "HAMLET". Building owners are listed, including "Mrs. Stevens", "Mr. Person", "Flour Mill", "C. Van Way", "J. S. Peart", "H. M. Z", "J. Howard", "J. Chapman", "G. L. Whitford", "Mrs. Jones", "Mrs. Washburn", "P. H. French", "Putnam", "S. Palmer", "W. M. Kin", "J. C. Smith", "J. G. Gaiser", "J. Schifferlin", "J. L. Merrill", "F. A. Goodwin", and "E. Thom". The river is labeled "C. R. R. R." and "C. R. R. R.". A north arrow points upwards on the left side.



... the gas was used for illumination by Christmas 1825...



Lester house...

TRAVELS
IN
NORTH AMERICA,
IN THE YEARS 1841-2;
WITH
GEOLOGICAL OBSERVATIONS
ON
THE UNITED STATES,
CANADA, AND NOVA SCOTIA.

~~~~~  
BY CHARLES LYELL, ESQ., F.R.S.

AUTHOR OF THE PRINCIPLES OF GEOLOGY.  
~~~~~

IN TWO VOLUMES.

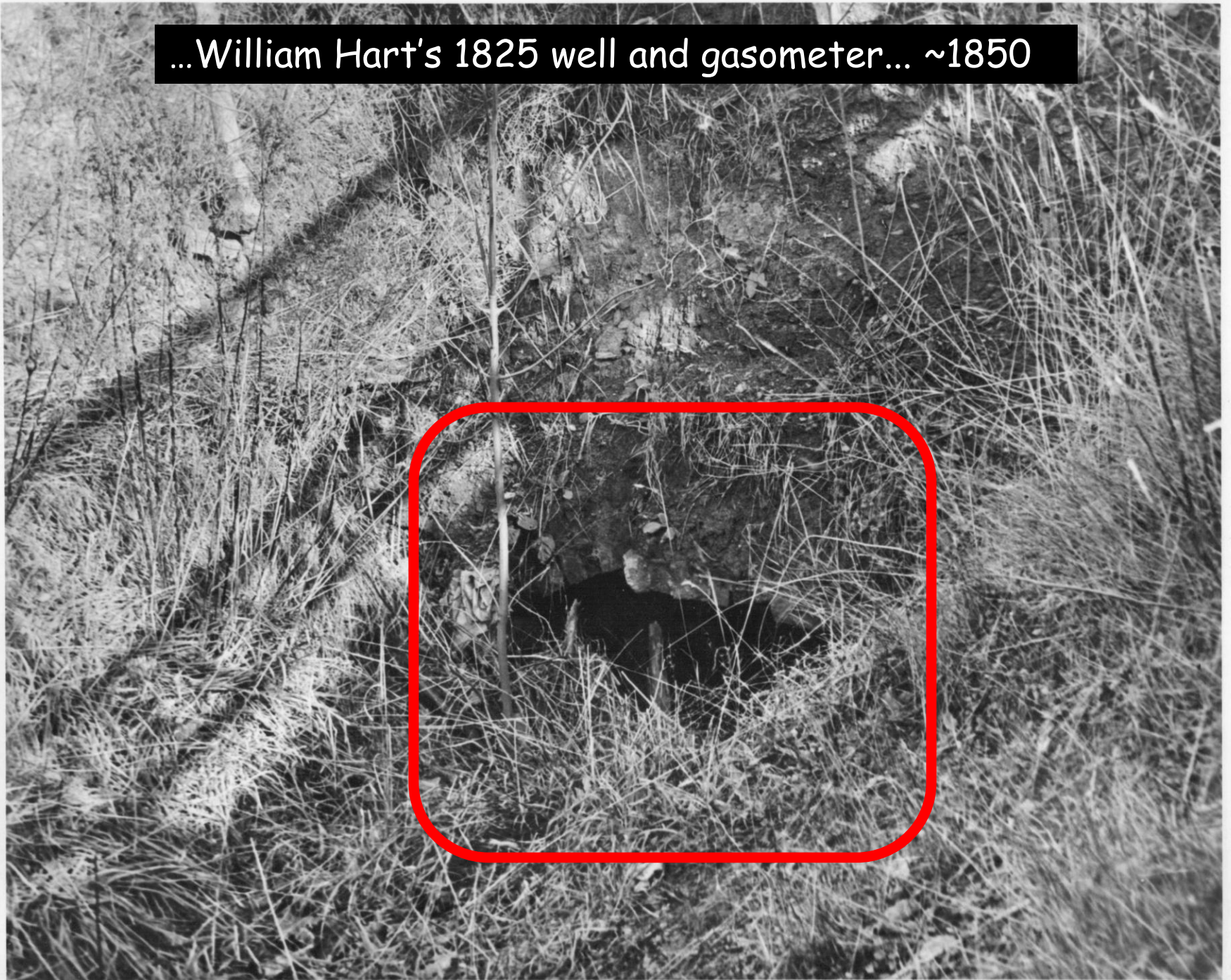
VOL. II.

NEW-YORK:
WILEY AND PUTNAM, 161 BROADWAY.
1845.



June 5.—Sailed in a steamboat to Fredonia, a town of 1200 inhabitants, with neat white houses, and six churches. The streets are lighted up with natural gas, which bubbles up out of the ground, and is received into a gasometer, which I visited. This gas consists of carburetted hydrogen, and issues from a black bituminous slate, one of the beds of the Hamilton group of the New York geologists, or part of the Devonian formation of Europe. The lighthouse-keeper at Fredonia told me that, near the shore, at a considerable distance from the gasometer, he bored a hole through this black slate, and the gas soon collected in sufficient quantity to explode, when ignited.

...William Hart's 1825 well and gasometer... ~1850



...Hart's well was in decline in the 1850s...



The first gas well in the shadow of the West Main Street bridge. Image courtesy of the O. R. Barker Museum.

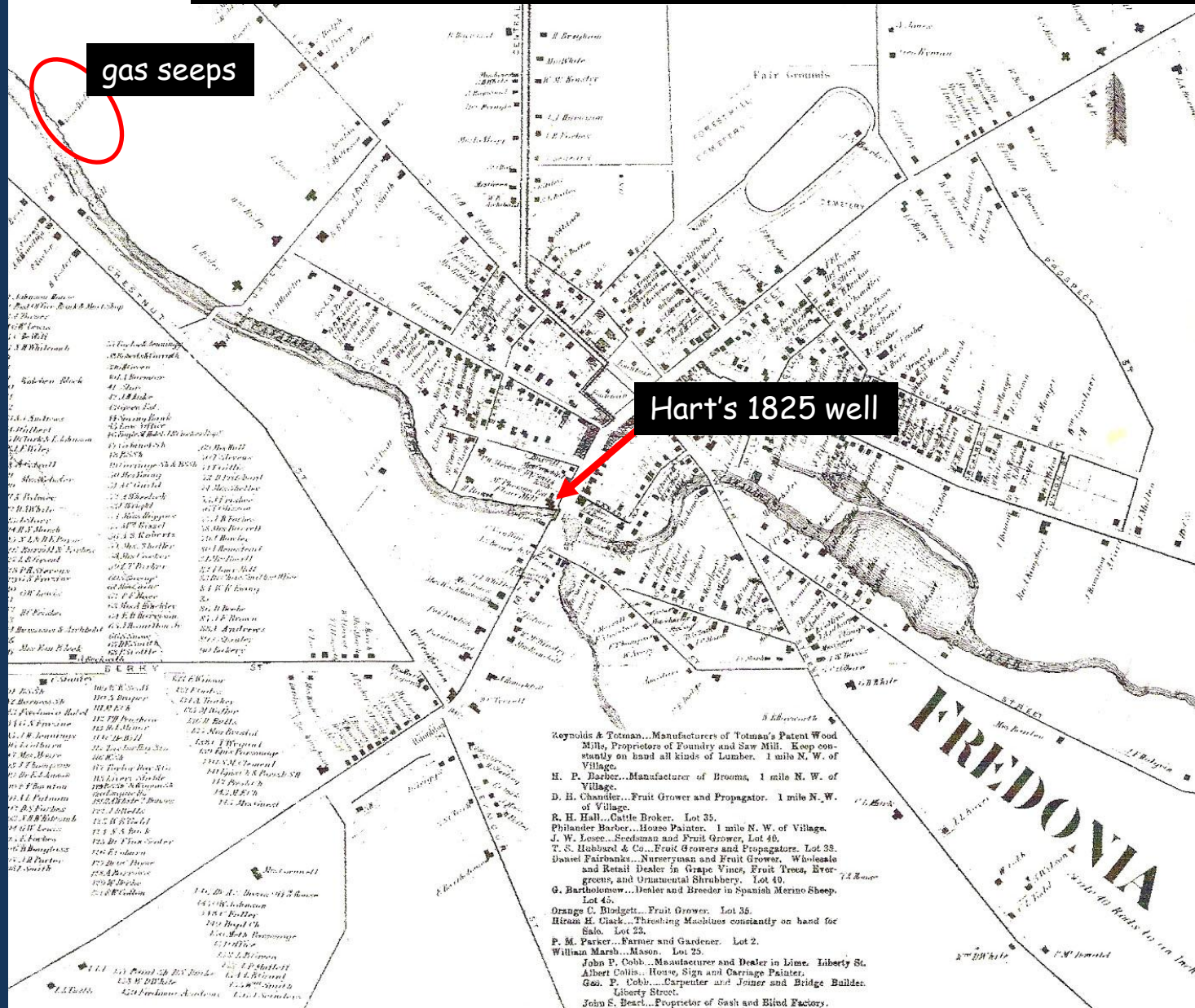
Preston Barmore ... born 1831 ...



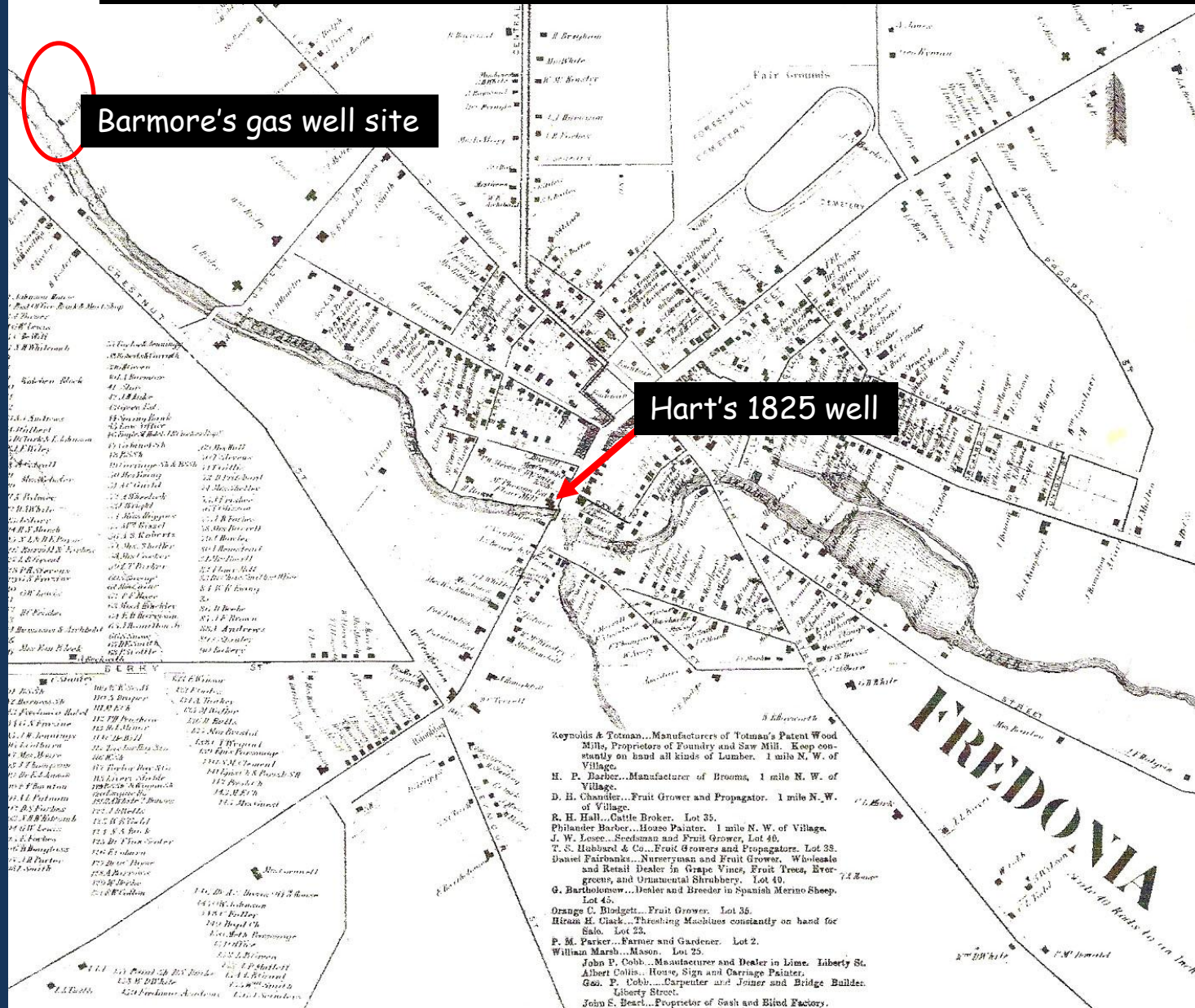
...Fredonia Academy (forerunner of SUNY Fredonia)...

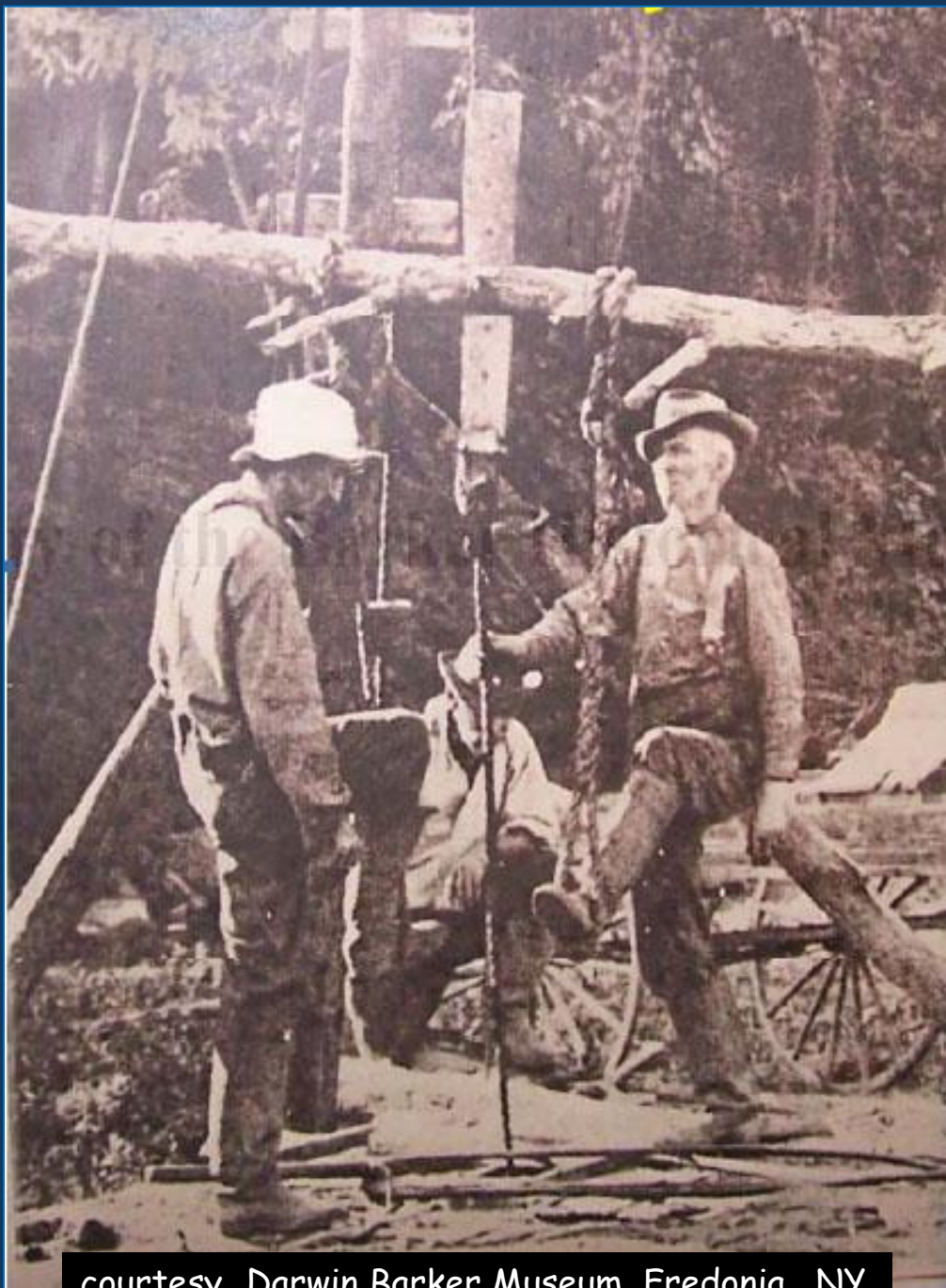


-1835 report of the New York State Geological Survey described abundant natural gas seeps about one mile northwest of Hart's gas well location;



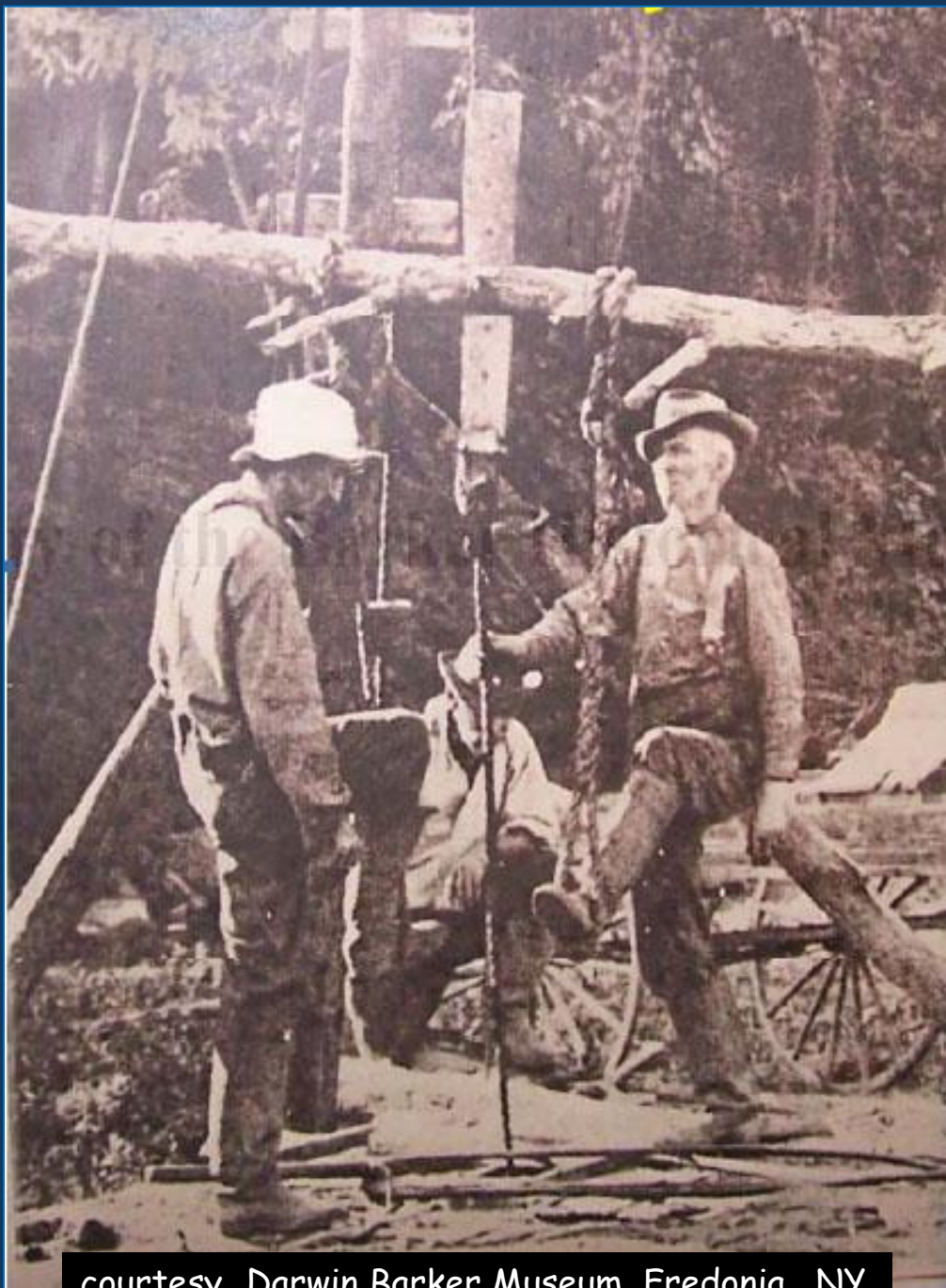
-in 1857, Barmore, with the backing of Elias Forbes, purchased a small parcel of land on the east side of Canadaway Creek on which to drill two gas wells;





"kicking down" the 1857 gas well...

courtesy...Darwin Barker Museum, Fredonia , NY



...the first well failed
to produce gas...

courtesy...Darwin Barker Museum, Fredonia , NY

...Barmore must have recognized the fractured nature of the bedrock...

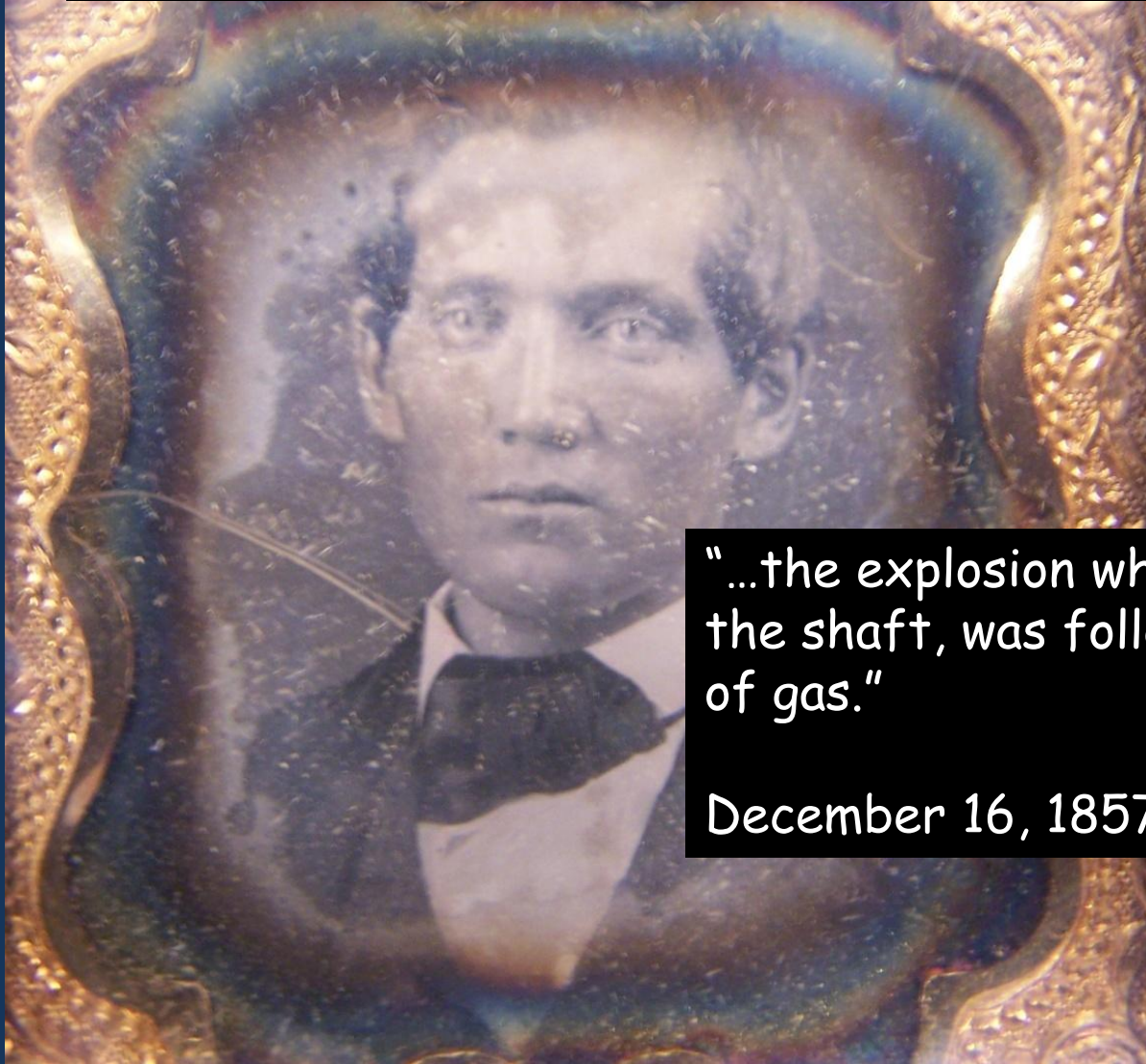


...he realized that gas flows from cracks (fissures) in the shale...



...in the fall of 1857 Barmore fraced the well with 8 pounds of gunpowder at a depth of 122 feet (the Dunkirk Shale).....

...the first recorded fracture stimulation of a gas well ... almost two years before the Drake well came in...



"...the explosion which expelled the water in the shaft, was followed by a plentiful supply of gas."

December 16, 1857, *Fredonia Censor*

...where was the gas coming from ... deep or shallow source? ...

fraced again at 85 feet...

...the first recorded staged frac...



Barmore's wells

Barmore's gasometer

Hart's 1825 well

Reynolds & Toman...Manufacturers of Toman's Patent Wood Mills, Proprietors of Foundry and Saw Mill. Keep constantly on hand all kinds of Lumber. 1 mile N. W. of Village.

H. P. Barber...Manufacturer of Brooms, 1 mile N. W. of Village.

D. H. Chandler...Fruit Grower and Propagator. 1 mile N. W. of Village.

R. H. Hall...Cattle Broker. Lot 35.

Philander Barber...House Painter. 1 mile N. W. of Village.

J. W. Loe...Seedman and Fruit Grower. Lot 40.

T. S. Hubbard & Co...Fruit Growers and Propagators. Lot 38.

Daniel Fairbanks...Nurseryman and Fruit Grower. Wholesale and Retail Dealer in Grape Vines, Fruit Trees, Evergreens, and Ornamental Shrubbery. Lot 40.

G. Bartholomew...Dealer and Breeder in Spanish Merino Sheep. Lot 45.

Orange C. Blodgett...Fruit Grower. Lot 35.

Hiram H. Clark...Threshing Machines constantly on hand for Sale. Lot 23.

P. M. Parser...Farmer and Gardener. Lot 2.

William Marsh...Mason. Lot 25.

John P. Cobb...Manufacturer and Dealer in Lime. Liberty St.

Albert Collins...House, Sign and Carriage Painter.

Geo. P. Cobb...Carpenter and Joiner and Bridge Builder. Liberty Street.

John S. Beal...Proprietor of Gash and Blod Factory.

FREDONIA

Barmore's gasometer ... pre-January 1964



Center St., Fredonia

Barmore's gasometer ... post-January 1964



lead pipe used to conduct gas from Barmore's wells to the gasometer and from there, throughout the village...





Fredonia Trinity Episcopal Church

first metered use of natural gas; December 1858...

...\$4.00/1,000 cubic feet...

...Preston Barmore ... realized the importance of fractures to the successful recovery of natural gas from shale in the late 1850s...

...he demonstrated an especially advanced level of scientific reasoning ...



Summary

-upstream and downstream side of the natural gas industry started in Fredonia...

-upstream -

where is the natural gas concentrated?

what controlled the movement of natural gas through the rocks?

-downstream -

natural gas storage and distribution
metering natural gas usage

-Preston Barmore -first petroleum engineer...

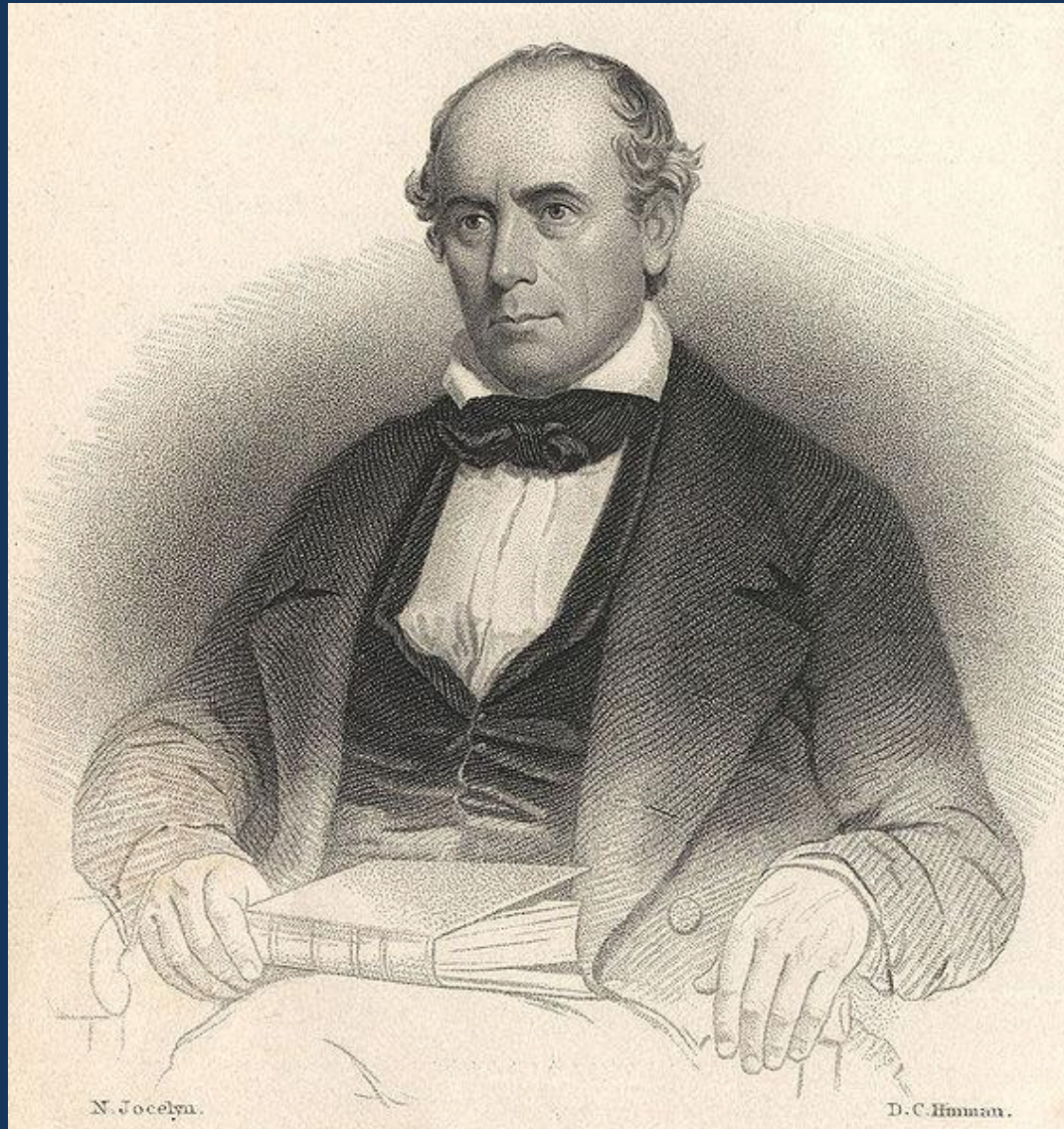
-eventually worked in the NW Pennsylvania oil fields...

-died in 1862 at the age of 30...

-forerunner to SUNY Fredonia - instrumental in the establishment of the early natural gas industry...

Elisha Mitchell

"...an instance unparalled on the face of the globe..."





"Hail! Hail! Freedonia!"