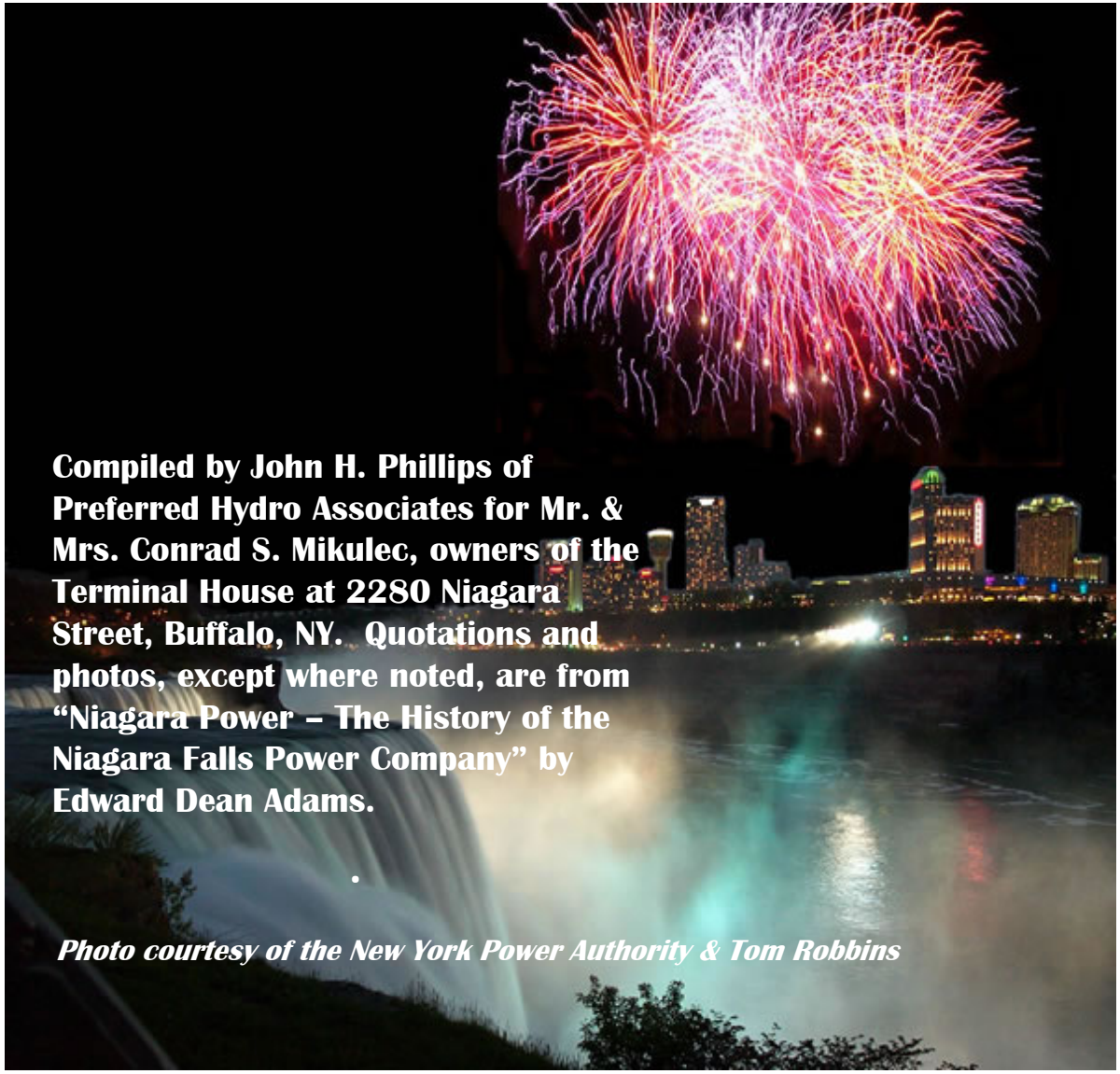
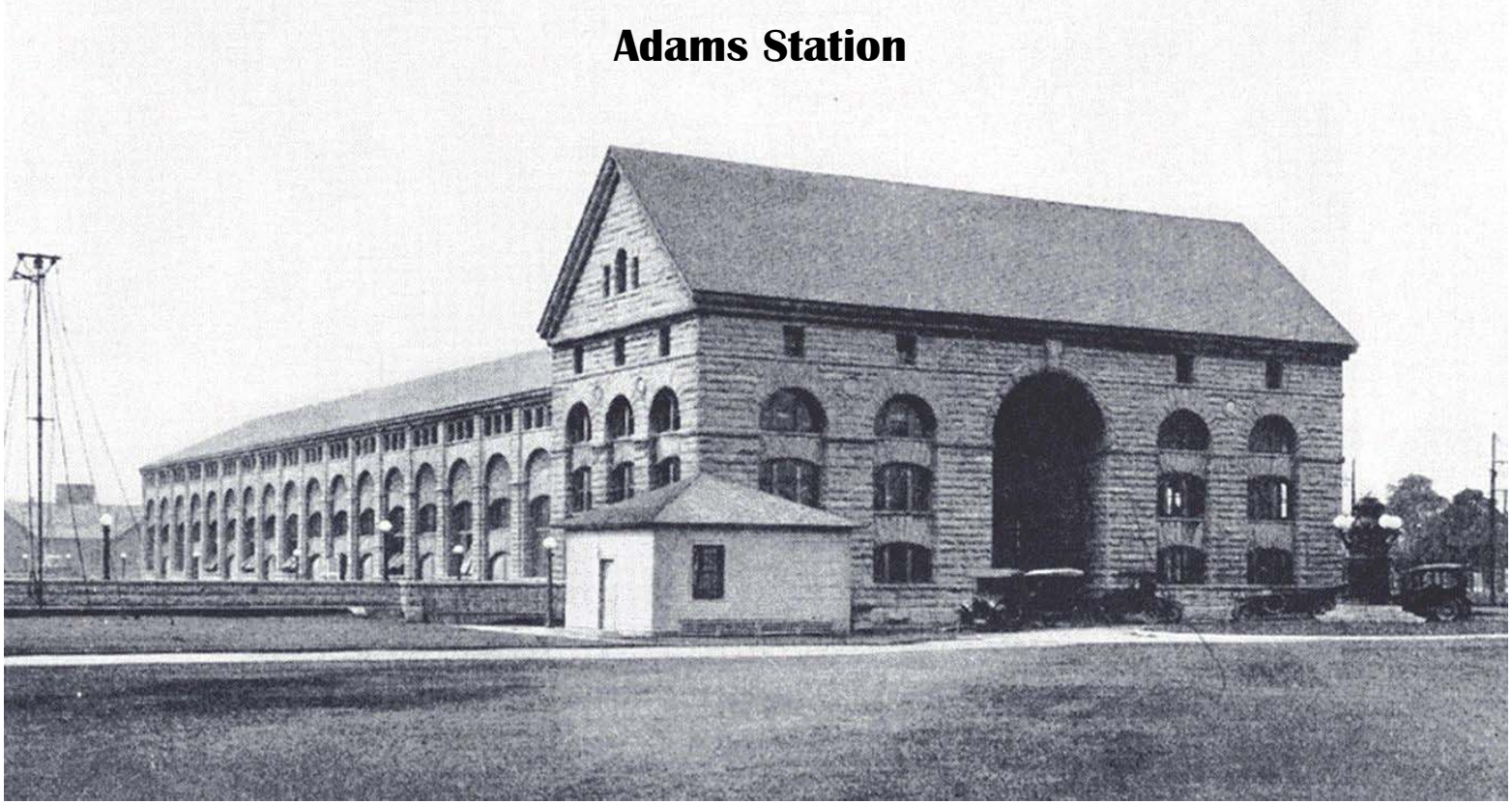
The Cataract Power and Conduit Company Buffalo Terminal House Key to the "Triumph of the Century" Is Rediscovered at 2280 Niagara Street



The Largest Power Plant in the World Needs Customers!

In 1895, the Cataract Construction Company completed and placed in service the Adams Hydroelectric Generating Station at Niagara Falls. The three generating units initially commissioned were designed and built by George Westinghouse and Nicolai Tesla. The machines had a collective capability of 15,000 horsepower or 11,200 kilo-watts. At the time, the Village of Niagara Falls had a population of 5,000 and a relatively small industrial base. Buffalo had the industrial load and the conduit to deliver it ran right through 2280 Niagara Street.

Adams Station



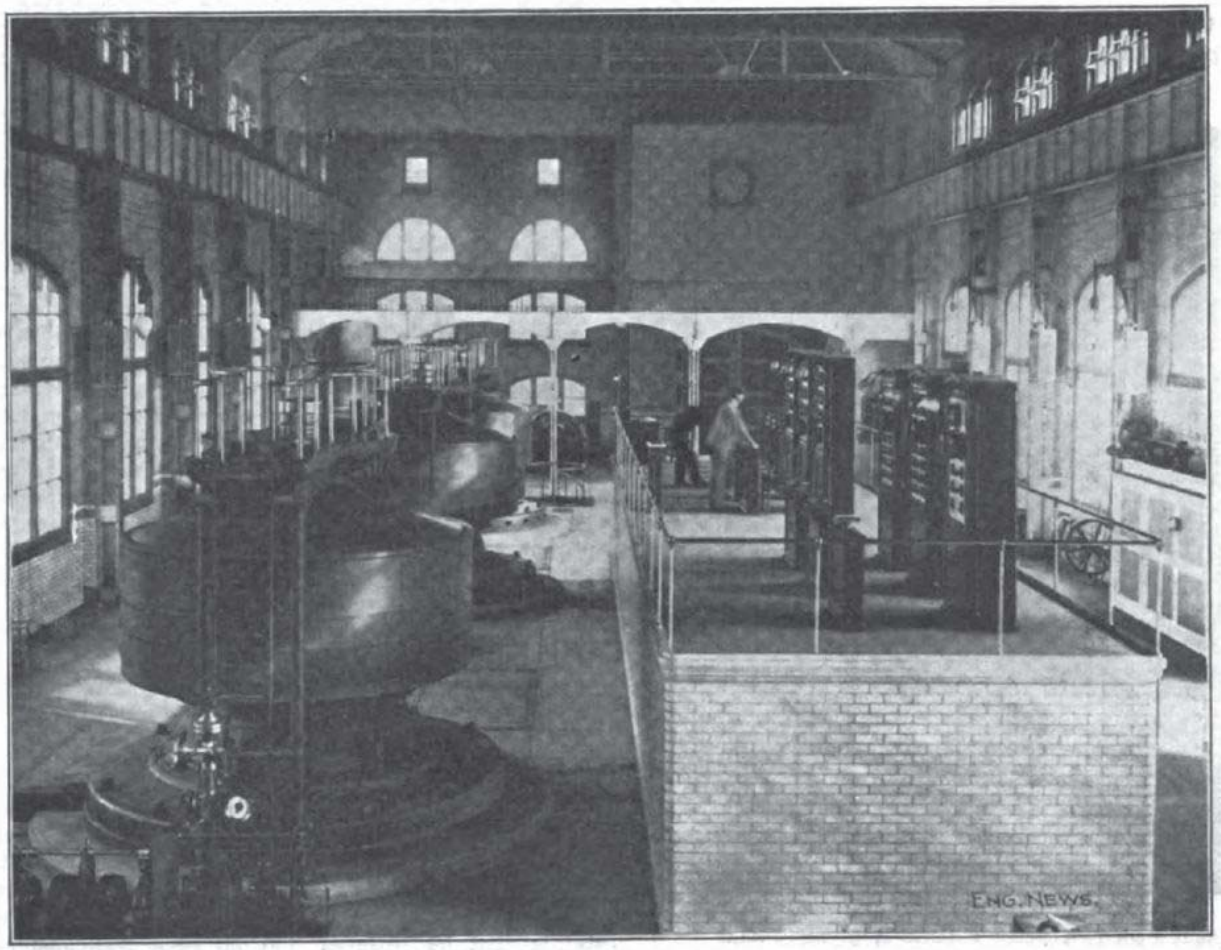
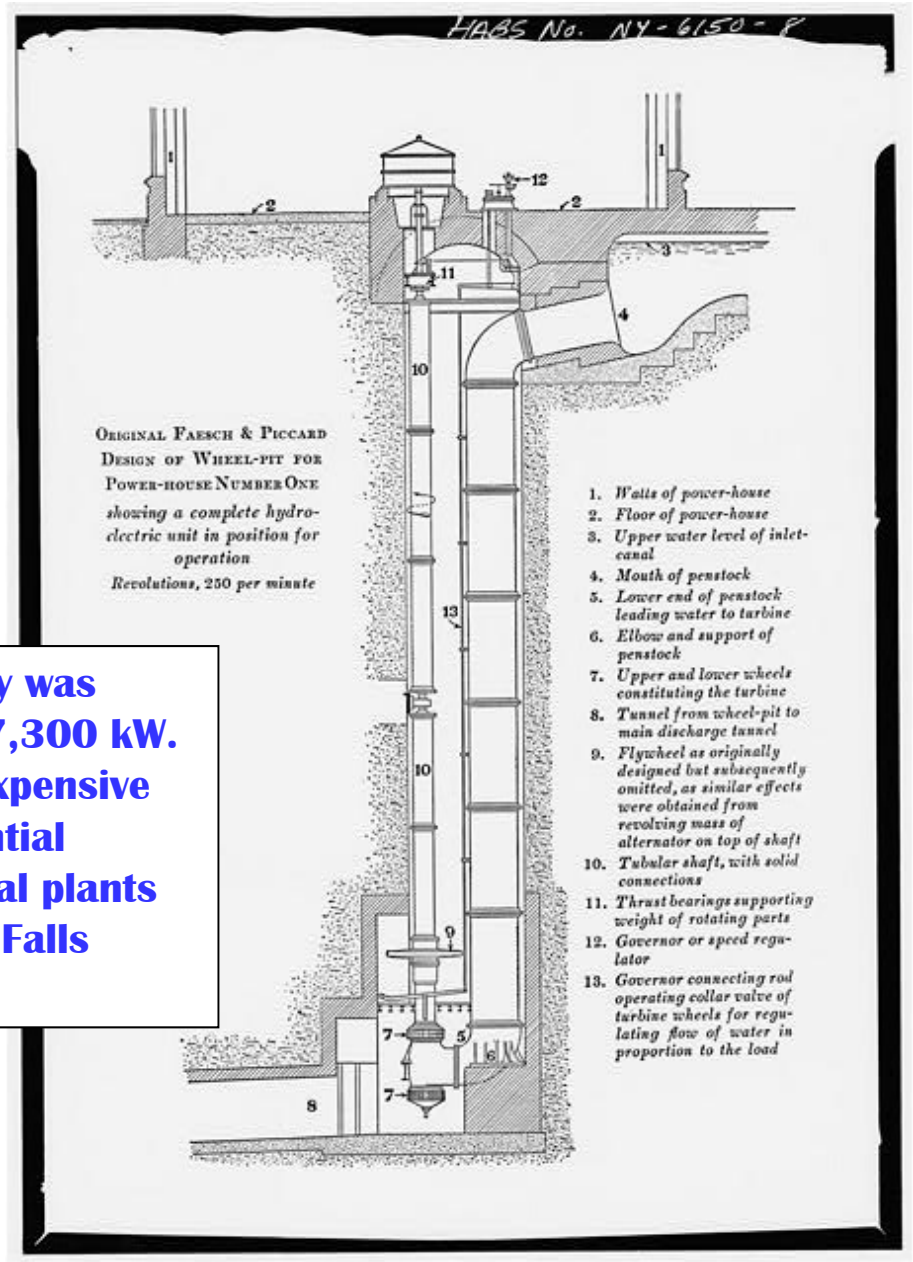


FIG. 2.—VIEW IN THE INTERIOR OF THE NIAGARA POWER HOUSE, SHOWING THE THREE 5,000-H. P. WESTINGHOUSE DYNAMOS NOW RUNNING.

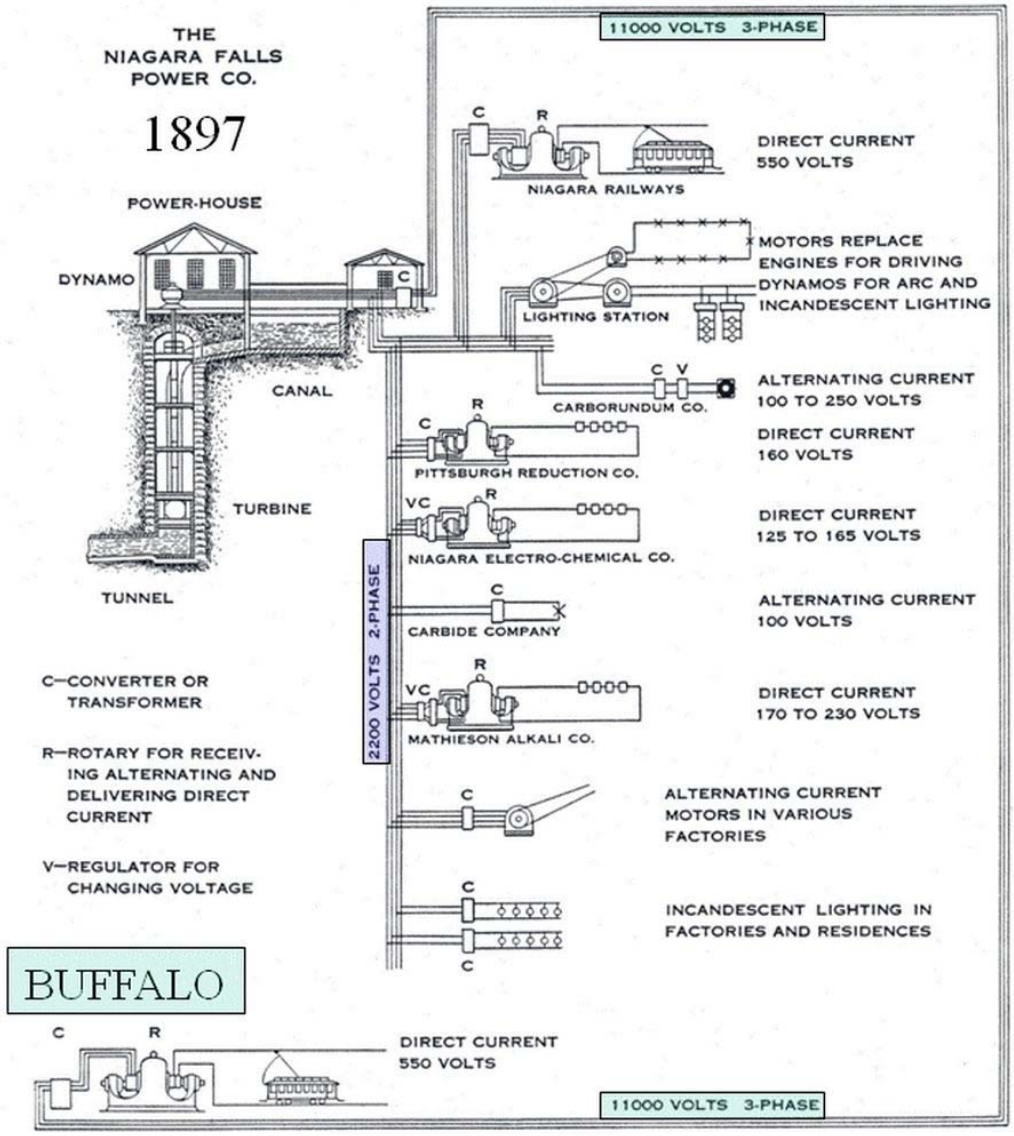
The ten machines ultimately installed in the powerhouse were all supplied by Westinghouse. Later, Adams Powerhouse No. 2 was built in parallel but with General Electric Units instead. The John Jacob Astor influence was apparently at work. He was a Director of the Niagara Falls Power Company, Cataract Power & Conduit Company and the General Electric Company. ***Picture from the Engineering News Dec. 10, 1896***

Crossectional View of a Turbine-Generator at the Adams Station

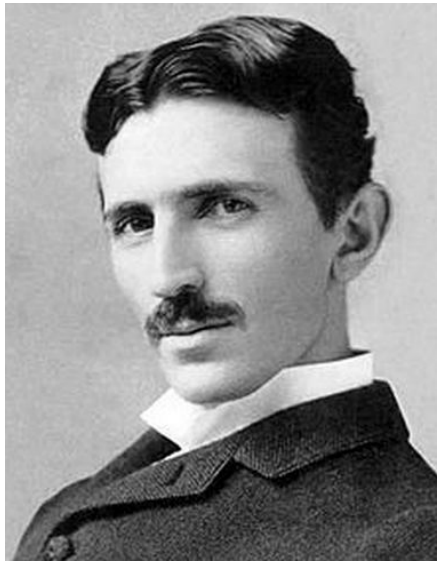


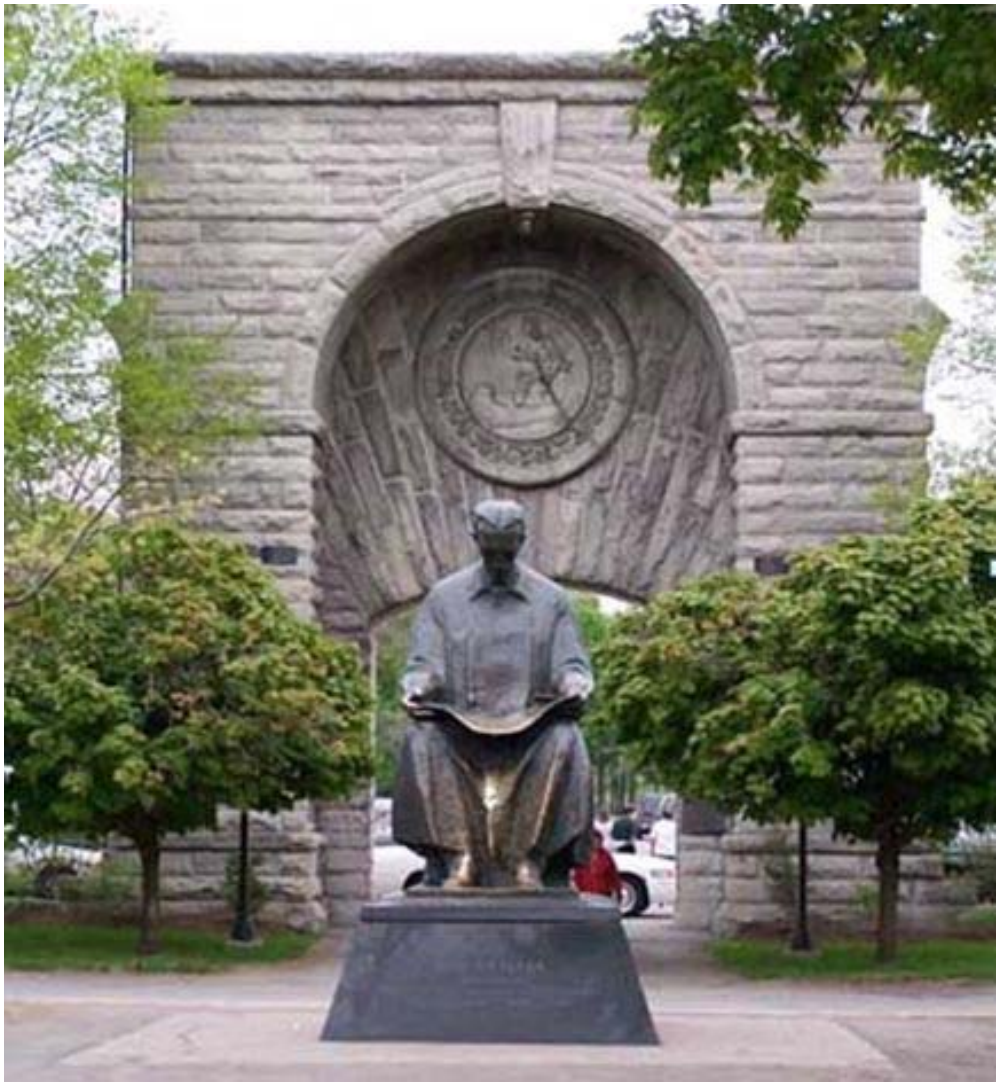
The total station capability was 50,000 horsepower or 37,300 kW. As a direct result, the inexpensive power attracted a substantial number of electro-chemical plants to the immediate Niagara Falls area.

The Early Power Network



George Westinghouse is pictured above and Nikola Tesla below. Tesla did not feel he was adequately compensated for the work at Niagara and Buffalo and left Westinghouse. Posterity has corrected the issue since it is his statue on Goat Island above the cataracts and not one of Westinghouse. Both pictures were taken in the 1890's.





This picture, taken by Chuck LaChiusa, is of the Tesla statue on Goat Island. The statue is in front of the reconstructed original entrance to the Adams Powerhouse.

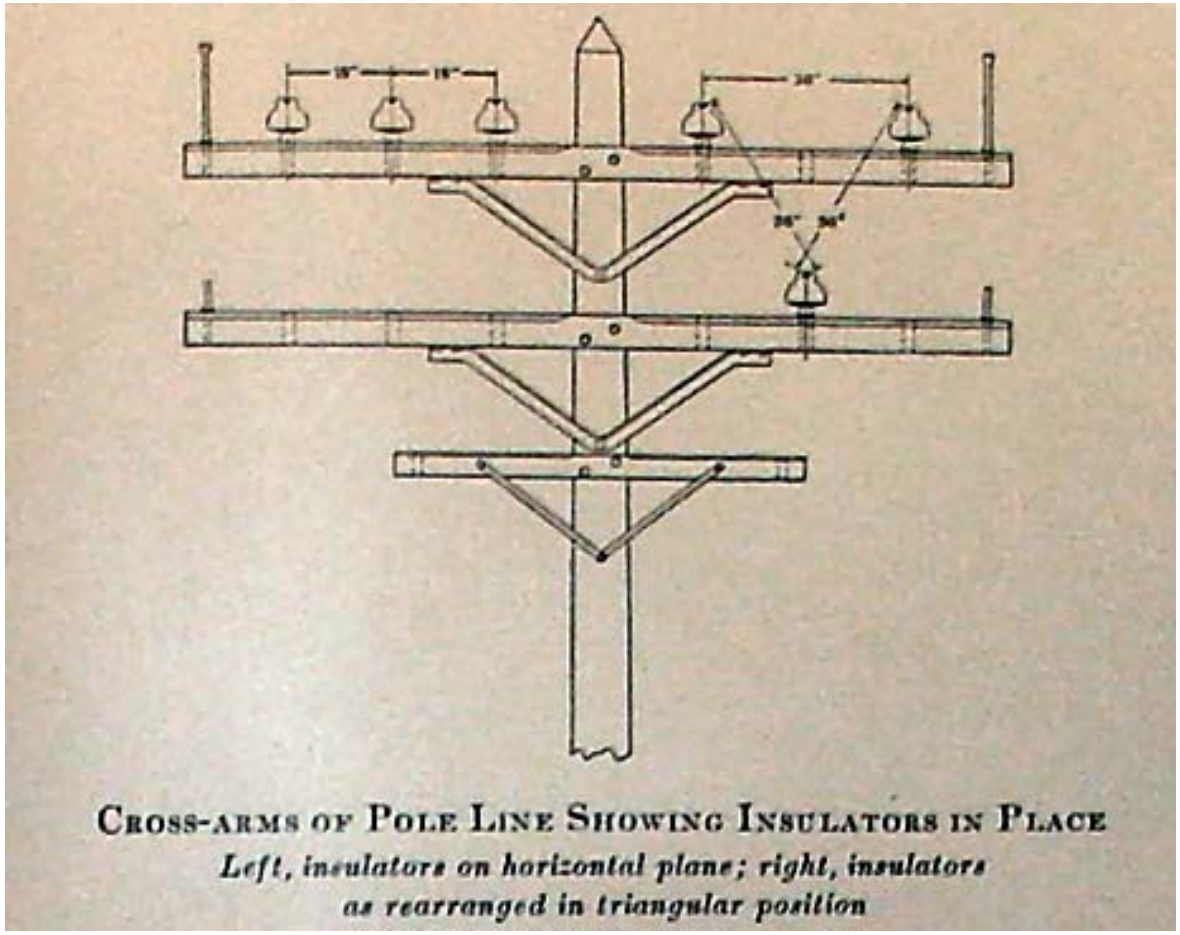
ENTRANCE TO POWER-HOUSE NUMBER ONE, WITH BRONZE MEMORIAL TABLET ERECTED IN DECEMBER, 1924, AS TRIBUTE TO HYDRO-ELECTRIC PIONEERS, IN PLACE

Entrance to the original Adams Powerhouse.
Note the powerhouse entrance and seal over the portal.

A single 11,000 Volt transmission line was initially constructed from the Adams Station at Niagara Falls to the Cataract Power and Conduit Company Terminal Station. While the line carried the most power that had ever been transmitted over such a distance, today the same voltage is at the level used to feed homes. It is considered a residential distribution voltage. Later a second and then a third line was added.

REPAIR WAGON AND FIRST BUFFALO TRANSMISSION LINE

"In the amount of power transmitted and in the importance of the service rendered by the transmitted power, the Niagara – Buffalo transmission transcended anything that had been attempted previously."



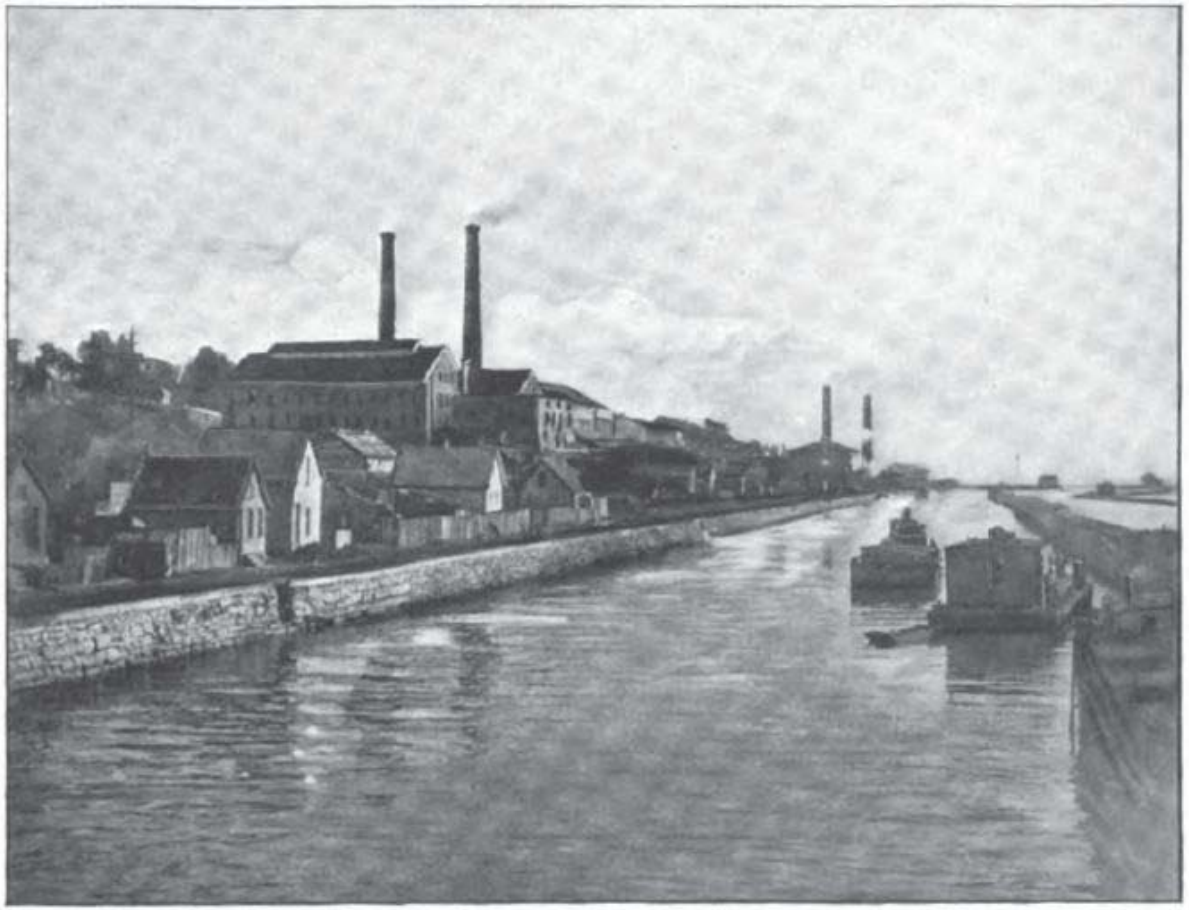
CROSS-ARMS OF POLE LINE SHOWING INSULATORS IN PLACE

Left, insulators on horizontal plane; right, insulators as rearranged in triangular position

For the second line, installed later, the conductors were placed in a triangle configuration. Individuals had liked the fireworks display caused when a wire was thrown up to cross two phases. This array reduced the line's vulnerability to pranksters.

"Niagara Power is now being satisfactorily delivered in Buffalo."

The service was inaugurated on November 15, 1896 and was commemorated ".... with attendant hoopla including the firing of a 21-gun salute by the Ninth Ward Polish-American Gun Squad over the Niagara River outside the Buffalo power station ." (quote from "The Day They Turned The Falls On")



THE BUFFALO STREET RAILWAY COMPANY'S PLANT, THE DESTINATION OF THE FIRST NIAGARA POWER SENT TO BUFFALO.

From Volume XI
1896 – 1897 Edition of
Cassier's Magazine

The initial delivery was 1,000 horse power (750 kW).

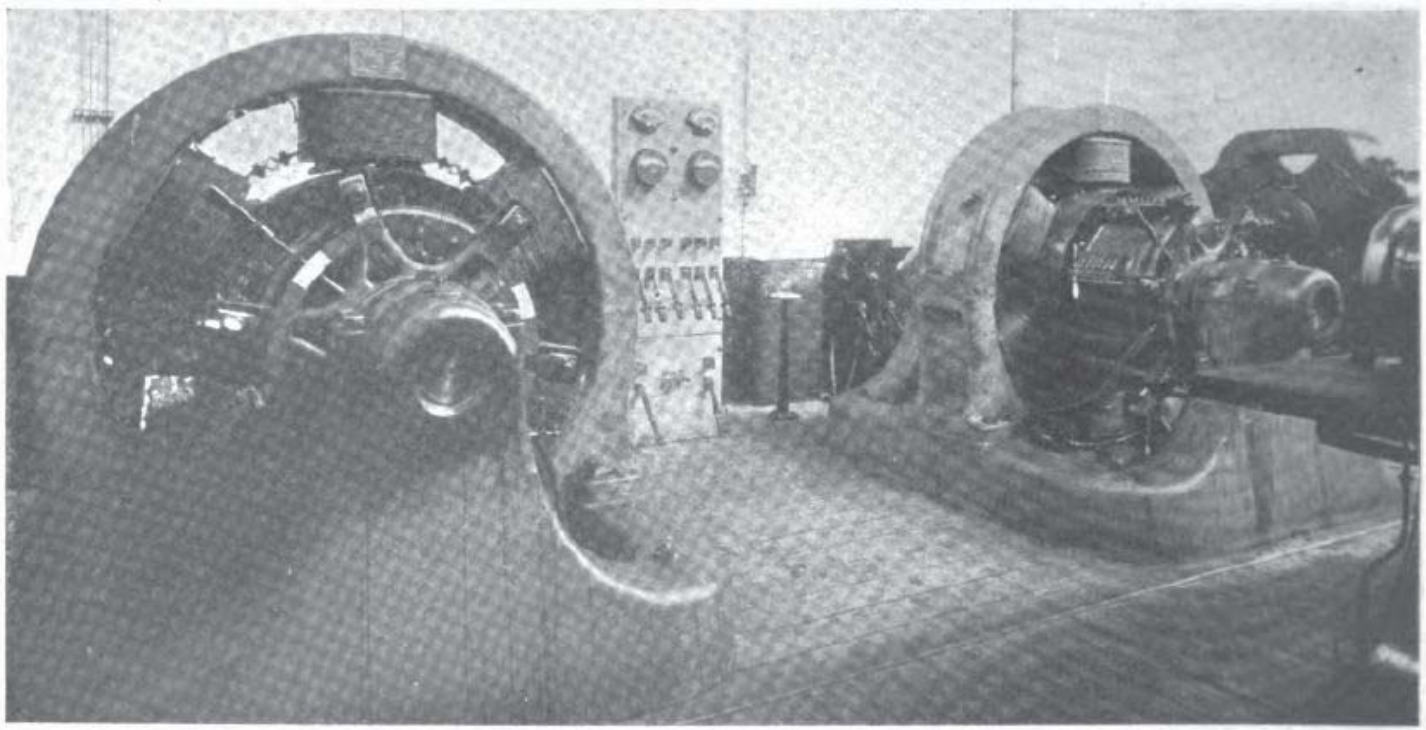


FIG. 4.—DIRECT CURRENT TRANSFORMERS AT BUFFALO STATION.

From the October 1896 Edition of Western Electrician

"Upon completion of the terminal house at the city line, the Cataract Power and Conduit Company began the supply of Niagara Power in Buffalo on November 15, 1896."

This picture from
the Engineering News
Dec. 10, 1896.

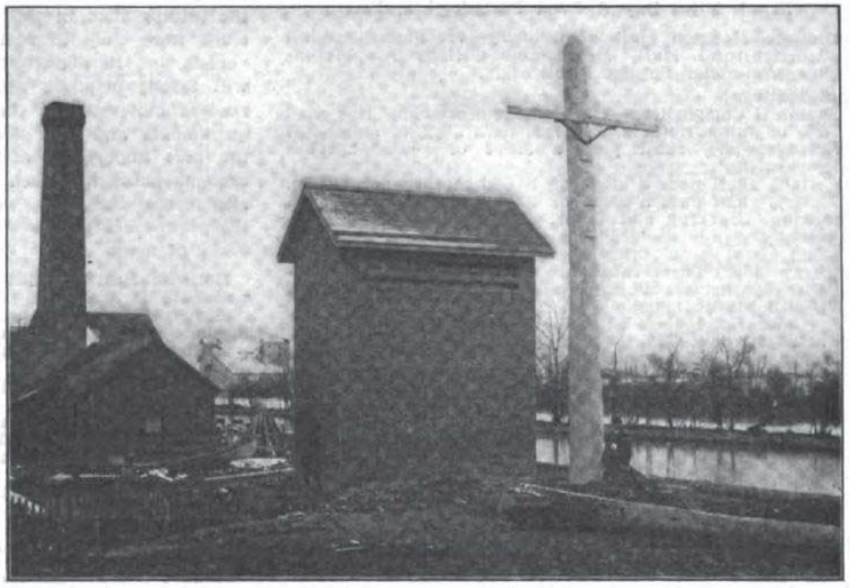


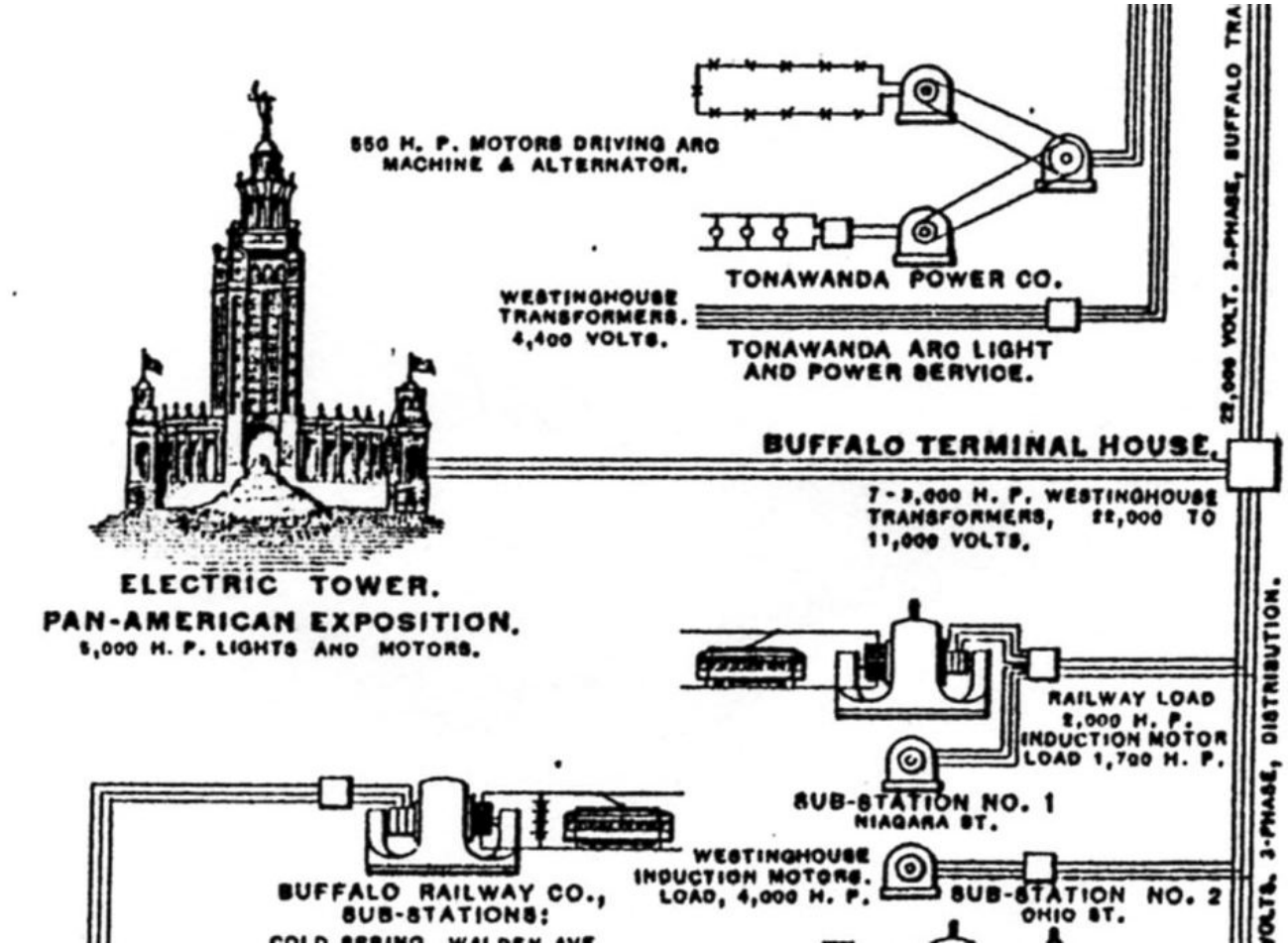
FIG. 6.—TERMINAL STATION AT CITY LIMITS OF BUFFALO, WHERE WIRES PASS FROM POLES TO UNDERGROUND CONDUITS.

The lot at 2280 Niagara Street, near the City line, was the site of increasing activity around the turn of the twentieth century. The initial delivery of 1,000 hp was to be followed by 10,000 hp each year for 4 years.

This drawing is from a
Buffalo map
of 1901.

Buffalo Map Commissioned by
Library of Congress,
Washington, DC

2280 Niagara Street



The new Buffalo Terminal House became the hub of Niagara Power in Buffalo and the exclusive source of external power for the Pan American Exposition.

The previous slide clips were from an original drawing by the Westinghouse Company and the files of Craig A. Woodworth, IEEE Life Member. Next to Mr. Adams, Craig is the major contributor to this piece. He is a retired employee of Niagara Mohawk, a successor company of the Cataract Power and Conduit Company.

http://www.ieeeghn.org/wiki/index.php/Early_Electrification_of_Buffalo:_The_Beginning_of_Central_Station_Service

Many thanks also to Andrea Rebeck of Preservation Buffalo Niagara and Lorraine Zahn of Write-Logic for their important contributions.

The Cataract Power and Conduit Company is incorporated.

Incorporated in 1896 by William B. Rankine, George Urban, Jr. and Charles R. Huntley, the Cataract Power and Conduit Company won the contract to distribute electricity in the City of Buffalo. The objectives of this company were as follows:

"... the use and distribution of electricity for light, heat or power within the city of Buffalo, the construction of conduits, poles, pipes or other fixtures in, on, over and under the streets, alleys, avenues, public parks, and places within the city of Buffalo for the conduct of wires and pipes and for conducting and distributing electricity".

From the University of Buffalo

The "Tower of Light" at the 1901 Pan American Exposition
Also Courtesy of Craig Woodworth

The Buffalo Terminal House Supplied Buffalo with inexpensive Niagara hydro-electric power via underground cables.

From the '"Electric World and Engineer " 1906

ment of the Buffalo General Electric Company in an adjoining sub-station. The combined rating of these 21 transformers is 5,250 kw,

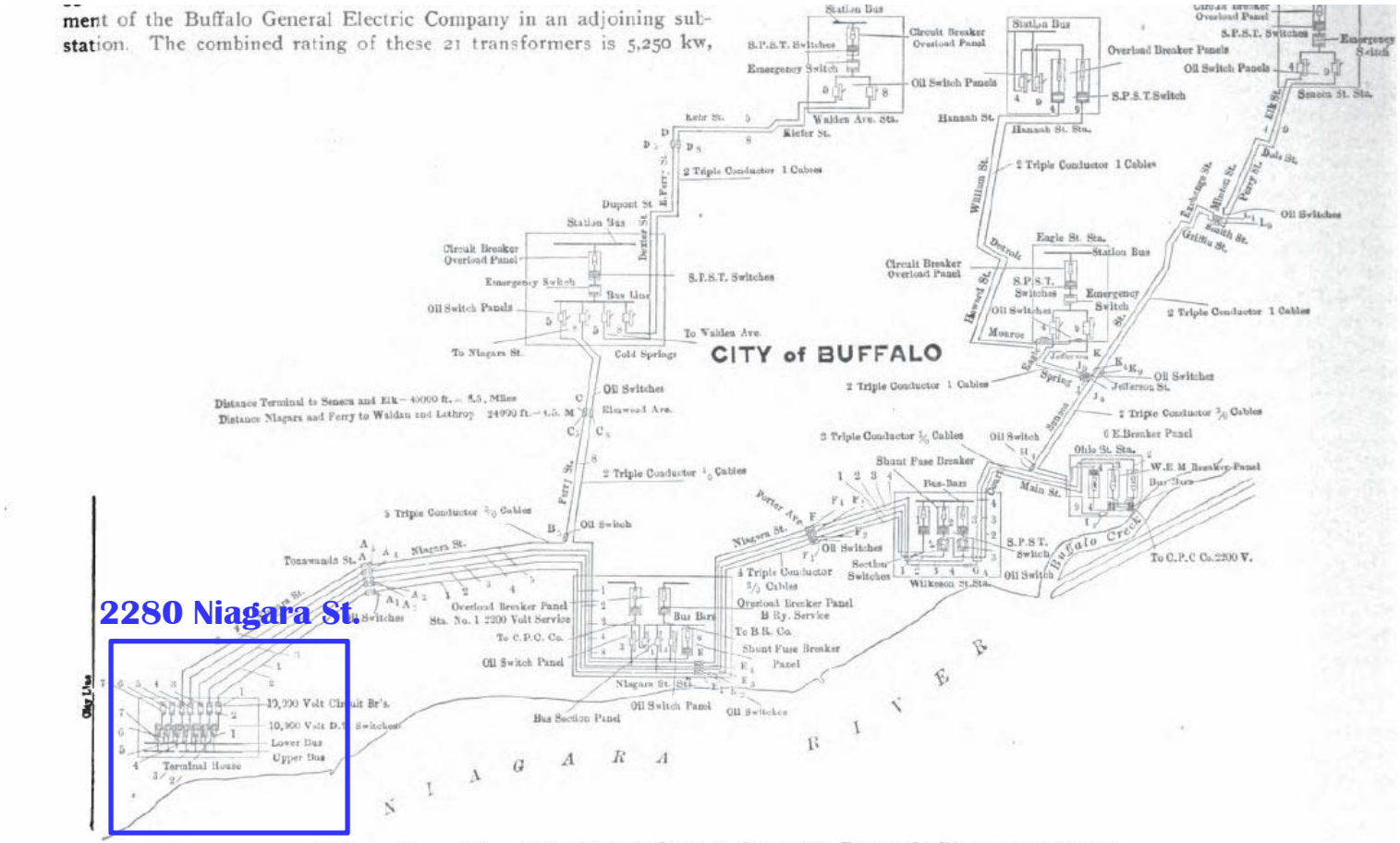


FIG. 9.—10,000-VOLT DISTRIBUTION SYSTEM CATARACT POWER & CONDUIT COMPANY.

The air was reported as being much cleaner when the coal fired generation was displaced. The underground cables also were not visible on the streets already cluttered with power, telephone, trolley, and telegraph poles.

The Buffalo Terminal House in 1906
Looking from the Erie Canal

TERMINAL HOUSE OF THE CATARACT POWER & CONDUIT COMPANY. THREE 22,000-VOLT LINES ENTER AT THE WEST END, AND THE 2200-VOLT LINES LEAVE THE BUILDING ALONG THE NORTH WALL, PASSING UNDER THE 22,000-VOLT LINES AND EXTENDING SOUTHWARD ALONG THE ERIE CANAL, SEEN IN THE FOREGROUND, TO MANUFACTURING PLANTS IN NORTH BUFFALO

From the "'Electrical Age" January 1906

Circuit Breakers located inside the Terminal House.
In 1901, 22,000 volts was the highest voltage ever used for bulk power transmission.

FIG. 3.

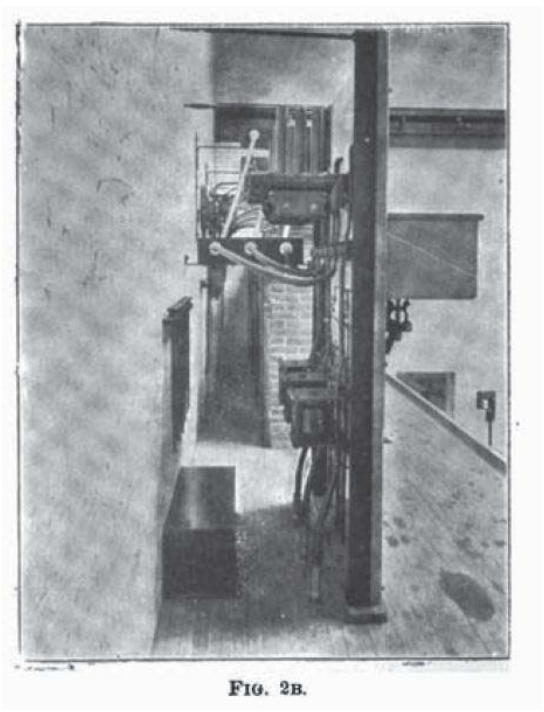


FIG. 2B.

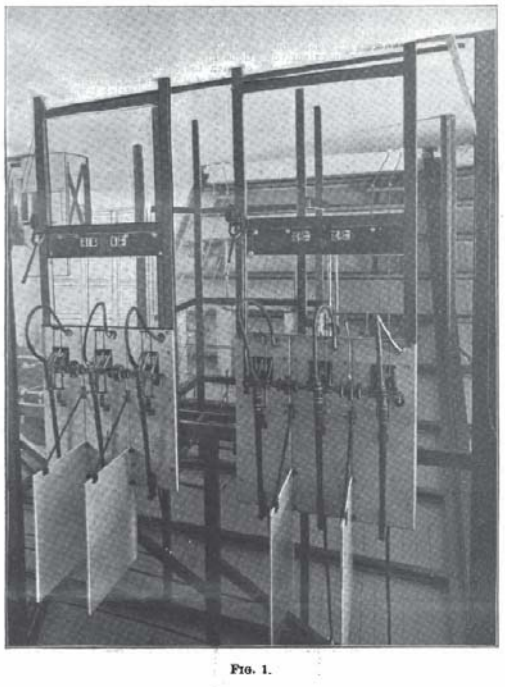


FIG. 1.

From the June 1901 Edition of Scientific American

The Buffalo Terminal House showing the entrance of one of the 3 - 22,000 volt lines from Niagara Falls.

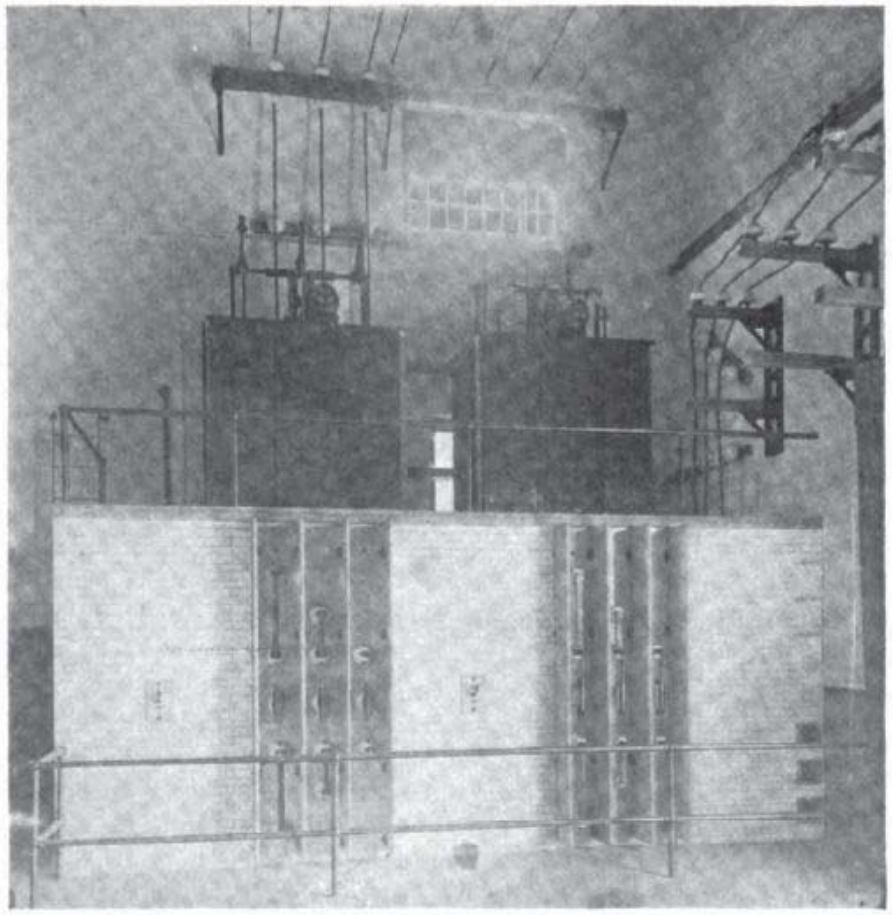


FIG. 17.—EAST END OF TERMINAL HOUSE, SHOWING SELECTOR SWITCHES AND OIL SWITCHES FOR 22,000 VOLTS FOR BANK 3 AND FUTURE BANK 4.

The conductors went through lightning arrestors circuit breakers and disconnecting switches after entry.

From the "'Electric World and Engineer" 1906

In 1906, there were 3 banks of 3 transformers in the building along with a spare. The "in service capability" was about 22,500 kVA nameplate.

From the '"Electric World and Engineer " 1906

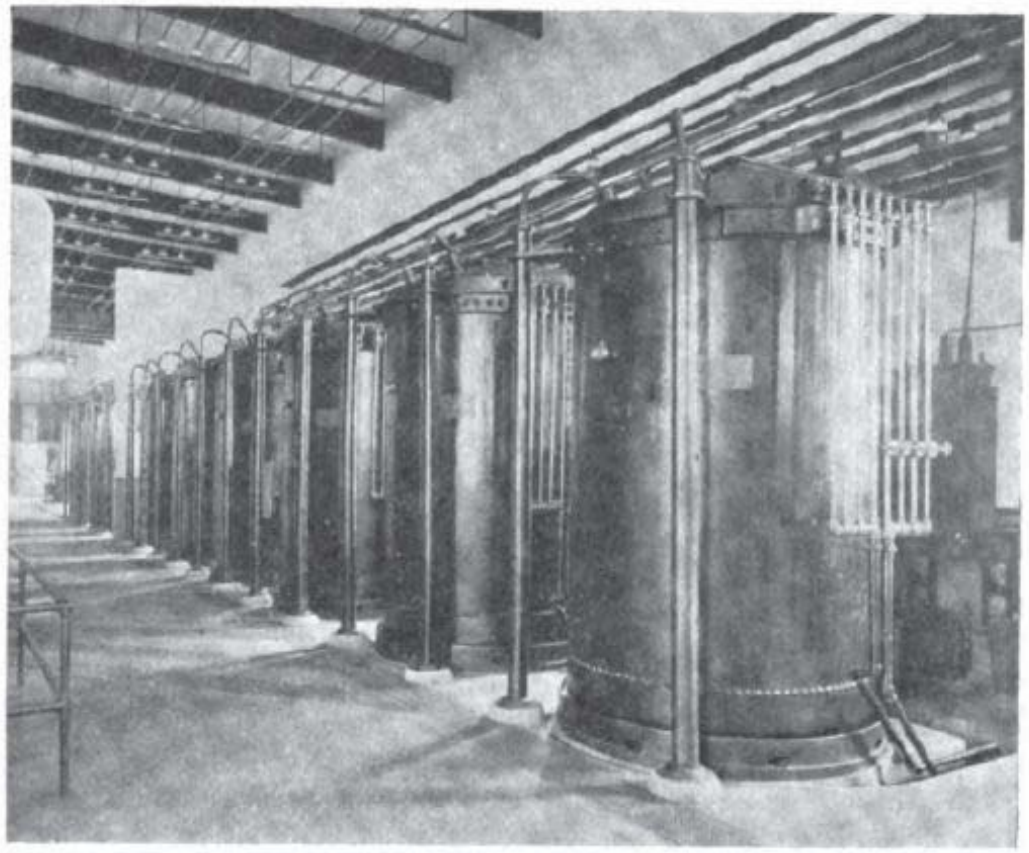
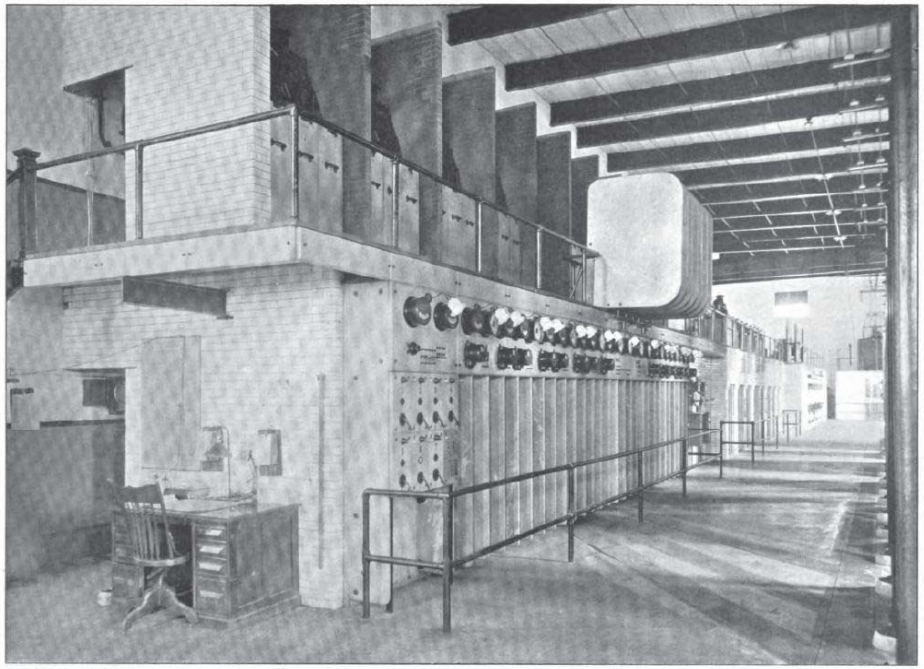


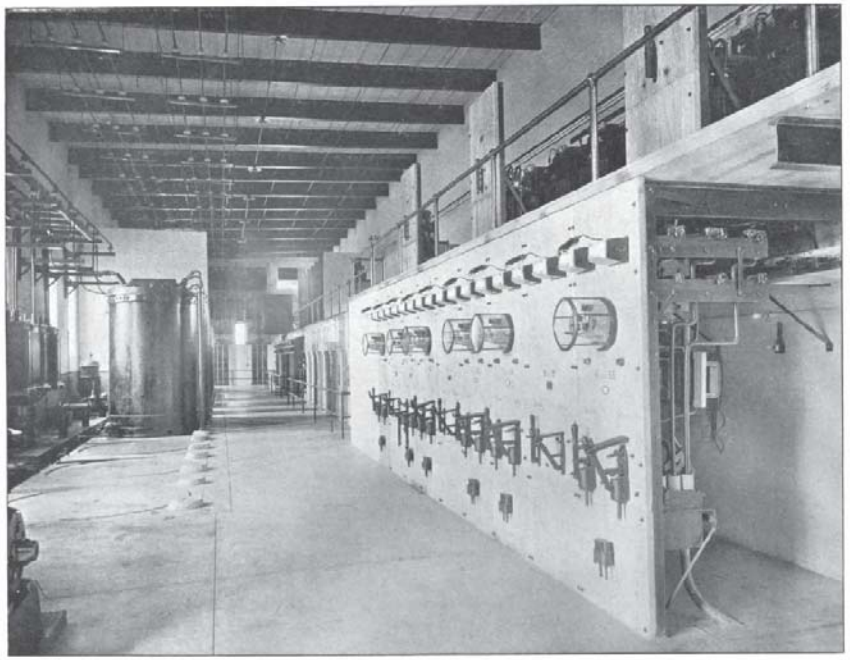
FIG. 16.—TERMINAL HOUSE, 2250-KW TRANSFORMERS.

The May 1901 issue of "Electricity" reported "In the terminal house, the 22,000 volt current is transformed by six of the largest transformers in the world".

Buffalo Terminal House
showing bookend views of the 11,000 volt and 2200 volt feeder controls and metering.



TERMINAL HOUSE OF THE CATARACT POWER & CONDUIT COMPANY, SHOWING THE 11,000-VOLT DISTRIBUTION BOARD AND THE OIL SWITCHES ON THE UNDERGROUND FEEDERS. THE CONTROLLERS FOR THE SWITCHES ARE ON THE FIRST PANEL OF THE BOARD



THE 2,200-VOLT FEEDER BOARD IN THE TERMINAL HOUSE. THE VIEW IS TOWARD THE WEST END WHERE THE 2200-VOLT LINES ENTER

From the '"Electrical Age" January, 1906

The Buffalo Terminal House Electric Load

The chart indicates the actual load on the peak use day of 1903. Note that during the 5:00 PM hour it was 80% of the nameplate rating of the 22,000 volt transformers.

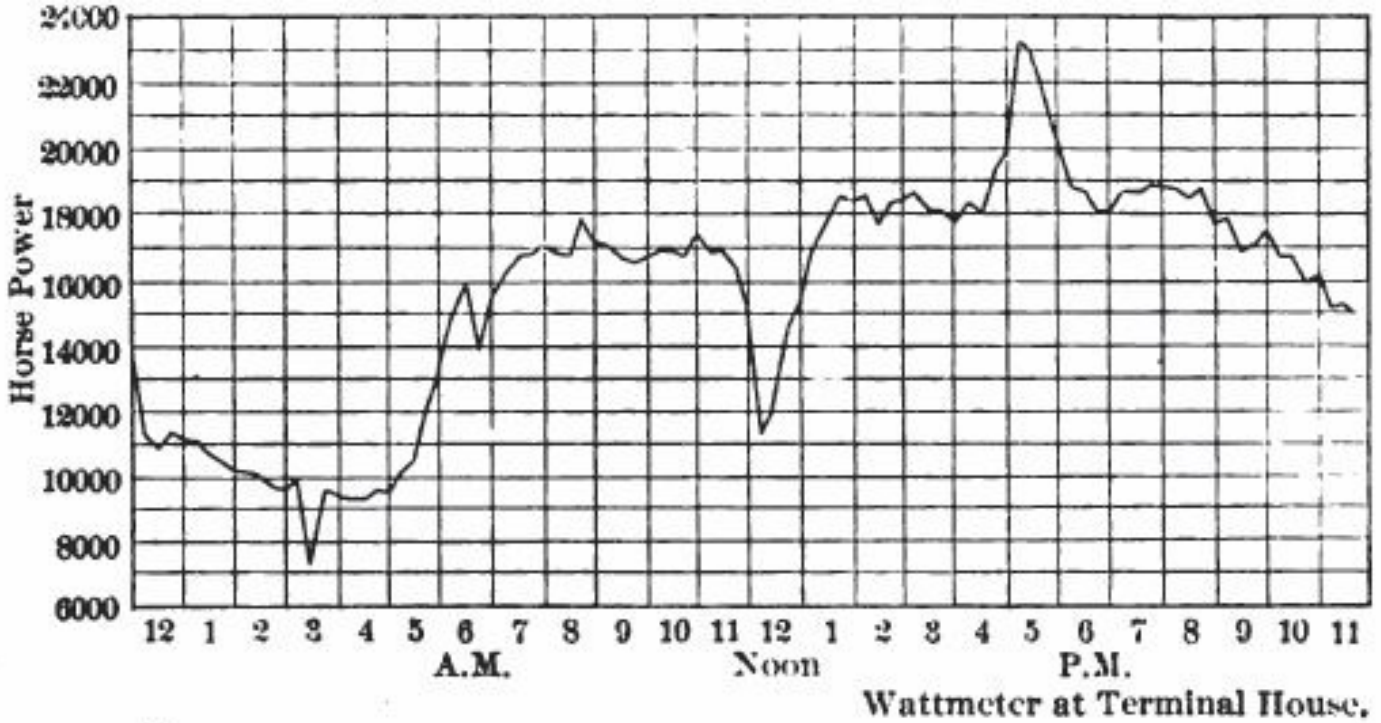


FIG. 8.—CATARACT POWER & CONDUIT COMPANY TERMINAL HOUSE LOAD SHEET, DEC. 18, 1903.

The Buffalo load reflected the public activity. Note the dip at lunch time and peak during the evening trolley rush hour and nighttime lighting. It was during the Christmas Season.

From the '"Electric World and Engineer" Dec. 10, 1905

Official Seal

The Cataract Power and Conduit Company was the vehicle to transmit Niagara Power to Buffalo. The Company was termed a "filial" company of the Niagara Falls Power Company by Mr. Adams in his History. The other filial companies were the Cataract Construction Company; the Canadian Niagara Power Company that ran the Rankine Station in Niagara Falls, Ontario; the Niagara Induction Railway Company and the Niagara Development Company. All shared many of the same directors and officers and the above seal. The seal was designed by Frederick McMonies. This picture was taken on Goat Island in 2005 by Chuck Lacuisa.

Official Seal

Adams wrote, “The Niagara Seal represents in a high degree, the wonder of nature and the art of man; the romance of a dying race and the science of a new century.” When the Buffalo service was inaugurated, The New York Times opined, “... to the capitalists composing the Niagara Falls Power Company belong the credit of having carried the plans to a completion, and to the Cataract Power and Conduit Company, composed of Buffalo business men, the credit of bringing the first installment of the (Niagara) energy to this city.”

On January 12, 1897, a dinner to celebrate the inauguration of service to Buffalo was held at the new Ellicott Club in Buffalo. The affair was termed the "Power Banquet" by Pierre Berton in his book "Niagara – A History of the Falls."

"There were 400 guests present including many recognized leaders among engineers, inventors, manufacturers and capitalists." The following speeches were given.

"The Company (*NFPC*) - Francis Lynde Stetson, of New York, the toastmaster
Welcome to Buffalo – His Honor Mayor Jewitt
The Empire State – Controller J. A. Roberts of Albany
Electricity – Nikola Tesla of New York
The City of Buffalo – Charles W. Goodyear of Buffalo
Water-Power – Charles A. Pillsbury of Minneapolis"

The New York Tribune reported that the general trend of the speeches was the admiration of the achievement, which it was said might justly be regarded as one of the triumphs of the century, and prophesies of the great future awaiting the Niagara frontier when the electric power reaches its fullest development.

Officials of the Niagara Falls Power Company (NFPC) and the Cataract Power & Conduit Company (CP&CC) are pictured above in the Adams Station:

1. William B. Rankine - Secretary NFPC and CP&CC and Treasurer CP&CC.
2. Edward A. Wickes - Vice President NFPC and Executive Committee CP&CC.
3. Darius O. Mills - Director NFPC and CP&CC.
4. George S. Bowdoin - Director NFPC and Representative of Money Suppliers.
5. Edwin Brown - Director NFPC and Money Representative.
6. Charles Lanier - Director NFPC and Money Representative
7. John Jacob Astor Director NFPC and CP&CC and Executive Committee CP&CC.
8. Edward Dean Adams – President CP&CC and Director NFPC
9. Francis Lynde Stetson – Vice President NFPC and Director CP&CC.

Colonel John Jacob Astor IV

Astor was Director of the Niagara Falls Power Company and the Cataract Power & Conduit Company. He was also an inventor, writer and a member of the prominent Astor family. He served as a lieutenant colonel in the Spanish-American War. Astor largely dealt in real estate, which included the original Waldorf - Astoria Hotel. A divorce and marriage to the much younger Madeleine Talmadge Force caused a scandal. He and his new wife took an extended honeymoon abroad to wait out the controversy. Madeleine Astor's pregnancy cut short the trip. They booked passage on board the RMS *Titanic* which struck an iceberg and sank on April 15, 1912. John Jacob Astor IV was among the more than 1,500 victims of the sinking.

From the Wikipedia encyclopedia.

Charles R. Huntley

Huntley was also an incorporator of the Cataract Power and Conduit Company. However, he was most famous for his role as president of the Buffalo General Electric Company which, would absorb the Cataract Power and Conduit Company in 1915. Huntley appropriately served on the Executive Committee of the Board of Managers of the Pan-American Exposition. The existing steam electric station in Tonawanda is named in his honor.

From the University of Buffalo

George Urban, Jr.

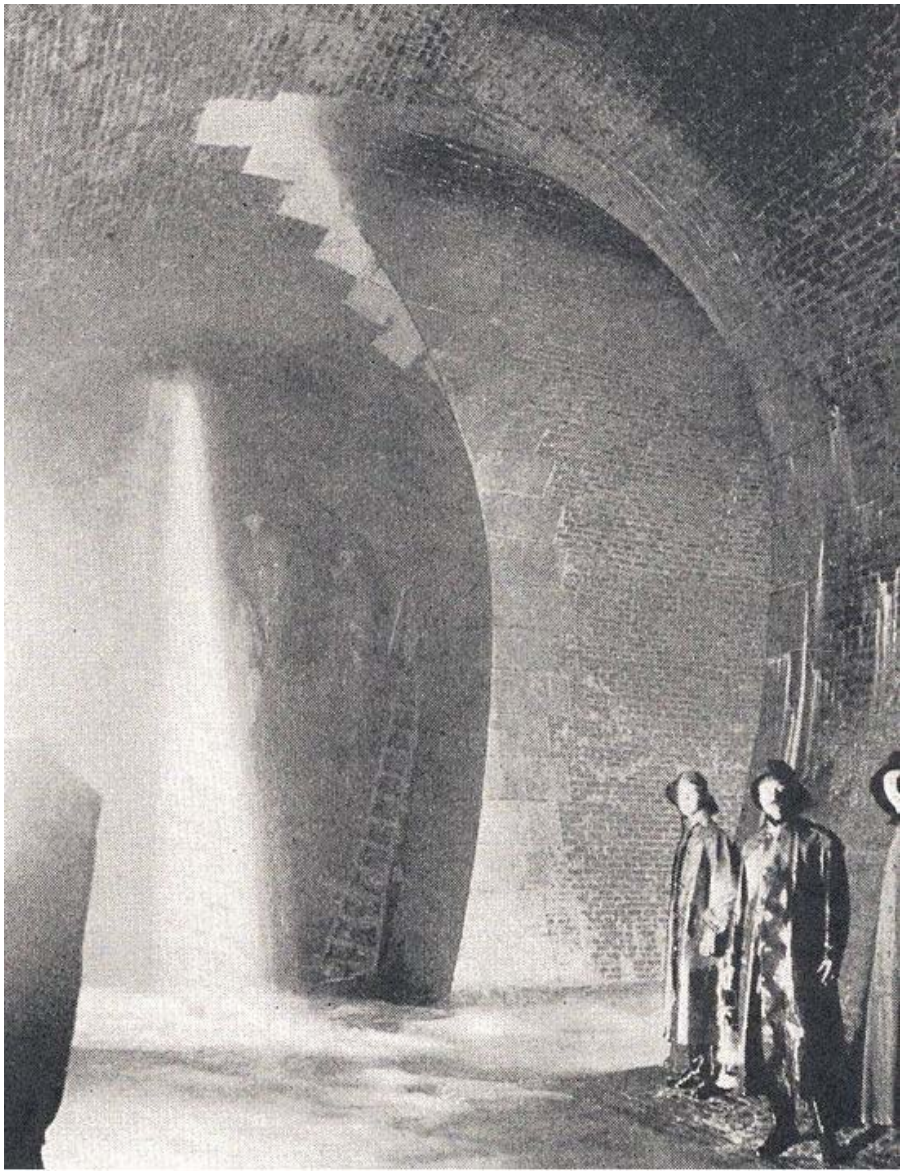
President – Cataract Power & Conduit Company

Urban headed the George Urban Milling Company and was involved in banking, insurance and numerous business interests. He was an incorporator and President of the Cataract Power and Conduit Company and served as an organizer and president of the Thomson-Houston Electric Light and Power Company before it was absorbed by the Buffalo General Electric Company. In 1901, he served on the Board of Managers of the Pan-American Exposition Company and would be a prominent figure in developing the electrical power industry in Western New York.

From the University of Buffalo

In June 1902, the the Adams Station was unwatered to inspect its hydraulic power tunnel. The 2280 Niagara Street station was used to back feed power from Buffalo to the Niagara Falls Power Company's customers in Niagara Falls.

The entire process was so complicated that few present day operators could plan and carry the program out. The evolution was not without incident, though, since as noted "some spectacular fireworks" occurred when one circuit breaker failed.



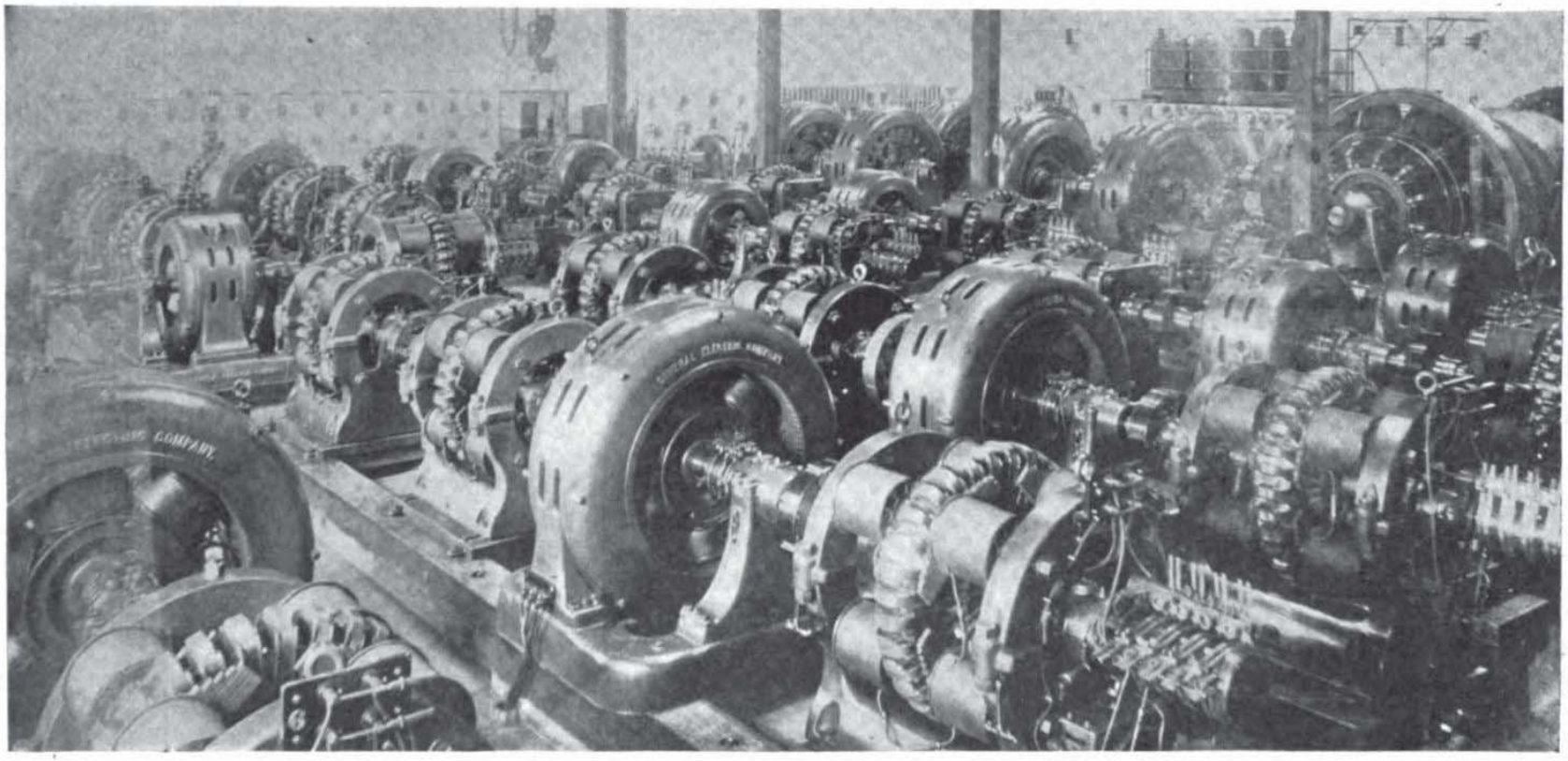
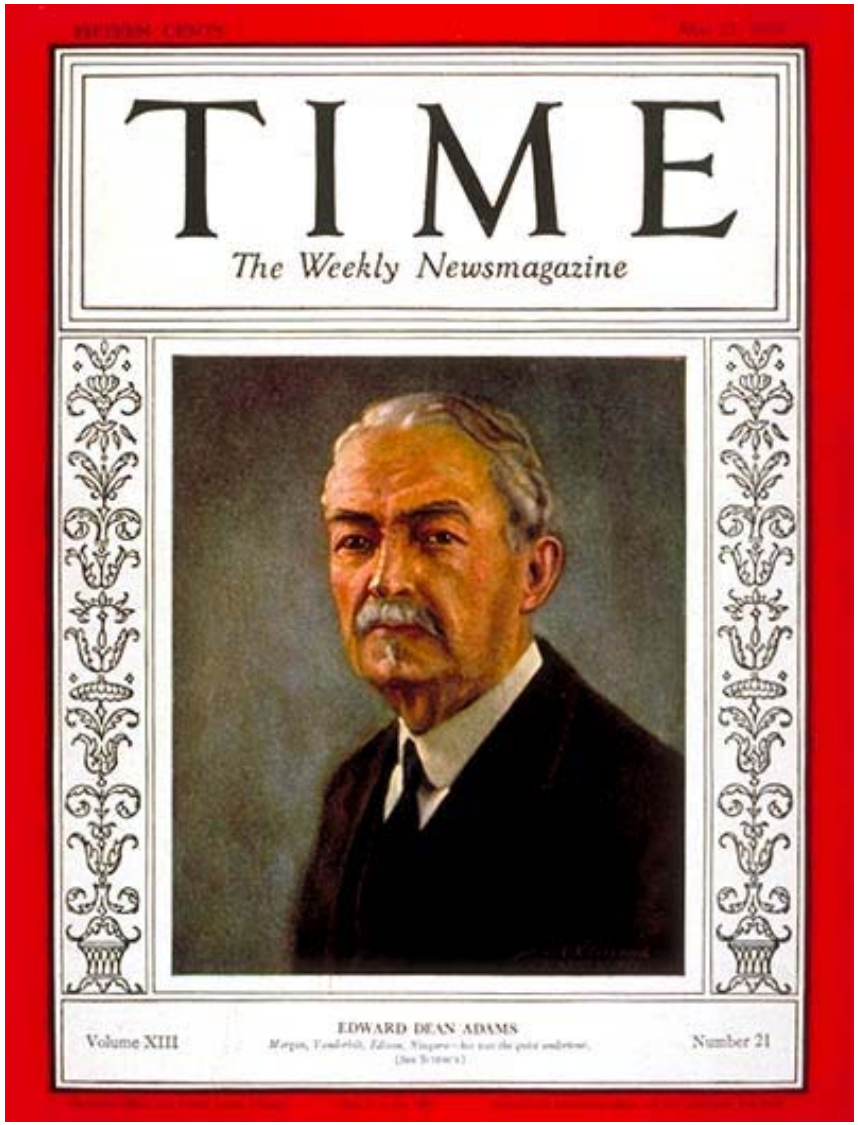


FIG. 1.—POWER HOUSE OF THE BUFFALO GENERAL ELECTRIC COMPANY.

The Cataract Power and Conduit Company was purchased by the Buffalo General Electric Company. It later became part of the Niagara Mohawk Power Corporation and is now part of The National Grid Company. Mr. Adams proudly stated that Cataract "... had never lost a customer on account of dissatisfaction with its rates or service."

Photo from "Electrical World and Engineer" Dec. 10, 1904



Edward Dean Adams

The President of the Caaract Construction Company and Director of the Niagara Falls Power Company as he appeared on the cover of the November 27, 1929 issue of Time Magazine. Adams was a prime mover of his namesake generating stations, the Buffalo Terminal House and many other developments. Adams was also the author of the two volume "Niagara Power – The History of the Niagara Falls Power Company" from which most of this material is taken.

Mr. Conrad Mikulec, the owner of the famous building at 2280 Niagara Street, intends to seek national historical recognition for the edifice. It will then be renovated and named the "Adams City of Lights." Its new entrance will incorporate the motif of the Adams Power House portal.

The technologist Mikulec plans to use the structure for the manufacture of fire detection electronics. The modern facility will create about 20 well paying, high skilled jobs at the site. He also plans to seek funds from the Niagara Greenway Commission for the renovation. In addition, he will apply for a hydro power allocation from the New York Power Authority to fuel the process. This time, the building will only require about 300 hp. The original transmission was 1,000 hp.