

AV The Oil and Gas Industry in the Empire State: Past, Present and Future

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Abstract

New York has supplied many firsts for the oil and gas industry: the first natural gas well, the first natural gas company, the first geological survey, and the first state-chartered energy R&D organization. The article reviews the historical context of resource development in New York State, the current state of the industry, and the direction it is likely headed in the future.

Natural gas and oil seeps have been documented for thousands of years. In the “~~aw~~ world,” the first documented seeps occurred in what is now New York, with written records of oil and gas seeps in the state dating back to 1627. It was at one of these seeps that in 1821, William A. Hart drilled a 27-foot-deep natural gas well. This was the first successful well that was intentionally drilled to obtain natural gas. Records show that this was his second attempt, giving him credit for the first dry hole as well.

Early industry activity followed the typical boom-bust cycles. Peak oil production reaches 6.7 million barrels of oil in 1882 and stands as New York’s record year. Natural gas, however, has gone through a number of cycles as new targets were discovered and exploited. Technology has always played a role and both secondary oil recovery and natural gas storage were pioneered in the oil and gas fields of New York in the early 20th century.

Currently, natural gas production in New York is resurgent. Technology and favorable market forces have caused a three-fold increase in natural gas production in the 21st century. And shale, which started it all in 1821, is now the rage. Opportunity has once again focused the industry’s attention on New York.

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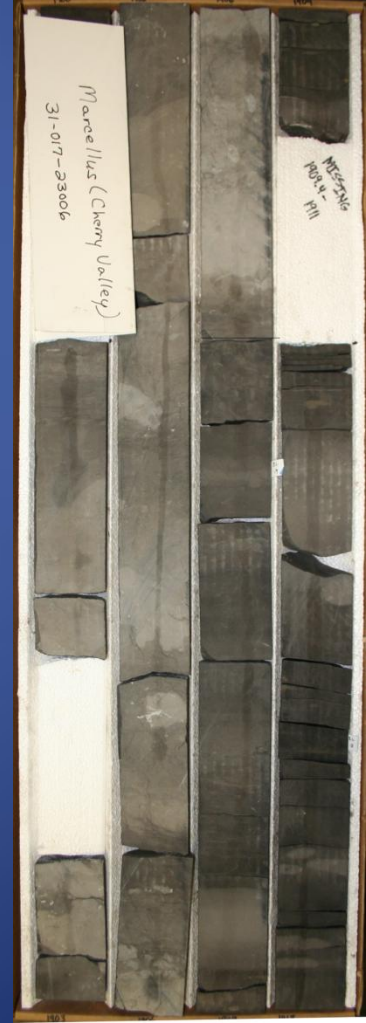
The Oil and Gas Industry in the Empire State: Past, Present and Future

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New York State Energy Research and
Development Authority

April 11, 2010

Outline

- Early History
- “Boomtown” New York!
- Exploring New Opportunities: Is the “Boom” Back in NY?
- Concluding Thoughts



Early History



Oil and Gas in the New World

- Hydrocarbons known to the natives prior to the arrival of Europeans, called “Anonontons”
- Oil seep near Cuba, NY visited in 1627 by Father de la Roche d’Allion: first record of hydrocarbons in the New World, event documented in the publication *Histoire du Canada* by Sagard (1632).
- In 1669, explorer La Salle reported a natural gas seep near Canandaigua, Ontario County, NY

Roadside Marker, Cuba, NY.



A New Nation's First Gas Well: The William Hart Natural Gas Well, Fredonia, NY: 1821

In 1821, the first gas well was dug in Fredonia,
Chautauqua County, New York.

The Hart Well, originally 27 feet and deepened
to 70 feet, was drilled at the site of a gas seep.
The well produced until 1858.

The Hart Well's "Driller's Report"*

- Edward Howard, a mill owner, set out to drill a water well to appease his wife.
- Mr. Howard sunk the first well using an iron rod (a proto-impact bit), the Howard #1, with the assistance of his neighbor William Hart who was a gunsmith.
- After a show of gas, the tool broke off and the well had to be abandoned.
- William Hart remained curious about the bubbling gas and set about drilling a second well (Howard #2) using a spring-pole drilling rig but at 30 feet he found little gas and quit – the first dry hole.
- On his third attempt, the Hart Well, he hit gas at 27 feet but deepened the well to 70 feet where it flowed.
- His first customer was a nearby hotel and subsequently a lighthouse.

Barcelona Lighthouse: First to be Illuminated by Natural Gas in 1830



The lighthouse, built in 1829, was abandoned in 1859, one year after the Hart Well.

Hart's Legacy: The Birth of Petroleum Geology and Engineering

- Drilled the first well specifically designed to find hydrocarbons (created *petroleum geology*)
- Also drilled the first “dry hole” (created *petroleum engineering*)
- Developed a crude gas meter (“gasometer”)
- Built the first natural gas pipeline
- Started the first natural gas distribution company by virtue of selling his gas



**There's a rock and plaque,
so it must be true!**

Photo credit: Gary Lash

First Geological Report on Natural Gas from the Fredonia, NY Area - 1830

- Published in the January, 1830, edition of *American Journal of Science and Arts*, edited by Professor Benjamin Silliman, the Yale University chemist/ geologist (first to distill petroleum).
- Discussed the geological conditions present (noted that there was no coal) and seems to find primarily “**fetid limestone,**” actually the **Upper Devonian Dunkirk Shale** rather than a limestone.

Statue of Silliman at Yale
Photo: Yale.edu





“Boomtown” New York!



New York's First Oil Wells

- Three dry holes drilled from 1860-1861 on the Seneca Reservation by Jonathan Watson & Company (oil was discovered on the reservation right near one dry hole).
- First “recorded” well drilled on the John T. Moore farm (completed July, 1860). The well struck oil but not in commercial quantities.
- Other wells were drilled over the next few years had shows of oil but none went into commercial production.

NY's First "Commercial" Oil Well:

- Job Moses organized the Hall Farm Petroleum Company to drill near Limestone in Carrollton Township, Cattaraugus County.
- Discovery well, Job Moses #1 was completed November, 1865, at a depth of 1,165 feet and cost \$7,000.
- Location near the shore of a creek was selected based on the belief that a "river of oil" flowed beneath the surface of streams.
- It was the Bradford sands.
- The rig, made of white pine, remained in place until 1882.

Image: *New York's Natural Gas and Oil
Resource Endowment: Past, Present and
Potential*, NYSERDA



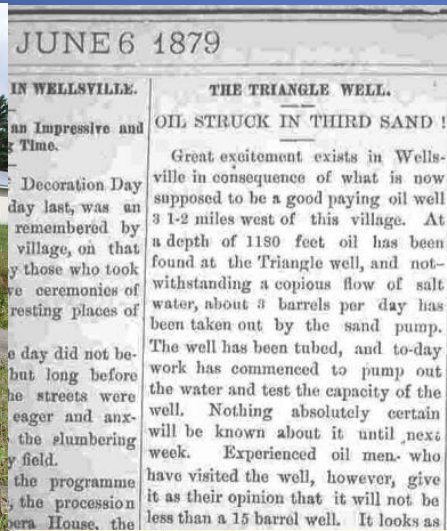
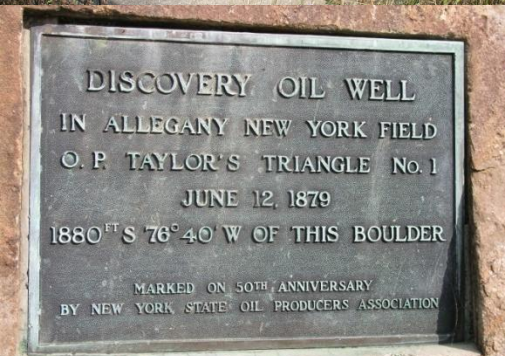
New York's First BIG OIL Man was *NOT* John D. Rockefeller but Orville P. Taylor

- Born in Virginia but educated in Attica, NY
- First worked with the railroads
- Shipwrecked in the Caribbean for 22 days in 1858.
- Worked on a railroad in Brazil (befriended the Emperor)
- Served in the Confederate Army 1861-1865 (wounded at Bull Run).
- Moved back to NY in 1870 and began manufacturing cigars
- Logically, entered the oil business in 1877



O.P. Taylor's Allegany County Wells

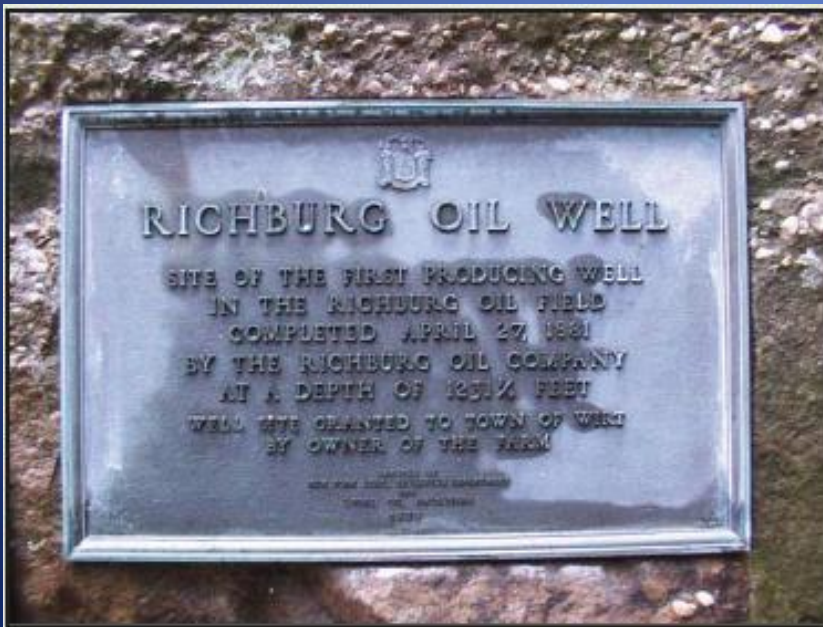
- From 1877 to 1879, he drilled 3 dry wells.
- Noted in his obituary: At this time he was **“distrusted by all except a few tried friends.”**



- In 1879, he drilled the Triangle #1 which flowed 10 barrels/day oil (the first flowing well).
- On April 27, 1881, his syndicate hit a well in the village of Richburg, NY.

An Oil “Boomtown” in New York: The Story of Richburg

- Population January 1, 1881: 180
- Oil discovered April 27, 1881.
- Unfortunately, Mr. Taylor died two years after the discovery.

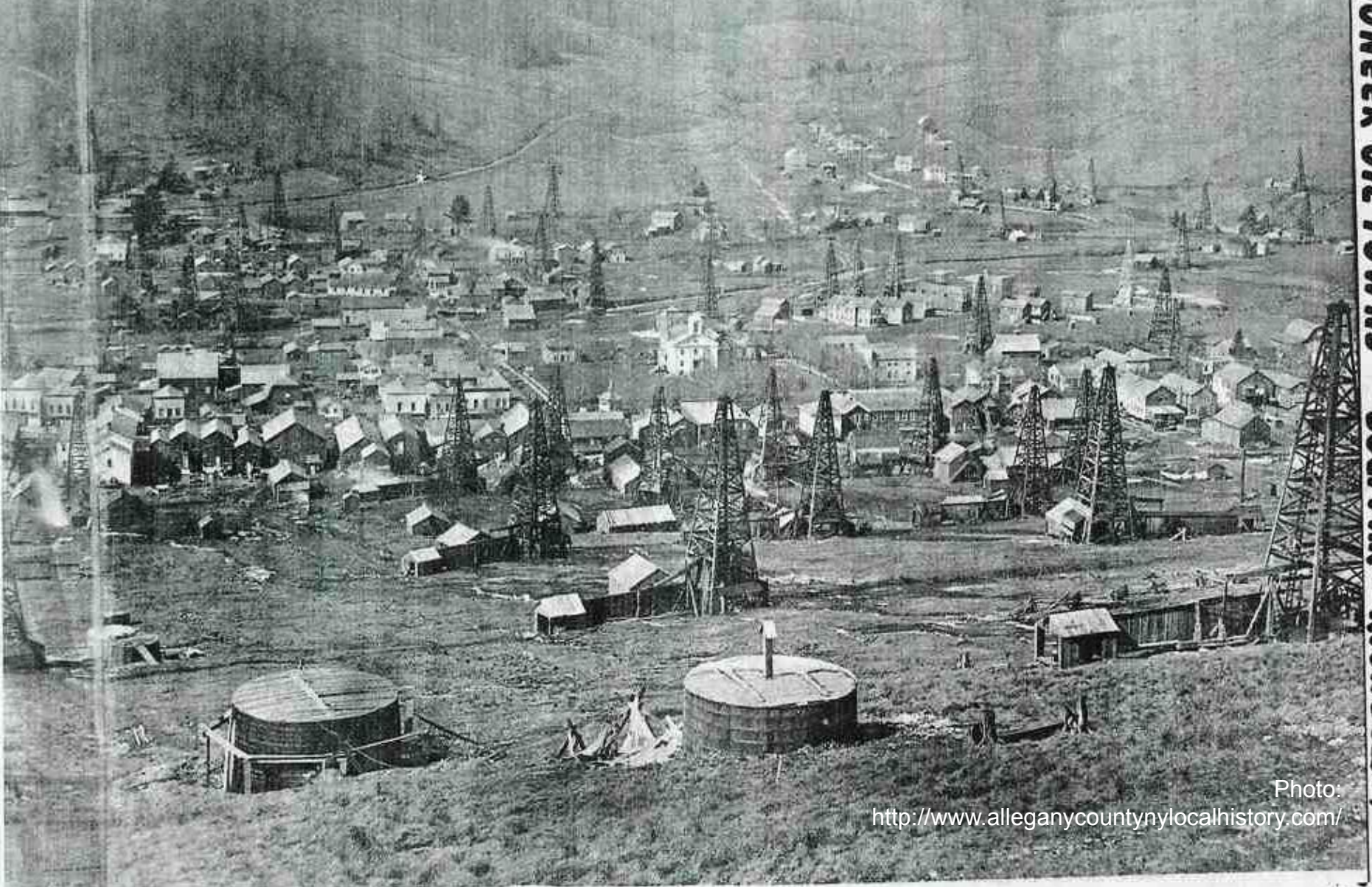


Richburg, NY's "Year of Glory"

"Within nine months, Richburg had a population of about 7000, two banks, two narrow-gauge railroads, a morning, an evening and two Sunday newspapers, telegraph and telephone service, fifty-six hotels and boarding houses, twenty-four saloons and restaurants, two bottling works, two faro banks, seventeen wholesale and retail grocers, eleven oil well supply stores, eight laundries, nine livery stables, four nitroglycerin dealers, five drug stores, five clothing stores, two iron and tool works, two hose companies, two express companies, twelve lawyers, nine doctors, four jewelers, four milliners, five policemen, three justices of the peace, two opera houses, seven billiard parlors, a skating rink, and more than twenty bagnios, including one for colored clientele. And the salary of the postmaster had increased from \$137 to \$1600 a year."

(Herrick, *Empire Oil*, 1949)

Richburg Oil Field – circa 1882



**PIONEER OIL TOWNS
BOLIVAR - RICHBURG,**

Photo:
<http://www.alleganycountynylocalhistory.com/>



Landman? →

From Boom to Bust

By January, 1882, there were more than 5,000 residents and 550 operating wells producing 10,000 barrels of oil per day. New York State led the world in oil production in 1882.

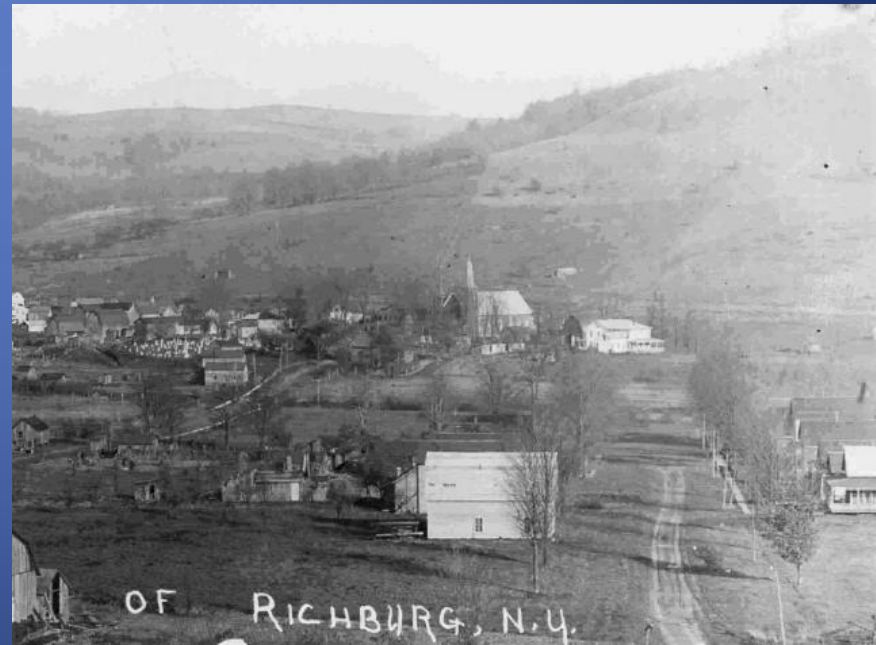
<http://www.alleganycountynylocalhistory.com/TownVillageReservation/TownWirt/TheEffectOfStrikingOil/StrikingOil-Richburg.htm>

“The census for 1890 credited Richburg with a population of 374-the smallest village in the state.”

Herrick, *Empire Oil*, 1949

Richburg, NY after the “boom.”

Photo : www.alleganycountynylocalhistory.com



Enter the Professional Geologists

- **Charles A. Ashburner**

Born in Philadelphia in 1854 and educated at the University of Pennsylvania. Worked primarily with the Pennsylvania Geological Survey. Died at 36 in 1890. His obituary ran 7 pages in the American Philosophical Society.

- **Irving P. Bishop**

Educated at Cornell University and held a professorship at what is now Buffalo State (SUNY) for many years (the college named Bishop Hall after him). Did significant work of western New York.

Ashburner's Contribution

- First comprehensive look at NY's oil and gas sector published in the transactions of the American Institute of Mining Engineers, 1888:

“...it is surprising that the State Geological Survey, which has done so much good work in the advancement of paleontological and geological science, has never made a practical report on the stratigraphy of the State, or published geological county maps, both of which would have proved of inestimable value to oil-, gas-, and other mineral explorers...”

- Described the process of exploration in a scientific way, including a geologic map of south-central NYS.

Writing on Petroleum Geology and the Business of Exploration:

Ashburner on “Speculation” in 1888

An excerpt from the first comprehensive look at NY’s oil and gas sector published in the *Transactions of the American Institute of Mining Engineers*, 1888. Ashburner discusses a folly by a group of Philadelphia investors to find gas in **southeastern NY and northeastern PA**:

utilized. If I am correctly informed of the location of this territory, a careful systematic drilling of two or three wells under the direction of an engineer and geologist experienced in the occurrence of natural gas, for the entire property, with a small expenditure of money, would no doubt settle the question of the existence of natural gas in commercial quantity; whereas it is currently reported that the company had expended, up to December, 1887, between \$40,000 and \$50,000 in drilling wells without having arrived at any practical conclusion as to whether it is possible for any gas to exist under its territory.

Bishop's Contribution

- Bishop began reporting to the NYS Geological Survey in the mid-1890s and these reports are included in the Survey's Annual Reports into the early 20th century.
- He surveyed most drilled wells and recorded stratigraphic information and production data creating an excellent record.

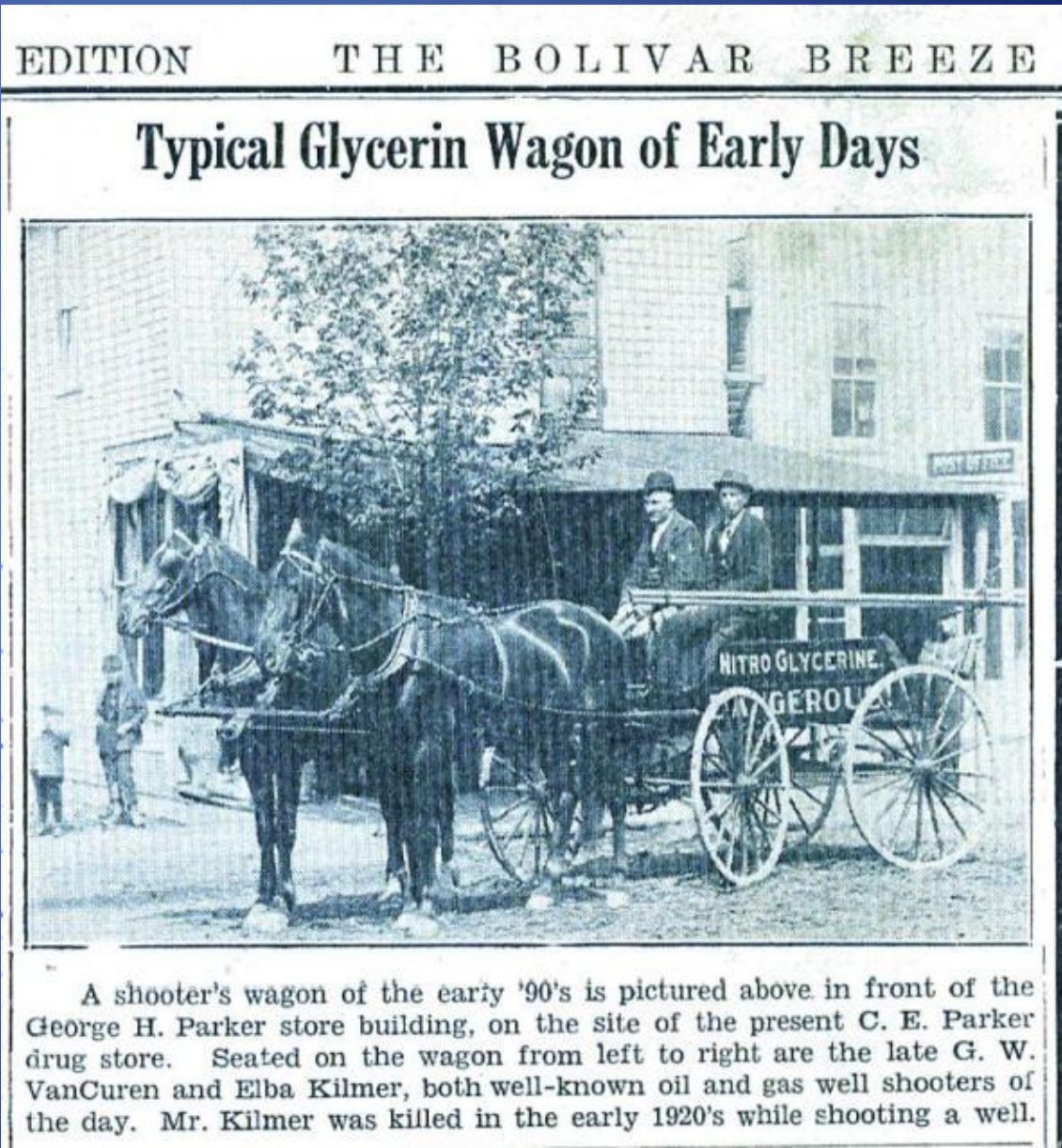
A Typical Record from Bishop's Reports

New York State Museum, 51st Annual
Report, 1897

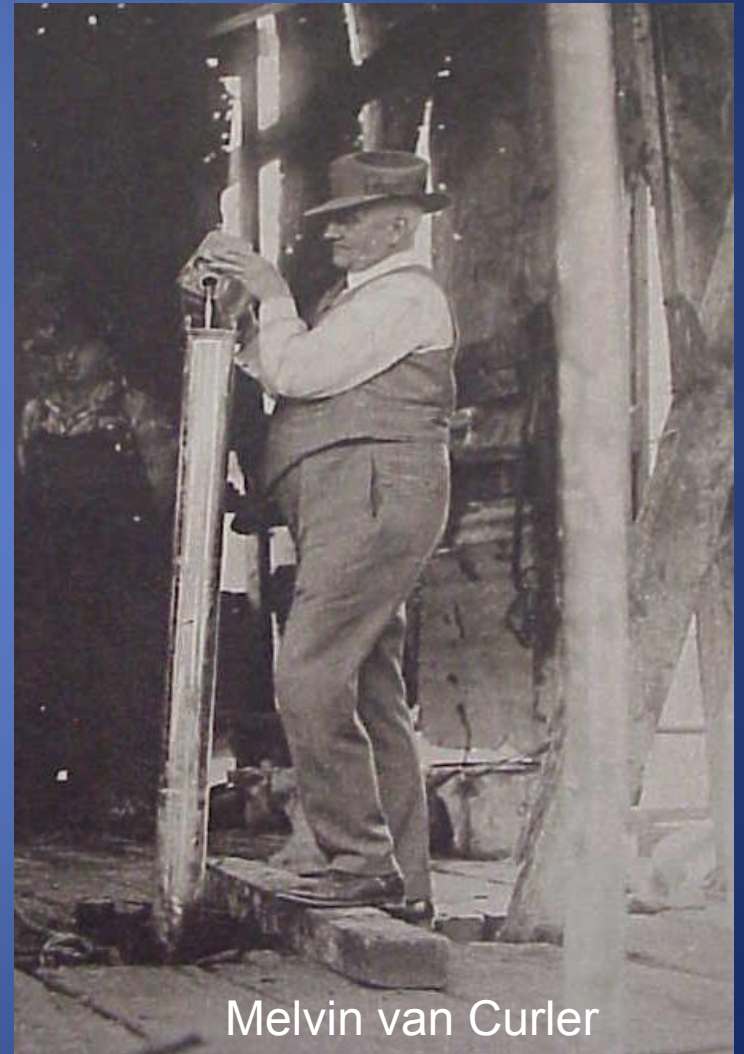
<i>Stevens well, no. 1</i>			
Completed Sep. 14, 1897			
Drift	204 feet	Niagara limestone	at 1475 feet
Shale (Genesee (?) and Hamilton)	to 550	Black slate	1570
Corniferous limestone	160 ft to 710	Clinton	1605
Limestone and shale	mixed to 1050	Medina sandstone	1704
Black and red shale	1250	Red shale to bottom of well	4
		Total depth	1708
First gas	at 1658 feet	Third gas	at 1690 feet
Second gas	1672		

Enter the Petroleum Engineers...

- “Shooting” a well dates back to 1865
- This crude “frac job” allows more communication with the formation
- It was extremely dangerous



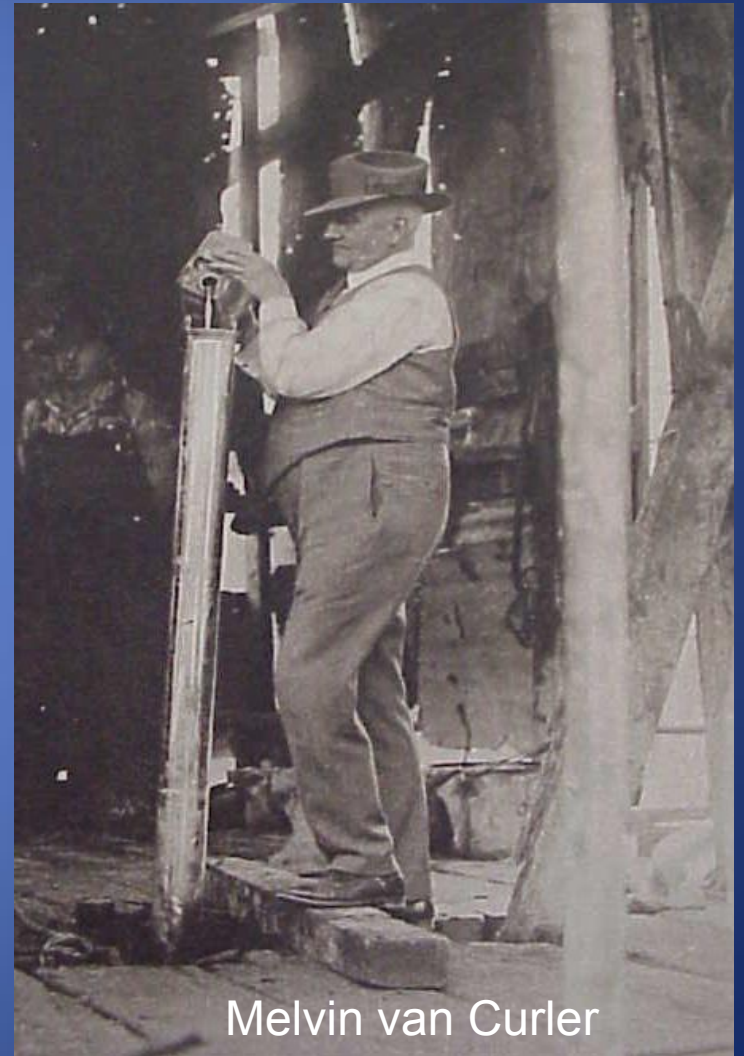
Early Well Stimulation



Melvin van Curler

Black and white photos: <http://www.alleganycountylocalhistory.com>, Melvin
and color photos: Richard Nyahay

Early Well Stimulation



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and color photos: Richard Nyahay

Early Well



ART SHAVALIER IN PICTURE

RIG WHERE BILL SHANNON WAS KILLED

And Don't Forget the Diviners!

“Almost the day the Drake Well was completed in 1859, and a rising flood of petroleum began to enrich the nation, diviners with forked sticks and wax balls, mediums, fortune tellers, clairvoyants, astrologers, and men who followed hunches, tried their hands at locating new oil fields with a varying degree of success; and many a location stake was driven to gratify a vision, or a dream, or in answer to the call of a spirit voice in the night.”
(Herrick, 1949)

Title page from a 1905 historical novel
of the Appalachian oil region.

THE
DIVINING ROD

A Story of the Oil Regions

BY
FRANCIS NEWTON THORPE
Author of "The Spoils of Empire"

Finally, the Titans of a Global Industry

John D. Rockefeller, born 1839 in Richford, Tioga County, NY.

Incorporated Standard Oil Company in 1870, Standard Trust in 1882 (the same year as Richburg's "boom" year).

Standard Oil Company built the first major pipeline in the USA, a 6" line from Olean, NY to Bayonne, NJ. (Herrick, 1949)

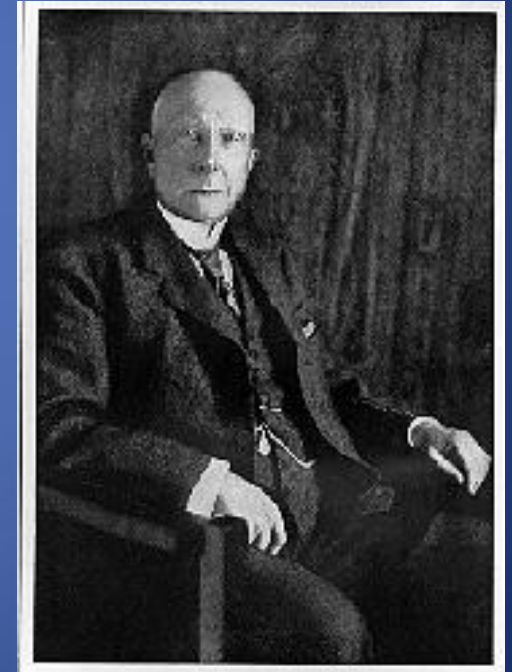


Photo from The History of The Standard Oil Company by Ida M. Tarbell, 1904 (digital version <http://www.history.rochester.edu/fuels/tarbell/MAIN.HTM>), other photos from public domain sites



Exploring New Opportunities: Is the “Boom” Back in NY?

Shale is Back: Party Like it's...1821!

2008 report with shades of C.A. Ashburner

Tristone Capital Co.

Industry Update

April 21, 2008

Marcellus Madness in Appalachia

- The Prize is Large. Based on...

Report from the *Oil and Gas Investor*, April 17, 2009:

Cabot works in Susquehanna County, Pennsylvania. It picked that area because the Marcellus is tremendously thick, reaching more than 300 feet. “We made a decision to concentrate our entire leasing program in just a few counties in **northeast Pennsylvania**,” said [Mike] Walen.

“This is probably the best play Cabot has in the States,” said Walen. “It’s truly world-class.”

**Those Philadelphia investors mentioned by
Charles A. Ashburner were not misguided, just
120 years ahead of the pack!**

Or Did Ashburner Have Other Motives...

DEATH OF CHARLES A. ASHBURNER.

“PITTSBURG, Dec 24 – Charles Albert Ashburner, the celebrated geologist, died at his home in this city after a brief illness this afternoon, aged thirty-six years. Mr. Ashburner has for a decade past been State geologist and coal statistician. *For several years he has been in the employ of the Philadelphia Natural Gas Company and other Westinghouse interests.*”

The New York Times, published December 25th, 1889

In 1887-8, it seemed that Ashburner was working for the competition!

Modern New York Shale Research: Eastern Gas Shales Program, Late 1970s-1980s

- Taking up where Hart left off, NYSERDA participated with the USDOE in the Eastern Gas Shales Program
- NYSERDA funded whole or in part a total of 14 shale wells (all at schools, colleges or public buildings)
- Eight were completed – and paid NYSERDA royalties for years

SHALE GAS
IN THE SOUTHERN CENTRAL AREA
OF NEW YORK STATE:

Volume I

How to Find and Develop Shale Gas
in New York State

Prepared for

NEW YORK STATE
ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

Project Managers
Parker D. Mathusa
Lawrence J. Pakenas

and

U.S. DEPARTMENT OF ENERGY
MORGANTOWN ENERGY TECHNOLOGY CENTER

Project Manager
Chuck A. Komar

Prepared by

DONOHUE, ANSTEY & MORRILL,
Boston, Massachusetts

April 1981

231/ET-FUC/80

Current Shale Work, 1994-

- Began when NYSERDA hired John P. Martin
- Starting in 1995, NYSERDA completed a series of studies on Devonian and Ordovician shales (mid-90s shale consortium included both Antrim and Barnett players).
- Completed a series of studies, papers and presentations
- Work led to new drilling activity for shale gas including 2001 Marcellus and 2007 Utica tests



A comment directed at me during
my first IOGANY*-hosted event,
circa 1994:

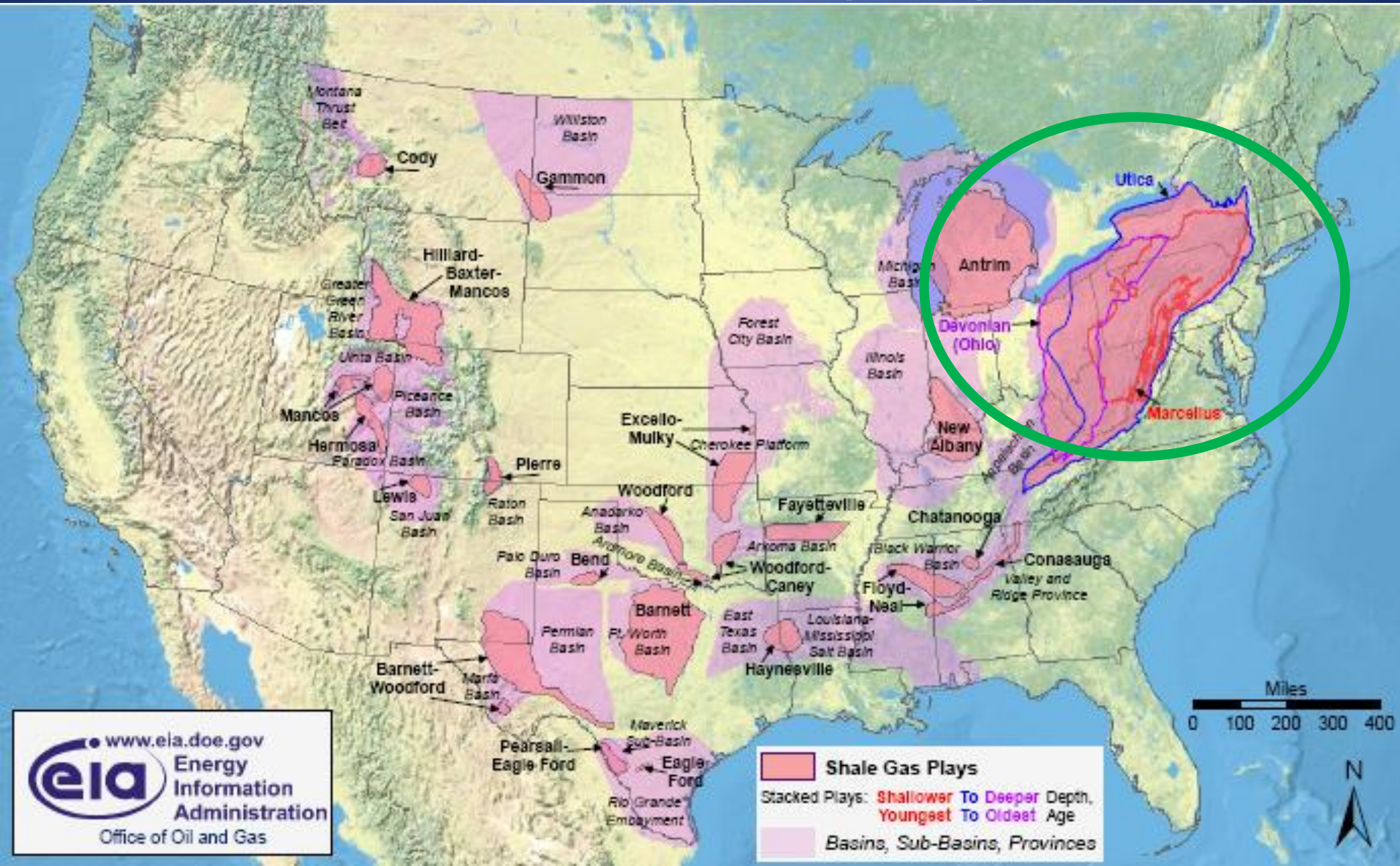
*“You’re not going to drill any
more lousy shale wells?”*

[or something like that]

* Independent Oil and Gas Association of New York

Legacy of 30 Years of Shale Research

Potential Gas Committee (2009): 616 Tcf



Potential Resource: Appalachian Marcellus

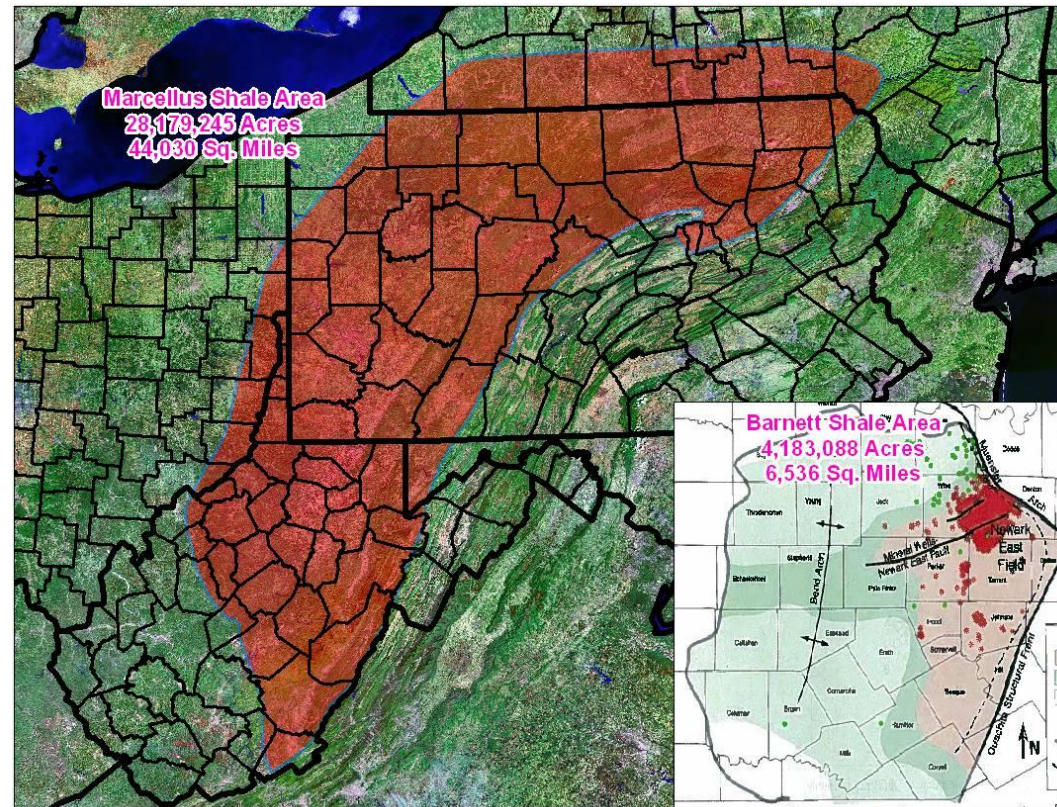
*Devonian Recoverable
Resource Estimate*

*Marcellus Recoverable
Resource Estimates*



Modern Explorer: Bill Zagorski worked with NYSERDAs mid-90s Shale Consortium, spotted the 2001 Marcellus well, and finally hit the big one in 2003. He also first characterized the Upper Trenton (Utica shale – type) “unconventional” play, NY

1977	Schrider – 240 TCF
1985	Kuuskraa – 67 TCF
2005	USGS Milici – 2.1 TCF
2007	Engelder and Lash – 50 TCF
2008	Engelder – 168 to 363 TCF
2009	USGS – 262 TCF
2009	Engelder – 489 TCF



Sources: William Zagorski, PTTC Workshop, Erie, PA, 2009; Schrider, Leo A., Komar, C.A., Pasini III, J., Overbey Jr., W.K., Natural Gas from Eastern Shales, SPE Annual Fall Technical Conference and Exhibition, 9-12 October 1977, Denver, Colorado. Photo: PTTC.org

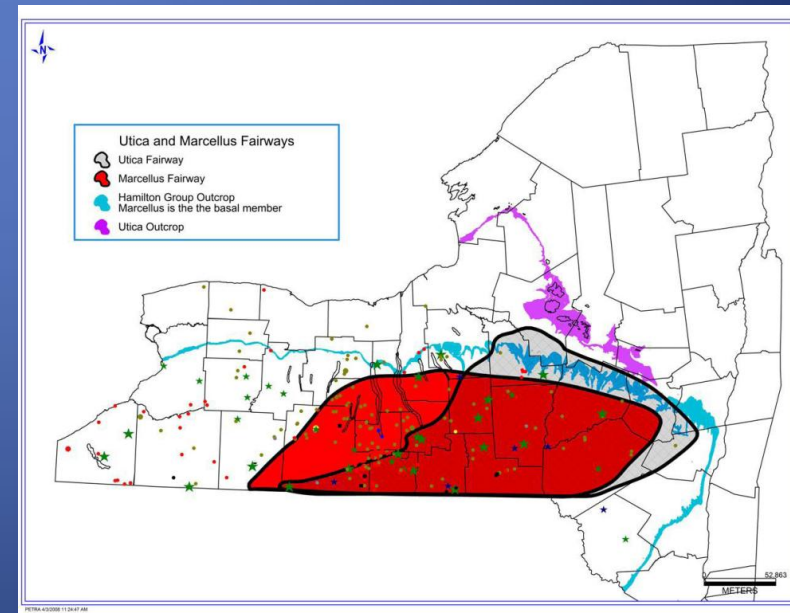
Estimated Potential Resource: New York Marcellus and Total Devonian Shale Gas

■ Total Devonian Shale Resource:	163-313 Tcf
■ Total Devonian Recoverable:	16.3-62.6 Tcf
■ Total Marcellus Resource:	92.8 Tcf
■ Total Marcellus Recoverable:	9.3-18.6 Tcf

Estimates of recoverable resources and the NYS Marcellus resource are estimates by the author. only Recoverable low estimate assumes 10% recovery factor of the lower value and high estimate assumes 20% recovery factor. Of the upper value.

Devonian Shale estimates from Hill, David G., Lombardi, Tracy E. and Martin, John P., "Fractured Shale Potential in New York," *Proceedings of the 2002 Ontario – New York Oil and Gas Conference*, Ontario Petroleum Institute, London, Ontario, v. 41, 2002.

Marcellus Shale estimates derived from data provided in Milici, Robert C. Christopher S. Swezey, *Assessment of Appalachian Basin Oil and Gas Resources: Devonian Shale—Middle and Upper Paleozoic Total Petroleum System* (version 1.0), U.S. Geological Survey Open-File Report 2006-1237, 2006 (calculated by 100% of plays 6, 15, 16, 19 and 50% of play 17)



Concluding Thoughts

- The history of the oil and gas industry is a colorful reminder of what effort went into building this great industry.
- Though first tapped way back in 1821, shale gas will be a key part of the nation's energy equation for decades to come.
- New York State will continue to be a target of explorationists, continuing a proud history dating to the beginnings of the industry.

Acknowledgements: I want to thank Ron Taylor, Town of Almond Historian and Webmaster www.alleganycountynylocalhistory.com, for all his great work preserving New York's history. Also want to thank Richard Nyahay, Bill Zagorski, and Gary Lash.