



THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS, INC.

NATIONAL HISTORIC ENGINEERING LANDMARK

Dedication, Sept. 15, 1977

VULCAN STREET PLANT

Constructed 1882

WISCONSIN MICHIGAN POWER COMPANY
Appleton, Wisconsin



DEDICATION CEREMONY

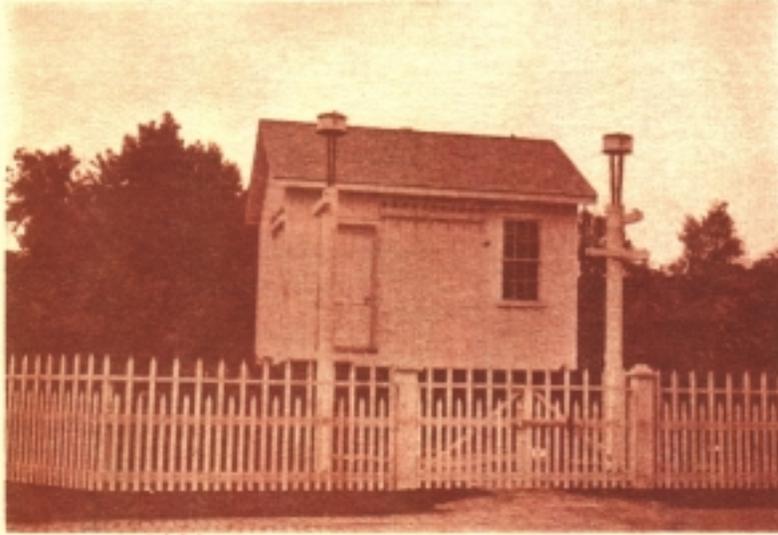
September 15, 19s77
Vulcan Street Plant
807 S. Oneida Street
Appleton, Wisconsin

- 4:00-6:00 PM** Tours of Vulcan Street Plant and Power Company Museum
- 5:00 PM** Dedication Ceremony with Plaque Unveiling
- 6:00 PM** Cocktails, Martine's, College Avenue, Appleton, Wisconsin
- 7:15 PM** Dinner, Martine's
- 8:15 PM** Addresses—Engineering Society Officers
- 8:30 PM** Address—Mr. Otto Boll, Manager of Engineering, Wisconsin Michigan Power Company.
“History of the Vulcan Street Project”

FOREWORD

The following pages on the history of the Vulcan Street Plant have been taken from a Wisconsin Michigan Power Company Souvenir Booklet commemorating the 50th anniversary of the plant in 1932. Contemporary records showed that it was the world's first hydro-electric central station, and began operating only 26 days after Thomas Edison's first steam plant began operating on Pearl Street in New York, September 4, 1882.

Since then, records have been found which indicate that the Vulcan Street Plant may not be the world's first hydro-electric central station, and may not be, in fact, the first hydro-electric central station in the United States. But it is the first Edison hydro-electric central station to serve a system of private and commercial customers in North America. The story of its development provides keen insight into the nation's first experiences with the electric light.



Replica of the world's first hydro-electric central station which began operation at Appleton, Wisconsin, in 1882. In this souvenir booklet it is referred to as the Vulcan Street Plant.

Golden Jubilee Anniversary Celebration

World's First Hydro-Electric
Central Station

APPLETON, WIS.

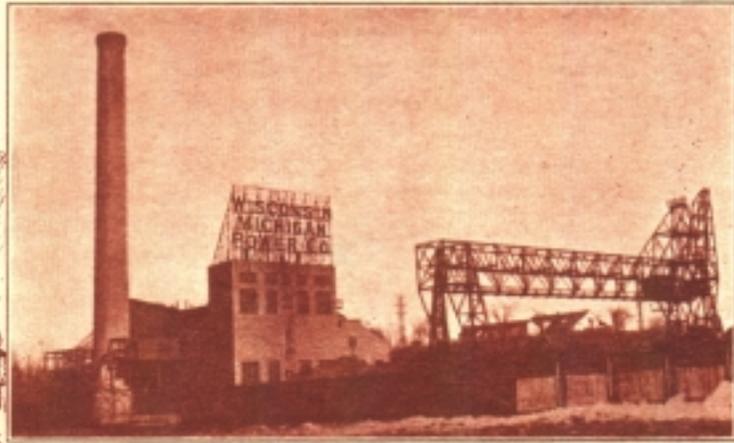
1882 -- September 30 -- 1932

Sponsored by

Wisconsin Utilities Association

..... and

Wisconsin Michigan Power Company



To the left, an old line drawing of the original Vulcan Street Plant—the world's first hydro-electric central station located at Appleton in 1882, and above its present day successor, the modern and efficient steam plant of the Wisconsin Michigan Power Company. :: :: :: ::

1882 — WORLD'S FIRST HYDRO-ELECTRIC CENTRAL STATION GOLDEN JUBILEE CELEBRATION — 1932

PROGRAM

DINNER MEETING

Friday — September 30 — 6:00 P. M.

Company Service Station at South Oneida Street

TOASTMASTER

E. J. STEINBERG, *President, Wisconsin Utilities Association*

INVOCATION..... REVEREND DOCTOR J. A. HOLMES, Pastor, Methodist-Episcopal Church, Appleton

ADDRESS..... A. K. ELLIS, Vice-President and General Manager, Wisconsin Michigan Power Co.
"Development of the Company"

ADDRESS..... S. B. WAY, President, Wisconsin Michigan Power Company
"Tribute to Local Pioneers Who Started the Enterprise"

ADDRESS..... EDWIN GRUHL, President, The North American Company
"Tribute to Thomas A. Edison"

PUBLIC OUTDOOR MEETING

Friday — September 30 — 8:00 P. M.

Company Service Station at South Oneida Street

MASTER OF CEREMONIES

A. K. ELLIS, *Vice-President, Wisconsin Michigan Power Company*

MUSIC..... Wisconsin Gas and Electric Company Employe Band, Racine

ADDRESS..... HONORABLE JOHN W. GOODLAND, JR., Mayor of Appleton

ADDRESS..... F. J. SENSENBRENNER—"Development of the Fox River Valley"

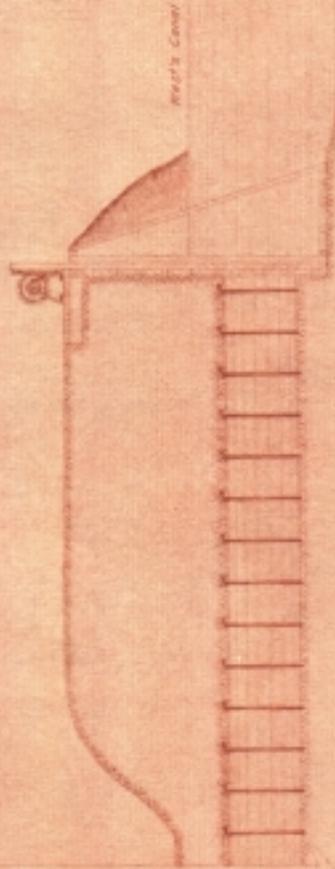
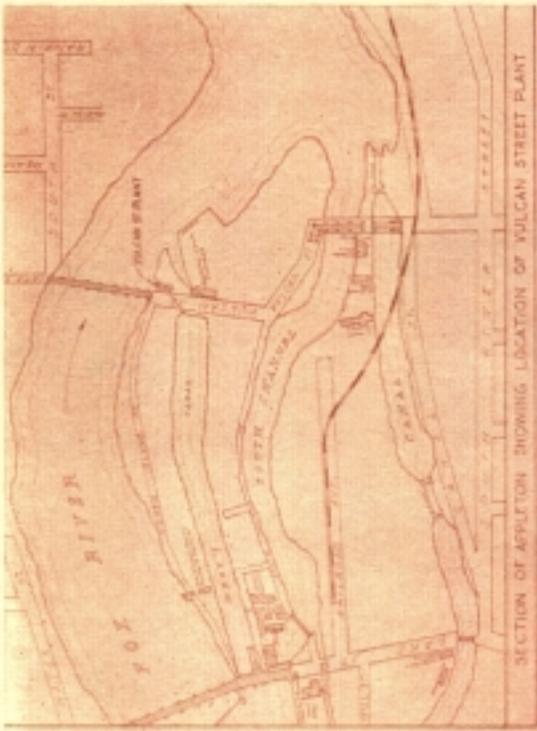
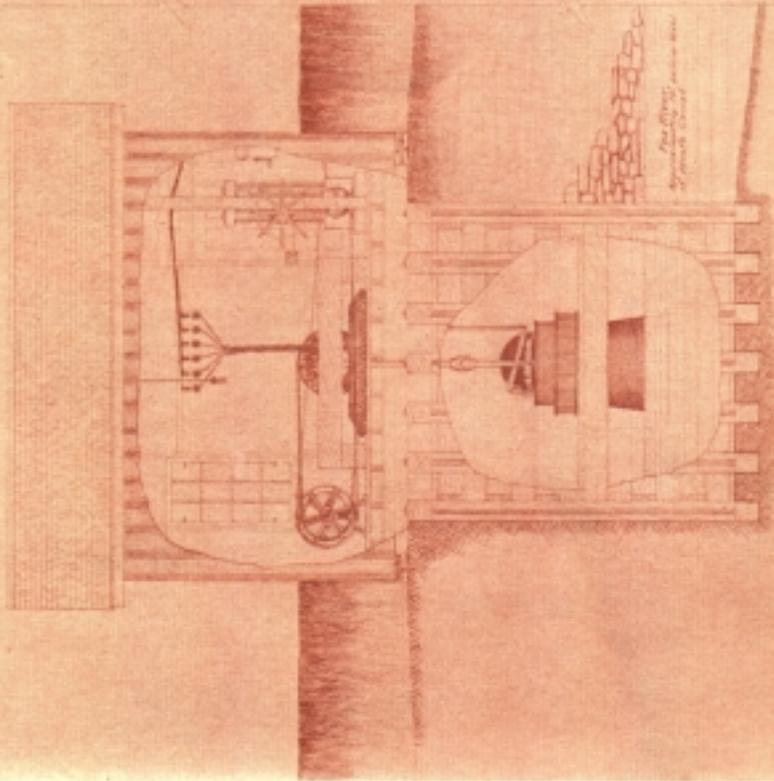
OPENING OF REPLICA PLANT AND DEDICATION EXERCISES

PRESENTATION OF—WM. KURZ—EDWARD O'KEEFE—AL. LANGSTADT

EXHIBITS DISPLAY

Company Service Station at South Oneida Street

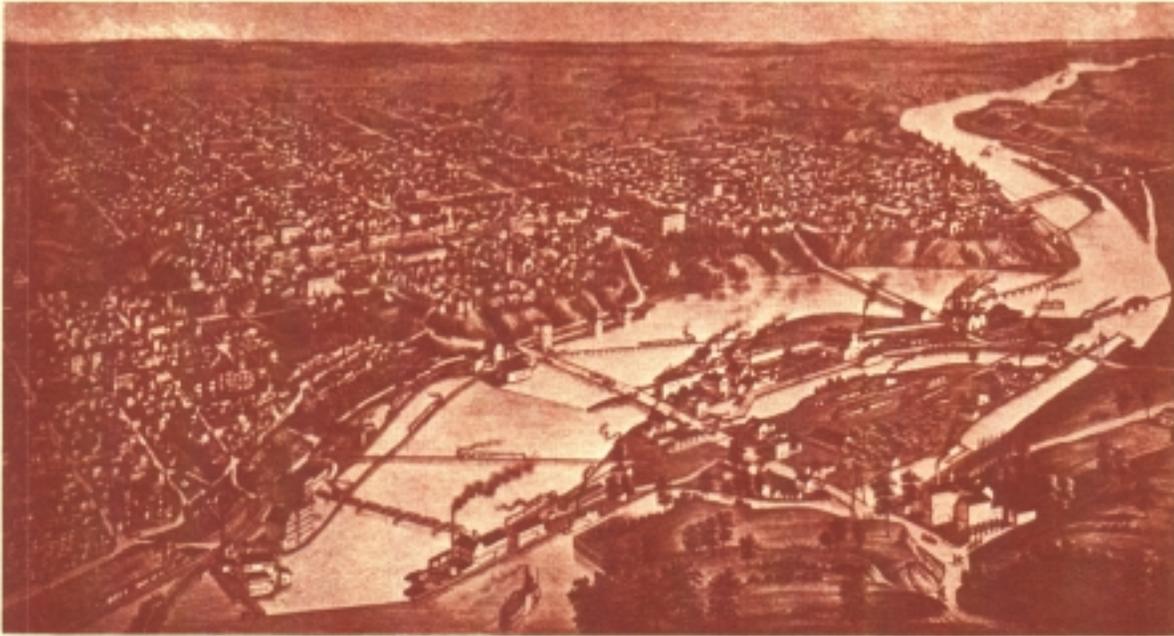
CROSS SECTIONAL DIAGRAM AND LOCATION MAP
 OF THE
 WORLD'S FIRST HYDRO ELECTRIC CENTRAL STATION
 STARTED SEPTEMBER 30, 1862
 APPLETON, WISCONSIN



WISCONSIN MICHIGAN POWER COMPANY

SEPTEMBER 30, 1932

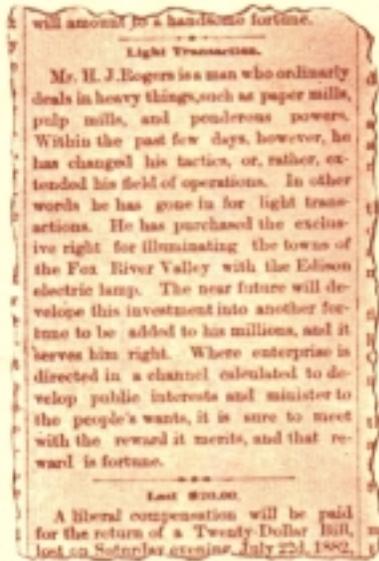
NOTE
 The above plan was prepared from the original plan of the original station. Street shown above the plan is the location of the original plan. The plan was prepared by
 Street SMITH & Lusk
 Date 11-26-32



Reproduced from an old bird's eye view showing Appleton of 1881



H. J. Rogers



Reproduced from July 27, 1882 issue of The Appleton Post

Fifty Years Ago

“The electric light is perfectly safe and convenient and is destined to be the great illuminating agent of the near future.”

With these prophetic words the editor of The Appleton Post on October 5, 1882, forecast the future of a then infant industry that since has more than fulfilled all early expectations.

It was on Saturday night, September, 30, 1882, that the world's first water driven electric central station was placed in successful operation at Appleton, Wisconsin. This fact was duly recorded in the weekly newspapers of the time—the Appleton Post of October 5, and the Appleton Crescent of October 7.

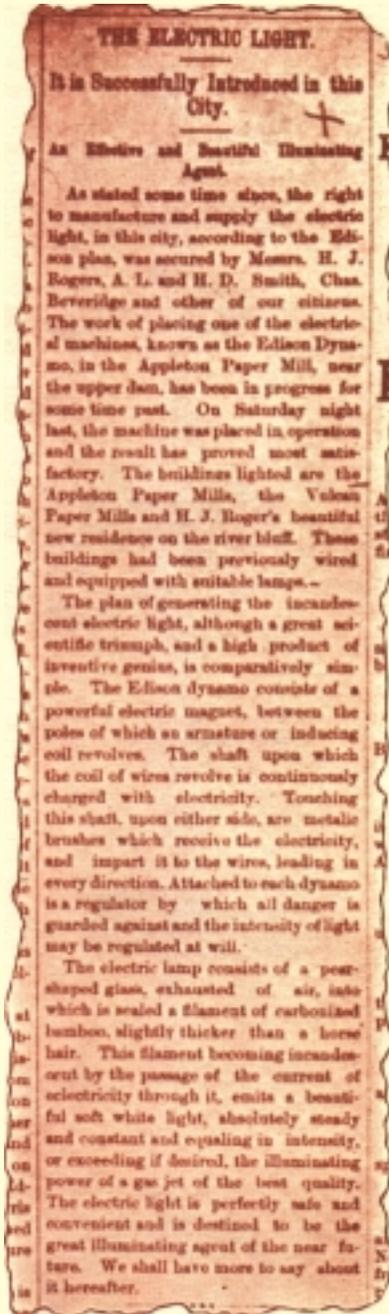
Three buildings were lighted—two paper mills and one residence. The people of Appleton went to see them in those early fall evenings and marveled, declaring them to be “as bright as day.” Then they went home to their own oil lamps or gas jets to discuss not only the new light, but many other things of significance and interest.

Files of the Appleton Post for 1882 show that those were stirring times, particularly in the booming city of Appleton. Long distance telephone connections were established, first with Oshkosh, 22 miles away, and soon all the way between Green Bay and Fond du Lac by way of Appleton, a total distance of 71 miles. Installation of an electric bell system to summon cash boys in Pettibone's store was regarded also as evidence of progress. A street railway system for horse-drawn cars was being projected, and workmen were sinking the first well for the water works.

Readers of the Post learned that Anna Eva Fay was coming to town for a mediumistic performance; that President Arthur vetoed the rivers and harbors bill of \$18,700,000 as being too large, and that the widow of Jesse James was returning some of his booty to the victims of the famous outlaw. Each week there were accidents. Drownings were frequent, and murders and suicides were not rare.

Those were the days of livery stables, porous plasters, wood and coal stoves and fleece-lined underwear, according to advertisements in the same newspaper. Doctors, dentists and lawyers were consistent advertisers, as were horse dealers and railroads. Patent medicines were offered, and presumably imbibed, in great profusion. A parlor organ, it seems, was required to impart the proper musical tone to the well regulated household.

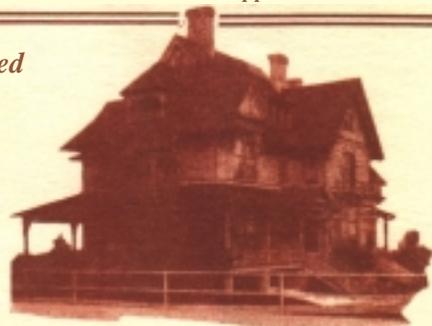
Into such surroundings came electric service first in form of light, then power and heat, to contribute to and in many instances make possible the progress that since has been achieved.



Reproduced from October 5, 1882 issue of The Appleton Post

The H. J. Rogers Home--First Residence Electrically Lighted

The first residence in the world ever lighted by electricity from a hydroelectric central station was served by the pioneer waterpower plant of 1882. This house, a familiar landmark in Appleton, Wisconsin, still contains the wiring, cleats, switches and electrical fixtures installed in 1882, all of which are still in operative condition. The house, occupied until recently when vacated pending settlement of an estate, has been served continuously — by the early plant of 1882, its several successors and the present Wisconsin Michigan Power Company.



Prophetic Comments
of the
Appleton Newspapers
of 1882

The Electric Light.
On Saturday last, the electric light producing machine which has been erected on the furnace grounds, was placed in successful operation. On Saturday evening the beautiful residences of our fellow citizens, A. L. and H. D. Smith, were illumined by this wonderful agent. Their dwellings, of course, presented a brilliant appearance, and were the objects of general admiration.

More Light.
The Electric Light Co. have their building down at the furnace completed and the machinery is now being placed. Although the structure is small it is built with that monumental solidity which will not admit of vibration. It stands on stone abutments and is braced and bolted in a manner calculated to give it enduring permanency. The power here supplied will be sufficient to carry from five to seven hundred lights. The Furnace, the Wooden Factory, the Valley Paper & Pulp mills, the new Paper Mill of Mr. Patton and the residences of Messrs H. D. and A. L. Smith will draw their electrical illuminations from this plant. The paper mill of Messrs Morrison and Billings will also be wired, and lighted by this power, in the near future.
The Edison electric light is a grand success and the enterprise of the corporation which has secured it for Appleton is worthy of municipal and individual commendation.

The Electric Light.
The gentlemen who have purchased the right to furnish the electric light for the city of Appleton propose to, at once, take active steps to introduce and utilize this beautiful illuminating element. To that end a site has been secured on the Furnace Co's grounds, and the work will be speedily commenced of erecting suitable buildings and machinery for dispensing the light. Several factories will be furnished with this means of illumination, and about thirty residents in the first ward have contracted to have their dwellings lighted from this source. Before snow flies, therefore, the electric light system will be in operation in Appleton.
Ultimately, this system will doubtless supplant gas as a means of lighting our streets. Through the efforts of Edison's genius the light can be subdivided so as to give any desired power.
The electric light will be one of the attractions of Appleton, in the near future.

Appleton Newspaper Advertisements of 1882



The Original Vulcan Street Plant

Below is an illustration, made from an old photograph, of the original building which housed the world's first hydro-electric central station. It was known as the Vulcan Street Plant. Its exact location is indicated in the upper right hand corner of the map illustration on page four; more detailed information also appears on the next pages.



First Hotel in Middle West Electrically Lighted

Waverly House, a popular hostelry of the early eighties and the pride of Appleton, was the first hotel in the middle west to be electrically lighted. It was served by the pioneer Appleton plant. Then already regarded as one of the finest hotels in the middle west, it became even more popular by virtue of being "electrically lighted in every room".





H. J. Rogers, prominent paper mill owner and operator who was the leader in introducing electric light in Appleton.



A. L. Smith, first president of the Appleton Edison Electric Light Company and one of its founders. He was a personal friend of Thomas A. Edison



Charles Beveridge, financially interested in the pioneer Appleton company and a member of its first board of directors.

Pioneering

Appleton, pleasant and progressive city in the bustling Fox river valley of Wisconsin, owes its distinction of having been served by the world's first Edison hydro-electric lighting system to the courage and foresight of a small group of its business leaders.

These pioneers of 1882 had no predecessors in the electric lighting business. The Edison system of producing light from power generated by dynamos had been demonstrated in exhibition plants, but its application to practical, commercial service had never been tested. Thomas A. Edison's original central station, the Pearl street plant in New York, was still under construction when the Appleton plant was being projected.

Under such circumstances H. J. Rogers, A. L. Smith, H. D. Smith, Charles Beveridge and a few others in vested funds and staked their business judgment in this brand new enterprise.

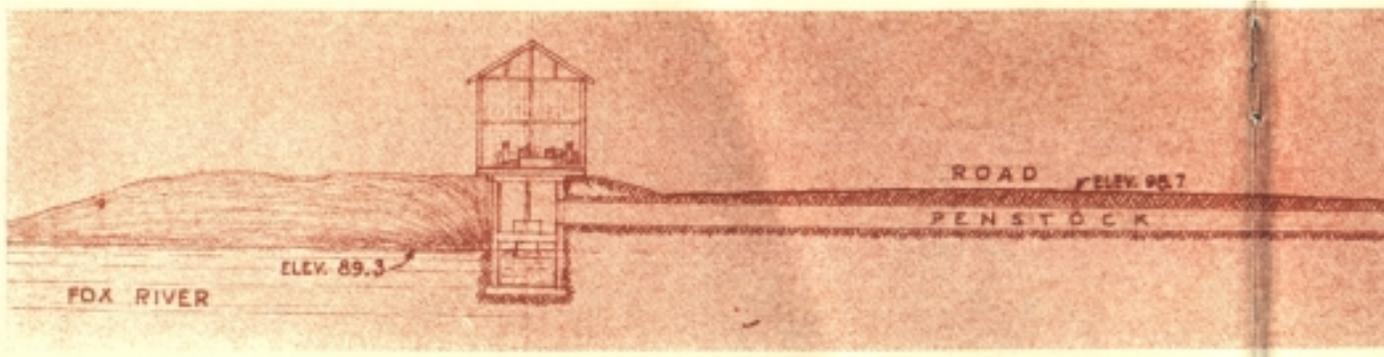
The electric lighting system that they established was the first in the world to be operated by water power and the first central station system of any kind in the west, thus sharing historic interest with the Edison steame-driven Pearl street lighting plant. Contemporary records show that the New York plant began operation September 4, 1882, and the Appleton plant September 30, 1882.

Mr. Rogers was the moving spirit in the introduction of electric light in Appleton. He was president of the Appleton Paper and Pulp Company and, odd though it may seem, president of the Appleton Gas Light Company.

The story is told that Mr. Rogers first became inter



H. D. Smith, blast furnace owner and one of the founders of the early Appleton Company, a member of its board of directors and continuously identified with the company in an official capacity until the time of his death.



With Edison

ested in the electric light while on a fishing expedition with his friend H. E. Jacobs of Fond du Lac. Mr. Jacobs represented the Western Edison Electric Light Company of Chicago, incorporated May 25, 1882, for the licensing of Edison lighting plants in Illinois, Wisconsin and Iowa. Between nibbles, it is related, Fisherman Jacobs gave Fisherman Rogers a glowing oration on the future of the electric light.

At any rate P. D. Johnston, an engineer for Western Edison, appeared in Appleton in July to explain the new lighting system to a group of men headed by Mr. Rogers. As a result of his visit these men determined to test the possibilities of electricity for lighting their mills and their homes.

Mr. Rogers at this time was building a pretentious new home on a bluff overlooking the river. Probably a desire to provide his dwelling with all the newest conveniences partly prompted his interest in the electric light.

Two Edison "K" type dynamos were ordered, the first being installed in the beater room of the Rogers' mill. That mill, the Vulcan Paper Mill and the Rogers home were wired, and each was directly connected to the generator.

Little of the preparatory details was published at the time. There was still considerable public skepticism over the venture, and its sponsors were far from cocksure over what might happen. In fact a false start was made. On September 27 the dynamo was operated but the lamps wouldn't light. Edward T. Ames, who had installed the generator, was summoned from Chicago. Survivors of those thrilling times relate that



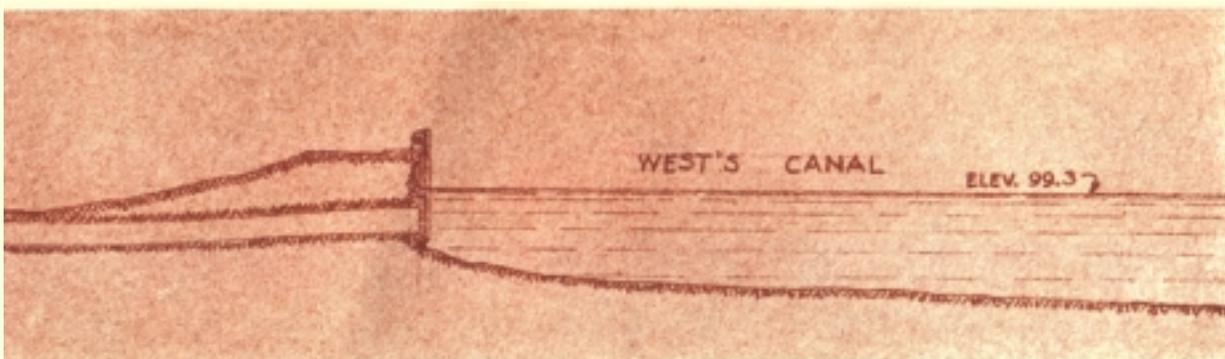
Wm. Kurz, first superintendent of the early Appleton plant, lone identified with it and still engaged in the electrical business in Appleton.



Edward O'Keefe, with his father, a consulting engineer of the early days, installed the water-wheel in the first plant. He still lives in Appleton.



Al. Langstadt, another present resident of Appleton who traces his utility experience to the pioneer days of the Appleton plant.



even Mr. Ames had to use the trial and error method of correcting the deficiency.

On the night of September 30, however, a successful start was made. As the dynamo gathered speed the carbonized bamboo filaments slowly became dull red, bright red and then incandescent. The miracle of the age had been performed, and the newspapers of the next week reported that the illumination was “bright as day”.

The early operators encountered plenty of problems but they conquered them with ingenuity and promptness. Because of the varying load on the paper mill beaters, the first generator ran irregularly, causing the lights to grow unduly dim or bright. Often the high voltage burned out the lamps. After a few weeks this condition was remedied by moving the machine to a lean-to attached to the mill office, where it was attached to a separate water wheel.

There were no voltage regulators, the operators being obliged to depend upon their eyes to gauge the proper brightness for the lamps. There was also no fuse protection, and when storms or falling branches caused short circuits the plant had to be shut down until the trouble was found and corrected. At first there were no meters. Customers were charged so much per lamp per month, and they often left lights burning all night, since it cost them no more. In 1882 service was from dusk to dawn; 24 hour service came along later.

Distribution lines were of bare copper wire. Early house wiring had very little more protection. The thin wires were covered with a light insulation of cotton. The rubber casing in use today was not known



Old style lighting switch with cover removed



Wooden fuse cutouts showing various styles for different cross connections



An installation of fuse cutouts dating back to about 1883



Appleton Pioneered Also In Electric Street Railway Operation

The same pioneering spirit which led to the establishment of the world's first hydro-electric power plant, manifested itself in 1886 when the street railway system of Appleton was electrified. The early view of College Avenue illustrates the type of electric street cars employed in the late eighties.

then. Wires were fastened to walls with wooden cleats, and tape was wound around wires when they passed through partitions. Early fuse blocks were of wood, and wood was extensively used for sockets and switch handles.

Examples of all of this type of early equipment may still be found in the Rogers' home. This building was the first residence in the world to be lighted by electricity from a hydro-electric central station. Until recently, when it became vacant pending settlement of an estate, it was served continuously by the electric utilities that followed in the footsteps of the pioneers. The original house-wiring and fixtures, after giving a half-century of service, are still in operative condition.

The second dynamo purchased in 1882 was placed in its own building along Vulcan street, and on November 25 began lighting the homes of A. L. and H. D. Smith. Meantime the dynamo in the Rogers mill continued in operation and by December five or six mills, a blast furnace and three or more homes were lighted by the Edison bulbs. Early the next year the Waverly House was wired, becoming the first hotel in the west with electric light.

Progress from that point was rapid. In 1886 two larger generators were purchased and placed in a new central plant on the site of Wisconsin Michigan Power Company's present motor bus station. When they were placed in operation, giving Appleton its first three-wire distribution system, the original model "K" dynamos were also moved to this location.

By 1886 Appleton had advanced to the electric street railway stage. It is claimed that the Appleton trolley car line, though not the first to be built, was the first to remain in regular operation. It was discontinued in 1930 when buses were found to be more suited to the city's needs.



Wood type of pendant and receptacle sockets



After months of search this wheel was located in the Crystal River about five or six miles out of Waupaca. It is now installed in the replica plant and is an exact type of the original Elmer wheel used in the first plant. It was manufactured by Morgan and Bassett, now the Appleton Machine Company, under the patents of Mr. Elmer, the inventor, who was a resident of Berlin, Wisconsin. Despite the number of years this wheel was partially buried in the Crystal River, the wooden gears in the core wheel are still intact and in operative condition. Mr. W. J. Roach of the Waupaca Electric Light and Power Company generously donated the wheel for installation in the replica plant. The original wheel, the hydraulic prime mover in the early plant, was believed to have measured 42 inches in diameter, operated under a head of approximately ten feet and at a speed of 72 R. P. M.



Method of mounting switch and fuse cutout in the early eighties



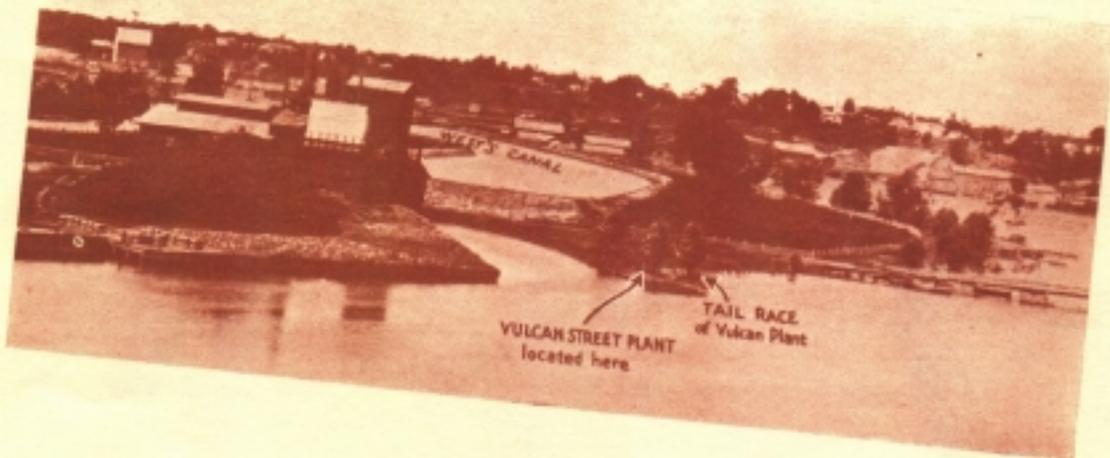
Type of lamp and lamp bases of 1882

Early Views of the Fox River Valley at Appleton, Wis.

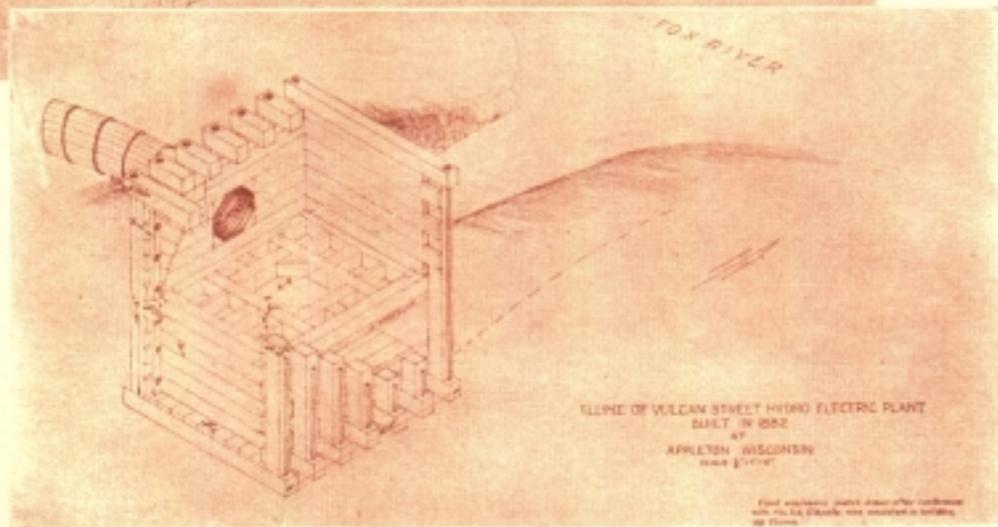
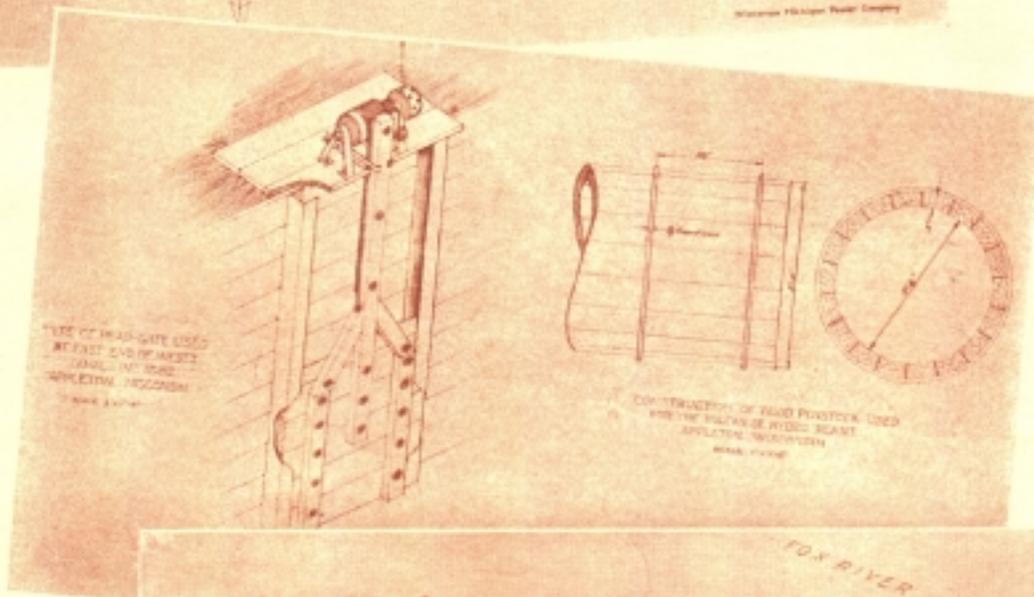
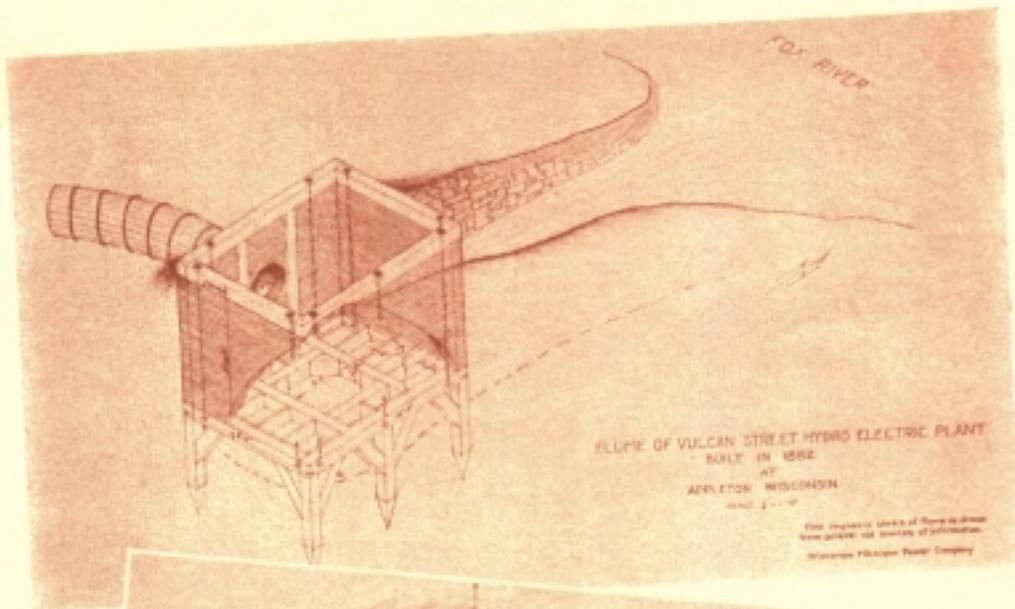
The view, immediately below, shows the early arrangement at the upper grand chute dam in Appleton about the time the first type K generator was installed. The building marked "rake factory", later a paper mill, housed the machine. In the building marked "Conkey's Flour Mill" was located one of the first commercial customers. Across the river, in the building marked "Pulp Mill", was located another early customer. The site on which this "Pulp Mill" stands now houses the steam and hydro-electric plants of the Wisconsin Michigan Power Company.

The lower view shows the site of the Vulcan Street Plant. The building was located on the little point where the three trees stand. The little bay to the right of the point was the plant tail race. To the left was West's Canal from which water was drawn for the Vulcan Street Plant.

Open view of miniature model to the right illustrates water-wheel and interior arrangement of the early Vulcan Street Plant.



1882 — WORLD'S FIRST HYDRO-ELECTRIC CENTRAL STATION



THEN...AND NOW

From the three customers originally served in Appleton by the 12 ½ kilowatt Vulcan Street Plant in 1882, Wisconsin Michigan Power Company has grown to serve nearly 93,000 electric customers in Wisconsin and Michigan with a generating capacity of over 600,000 kilowatts. The major portion of this generation comes from the Point Beach Nuclear Plant, which consists of two of the most reliable and efficient pressurized light water reactors in the world.

During these 95 years, the cost of electricity has continued to decline because of improved efficiencies and technology, and only recently have inflation and the cost of fuel forced it up. But if we proceed with the same dedication and determination as the men behind the Vulcan Street Plant, the nation can look forward to greater “technological firsts” that will assure a reliable supply of energy at a reasonable cost and a high standard of living for all.

ACKNOWLEDGEMENTS

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Chris White	Information Specialist
Les E. Muenster	Media Coordinator

The efforts and support of these many people are deeply appreciated.

Special Thanks

To Chris White and Les Muenster for their contribution to the content of this commemorative brochure, and to David Dehring for its compilation.

