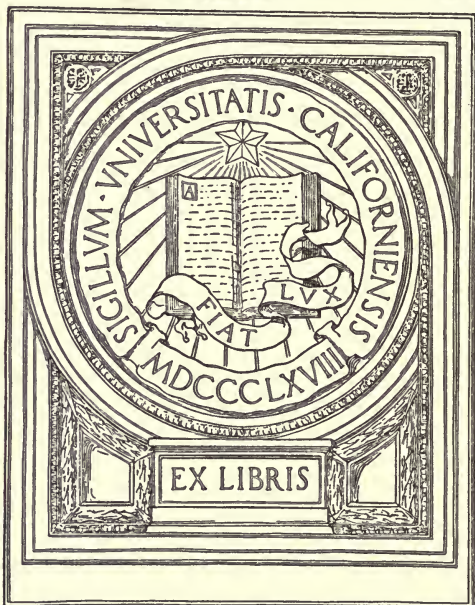


UC-NRLF



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IN MEMORIAM
George Davidson
1825-1911

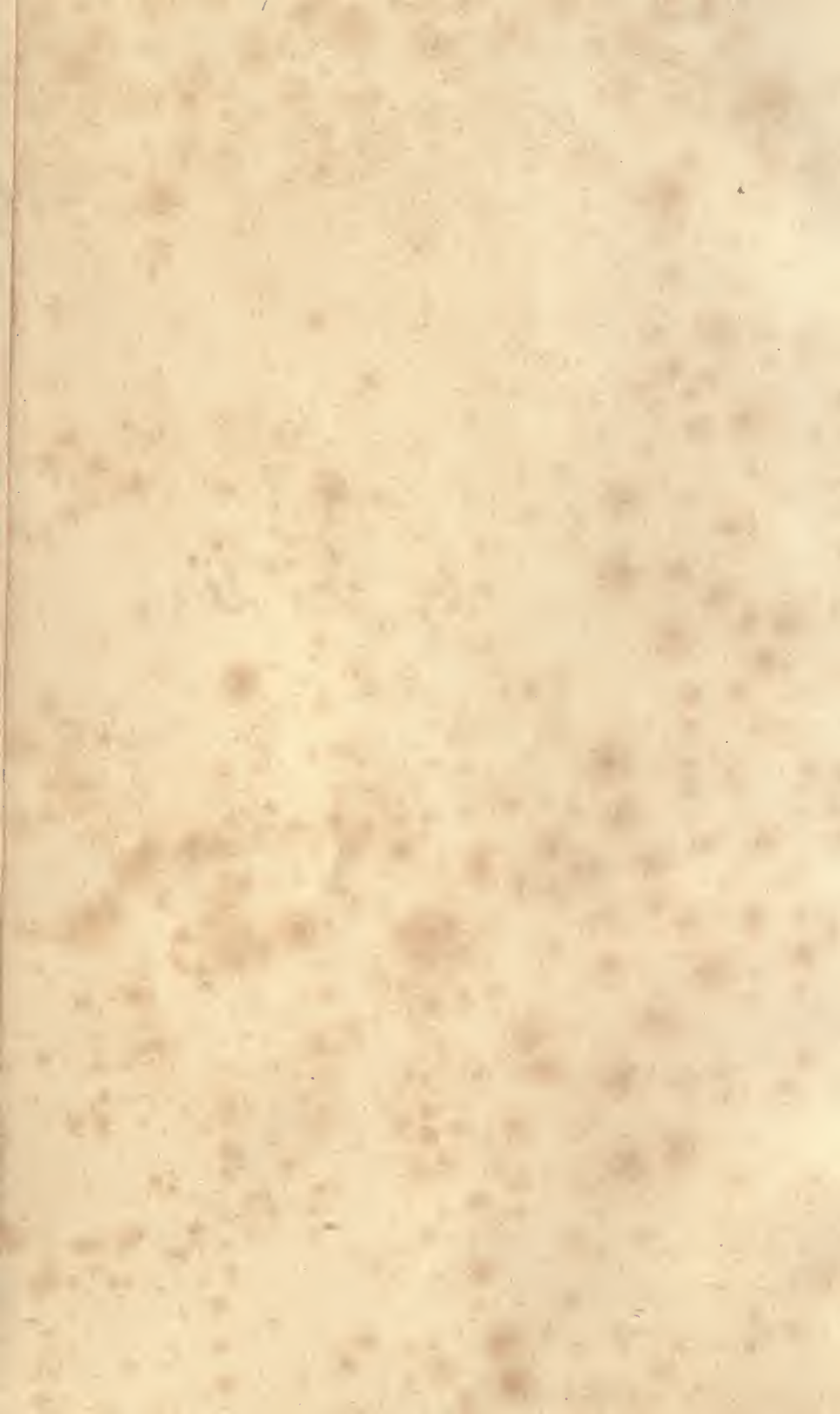


Professor of Geography
University of California

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asterisk

For
Mr. Daniel C. Jackson
with the compliments of
Thomas G. Murray.



POWER STATIONS



WATERSIDE STATIONS, THE NEW YORK EDISON CO.

POWER STATIONS

BY

THOMAS EDWARD MURRAY, LL.D., D.Sc.

*Past President Association of Edison Illuminating Companies, Member
American Society Mechanical Engineers, Fellow American
Institute Electrical Engineers.*



NEW YORK

1922

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THOMAS EDWARD MURRAY

Printed in U. S. A.

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PREFACE

The birthday of the central station industry engaged in the production and distribution of electrical energy for heat, light and power purposes can be assigned to the 4th of September, 1882. On that day regular commercial service was inaugurated from the old Pearl Street Station (New York) designed and built for the Edison Electric Illuminating Company of New York by the master of the industry—Thomas Alva Edison.

Many of the characteristic features of the most modern plant of to-day, such as direct connected units, high speed prime movers, water tube boilers, coal and ash conveying machinery and units operated mechanically and electrically in parallel were incorporated in this remarkable pioneer plant. While the total capacity of the six units of this early installation was less than one-sixth of the capacity of a single unit of one of our huge modern generating stations, it can be said to be the prototype of the stations that followed it for many years.

The problems that presented themselves then were largely questions of design and application for which there was no precedent and no experience to point the way. Now all these things have changed; the mechanical and electrical apparatus has become more or less standardized and the building of a large power plant is principally a matter of the economical arrangement of the equipment, the development of the structural design and the carrying out of the building and installation operations with the utmost efficiency in the utilization of labor and material.

To produce a structure which is pleasing to the eye and which fulfils its mission from an operating standpoint and at the lowest possible cost, represents a co-ordination of administrative, engineering and constructive functions which can be secured only through an experienced and competent organization capable of synchronizing the preparation of specifications, placing of contracts and the routing and delivery of all of the immense amount of materials and supplies that enter into such a complex structure as a modern power station.

It is necessary that the organization provide for inspection in the field of the materials and equipment, provision for their delivery in the order and at the time required, and the handling, storage and accounting for the supplies as they arrive on the job.

In the following pages are described and illustrated some of the largest plants—steam and hydro-electric—amounting in total to over a million and a half horsepower, which have been designed and constructed during the past twenty years by Mr. Thomas E. Murray and associated engineers.

A careful study of this volume will be of interest to operators as well as builders of central power stations and will reveal many unique features in construction and arrangement, embodying the results of long experience in connection with the construction and operation of some of the largest hydro-electric, street railway and steam generating systems in the country.

JOHN W. LIEB.



THOMAS ALVA EDISON

The Master Pioneer of the Electrical Industry, to whose inventive genius we owe the conception of the central station and who was the builder of the first central station for the generation and distribution of electricity for light, heat and power.



ANTHONY NICHOLAS BRADY

To whose economic vision and constructive genius the Electrical Industry is indebted for the expansion of the Public Utility enterprises that made possible the building of electric power stations aggregating over one million three hundred thousand horsepower.

INTRODUCTION

THE OBJECT of this volume is to supplement the book entitled "Electric Power Plants" published in 1910 and to make available in convenient and concise form some of the more important data relating to the design of several modern steam and hydro-electric stations which have been erected under the author's supervision, with illustrations of their outstanding features. Because of their related interest, a boiler plant for a Government War development and a boiler plant for an oil refinery have been included.

The design of a power station invariably presents new problems that must be solved for each individual case, not only because of local requirements of site and load characteristics, but also because of advances in the art and the rapid development that is taking place in the design of both the major and minor steam and electrical equipment.

The design of a modern station, with its complexity of detail, is not the product of a single mind and the author wishes to take this opportunity to renew his acknowledgment and appreciation of the efficient co-operation and assistance which he has received from the executive and engineering staffs of the companies concerned and of his own engineering assistants.

THOMAS EDWARD MURRAY.

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MILLERS FORD STATION

The Dayton Power and Light Company

Dayton, Ohio



MILLERS FORD STATION, DAYTON, OHIO

MILLERS FORD STATION

DAYTON POWER AND LIGHT COMPANY, DAYTON, OHIO

Capacity: 45,000 kw.

Building: Brick with steel frame on concrete foundation.
Boiler Room, 144 ft. x 104 ft. Turbine Room, 117 ft.
x 74 ft. Electrical Galleries, 117 ft. x 39 ft.

Boilers: Six 1373 h.p. water tube boilers with superheaters
and Metropolitan Cinder and Dust Catchers.

Stokers: One fourteen retort underfeed for each boiler.

Stoker Drive: Motor and engine.

Forced Draft: Four turbine-driven blowers, 80,000 cu. ft.
p.m. capacity. One motor-driven blower, 80,000 cu. ft.
p.m. capacity.

Stacks: Two 16 ft. dia. steel, lined with 4 in. brick; 310 ft.
above boiler room floor.

Coal Handling: Steel tower on boiler house roof; coal is
distributed by three-ton coal car to bunker.

Ash Handling: Ashes removed in 1/2-ton cars from hoppers
to outside of building.

Steam Conditions: 200 lb. pressure, 125° F. superheat.

Condensers: One 30,000 sq. ft. surface, and two 15,000
sq. ft. surface, with combination turbine and motor-driven
auxiliaries.

Feed Pumps: Two 1,000 g.p.m. and two 500 g.p.m., turbine
driven.

Heaters: Two open feed water, each 500,000 lbs. per hour
capacity.

Service Pumps: Two 500 g.p.m. and one 300 g.p.m., tur-
bine-driven. One 300 g.p.m., motor-driven.

Generating Equipment: One 20,000 k.w., 6600 volts, 60 cycle, 3 phase, horizontal turbo-generator. Two 12,500 kw., 6600 volt, 60 cycle, 3 phase, horizontal turbo-generators.

Exciters: Two 170 kw. and one 110 kw., 240 volt, direct connected. One 100 kw., 240 volt, geared turbine unit.

Transformers: Two banks 900 kw., 6,600/230 volt. Two banks 200 kw., 6600/230/115 volt.

Motor Generators: One 12.5 kw. for battery charging.

Switching Equipment: Remote control electrically operated oil switches.

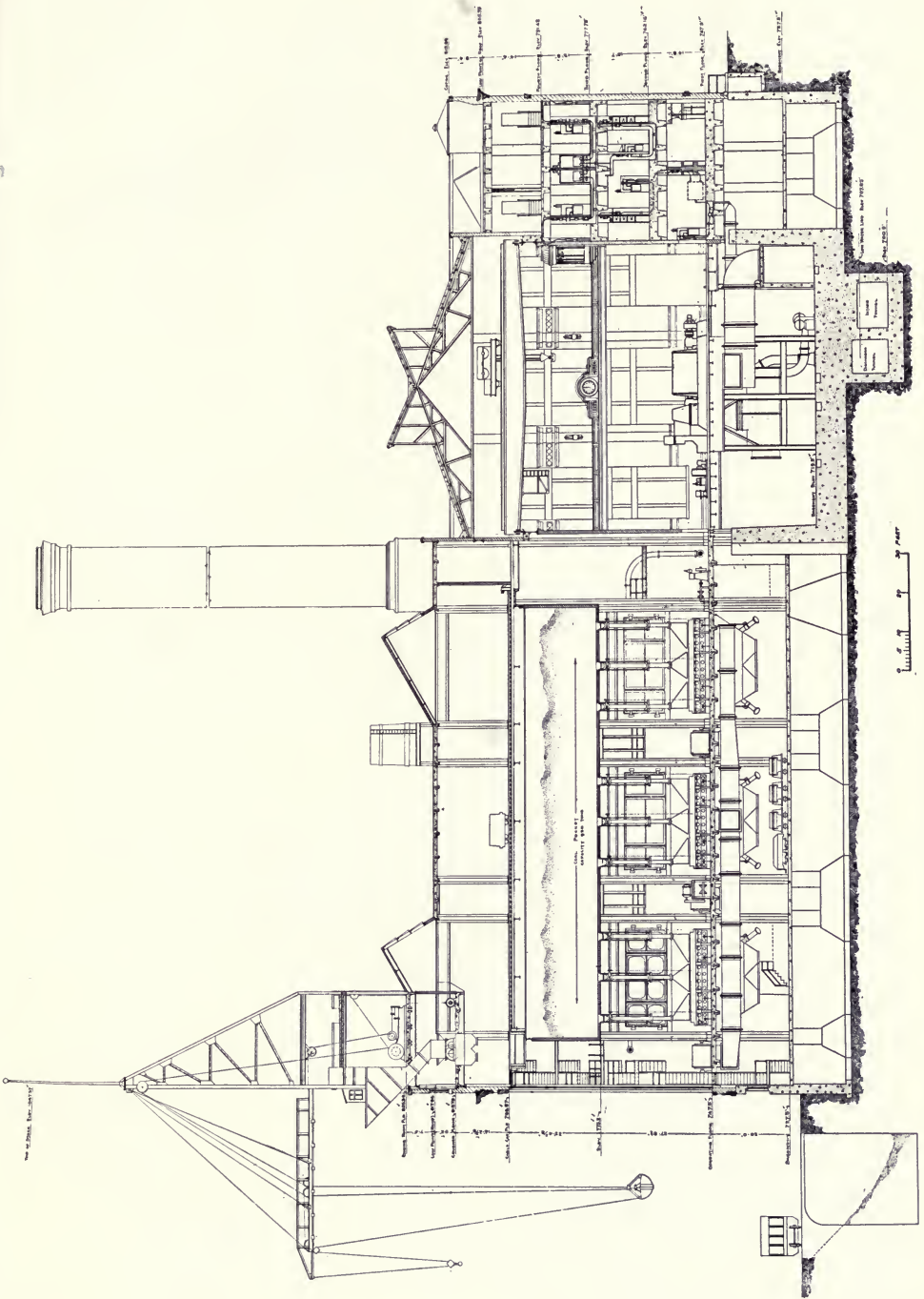
Storage Battery: 120 cell, 250 volt, 120 ampere for one hour.

Reactance Coils: Nine 700 amp., 6600 volt, single phase, 60 cycle, 400 kv.a. Eighteen 350 amp., 6600 volt, single phase, 60 cycle, 200 kv.a. Nine 25 amp., 6600 volt, single phase, 60 cycle, 5.7 kv.a.

Traveling Crane: One 75-ton, motor-driven, with 10-ton auxiliary hoist.

District Served: Lighting, industrial power and railways in City of Dayton and surrounding communities.

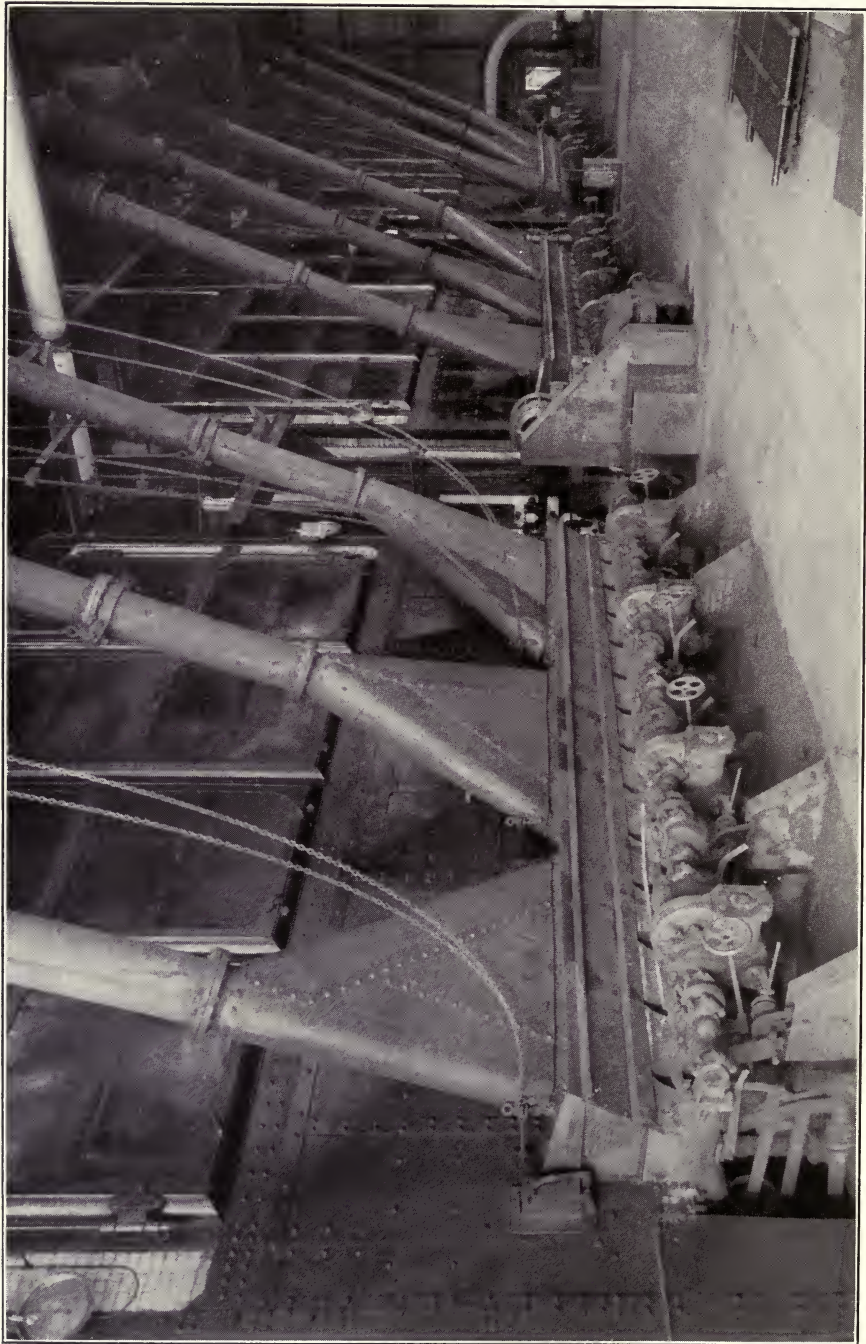
Built: 1918.



CROSS SECTION, MILLERS FORD STATION



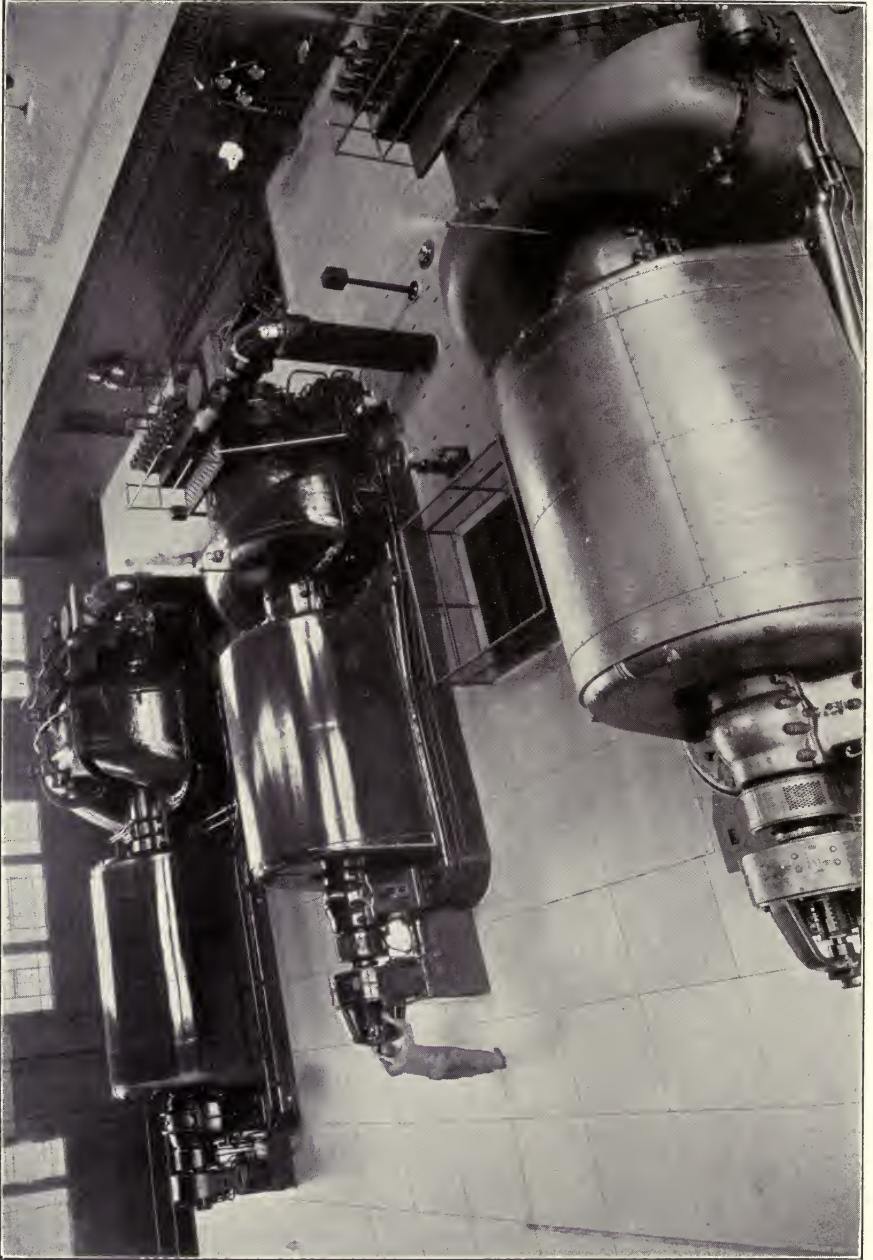
COAL HANDLING TOWER, MILLERS FORD STATION



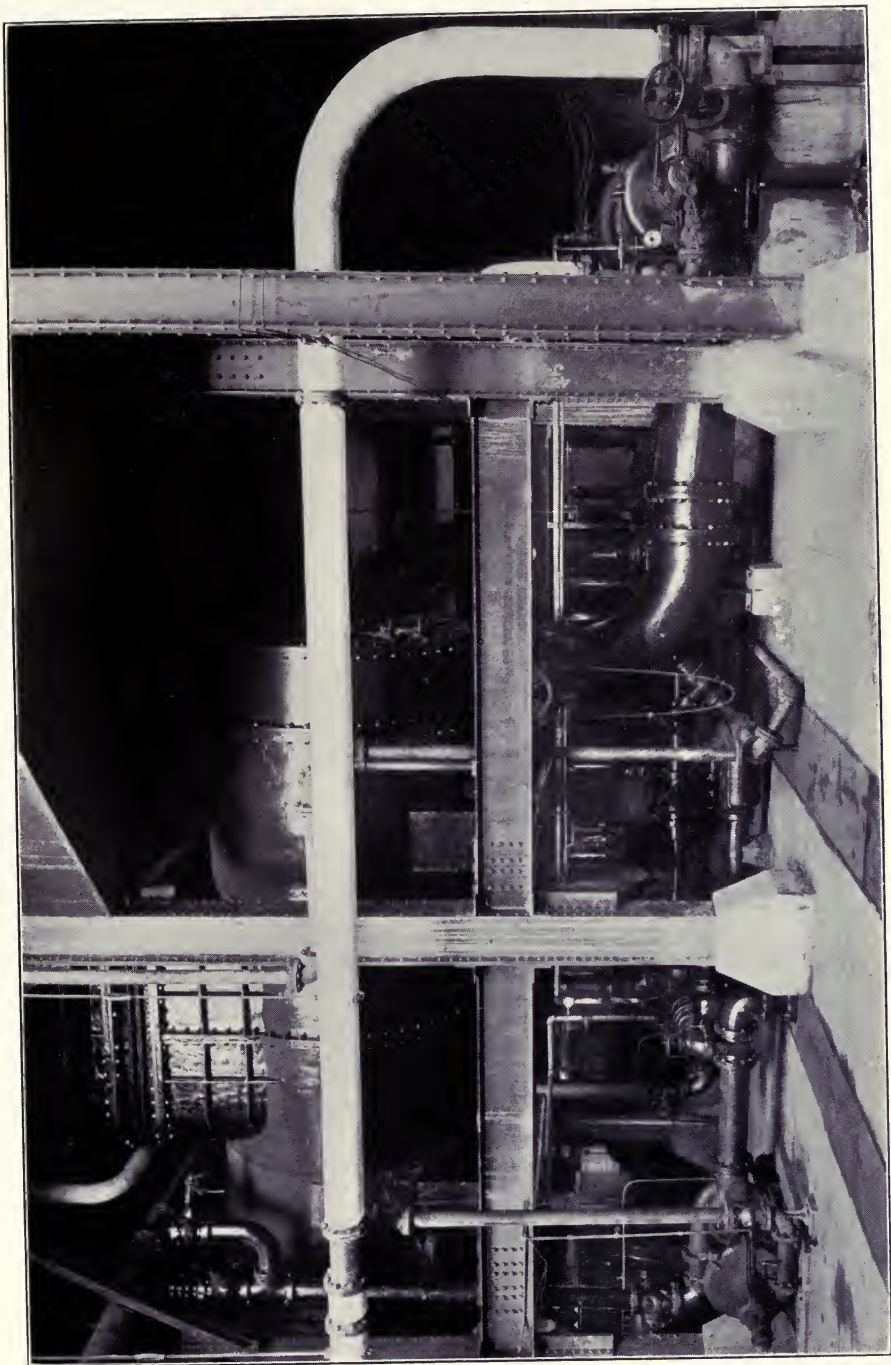
FIRING AISLE, MILLERS FORD STATION



FORCED DRAFT BLOWERS, MILLERS FORD STATION



TURBINE ROOM, MILLERS FORD STATION



CONDENSER, AUXILIARY APPARATUS AND FOUNDATIONS OF TURBO-GENERATORS, MILLERS FORD STATION

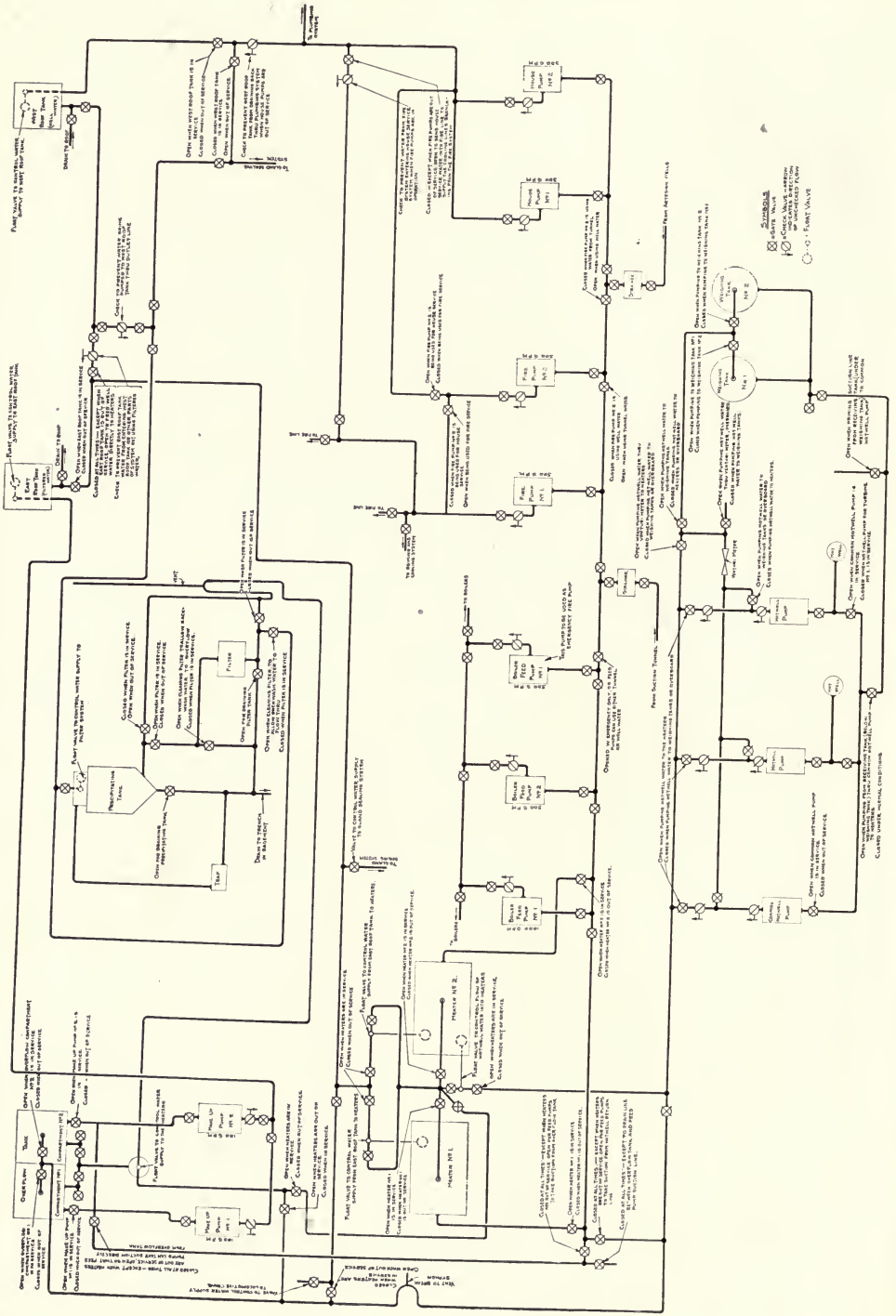
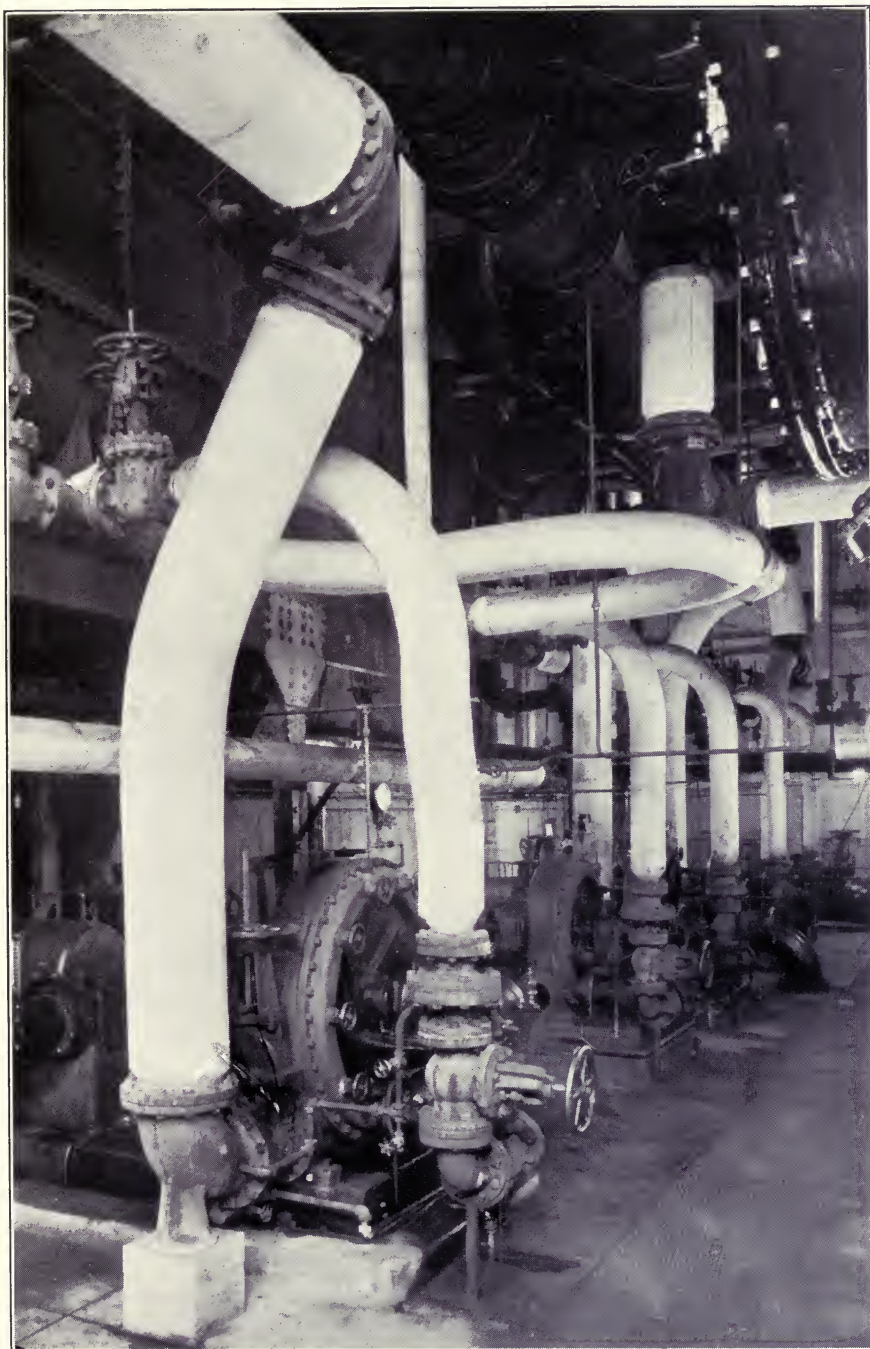
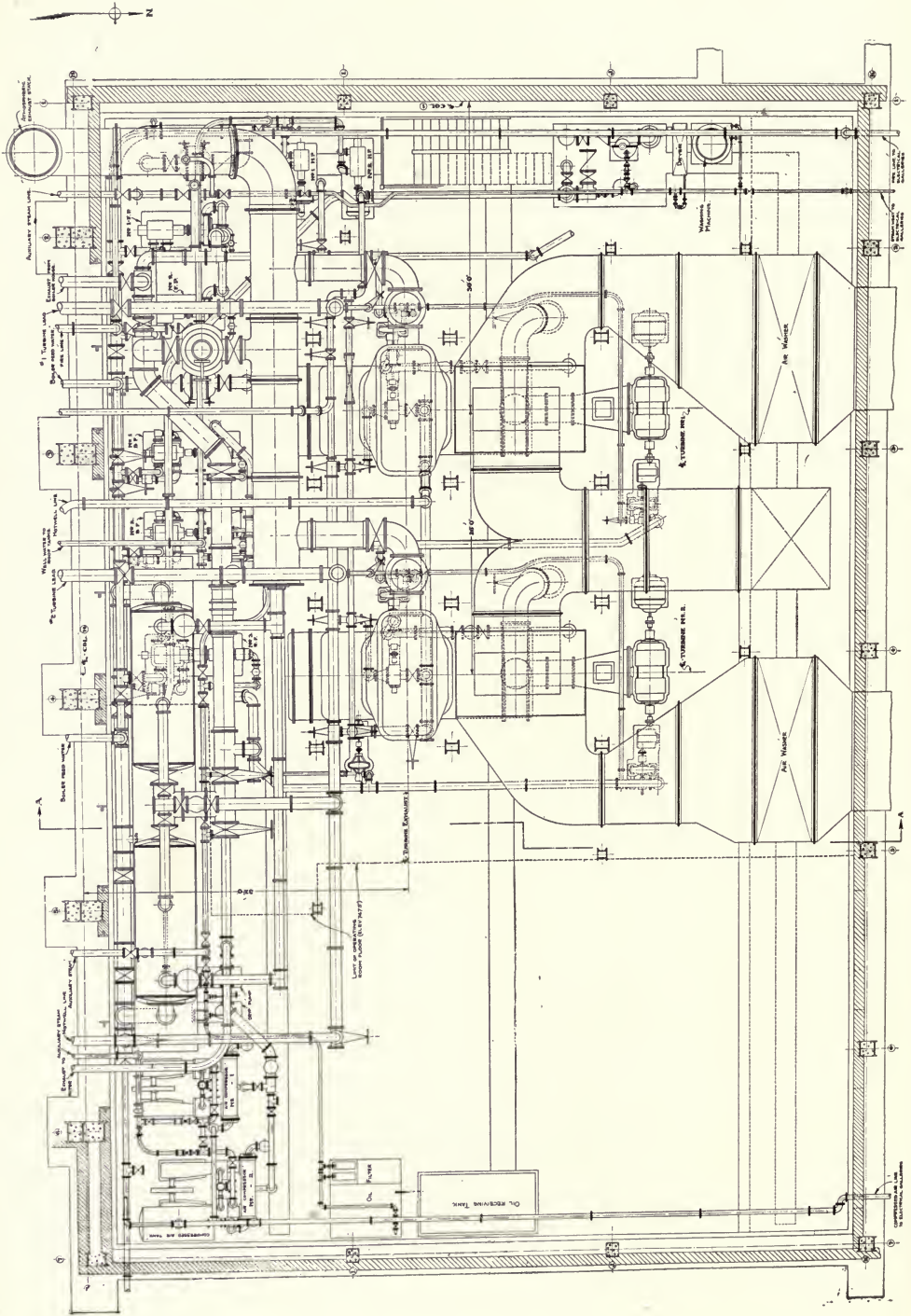


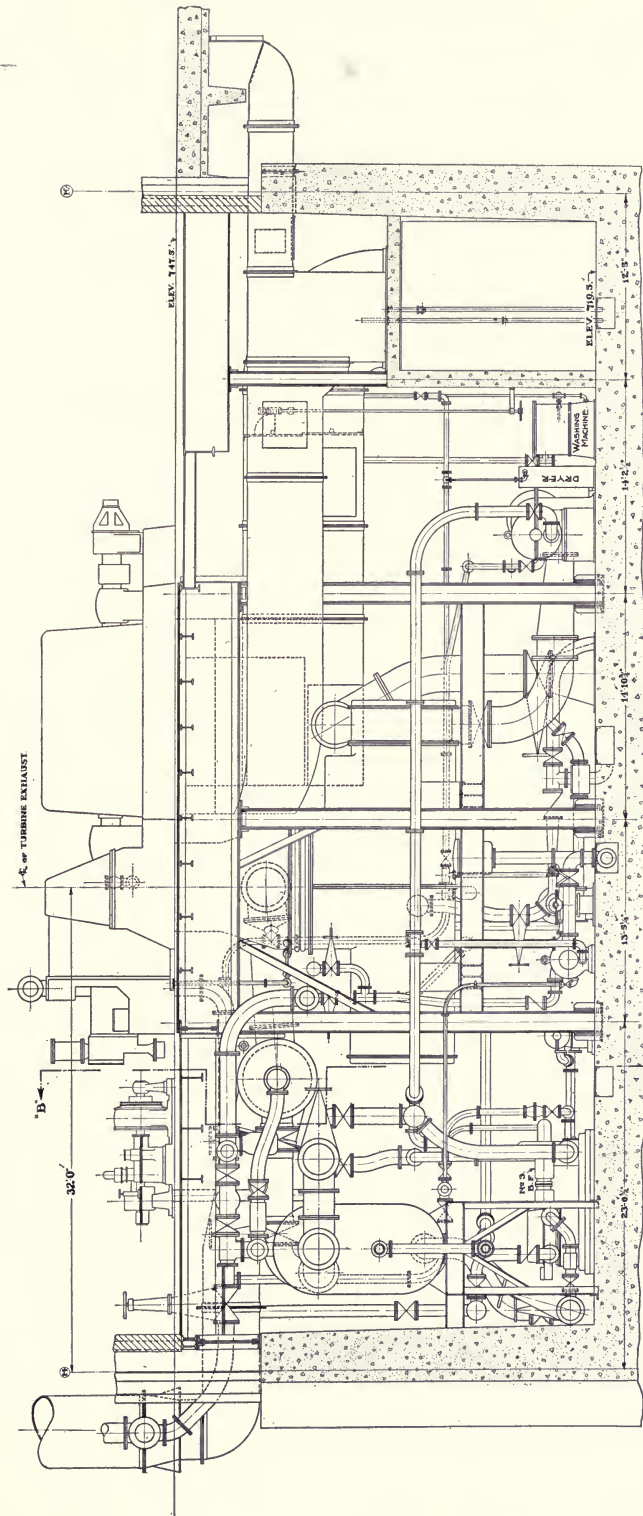
DIAGRAM OF WATER SYSTEM, MILLERS FORD STATION



BOILER FEED PUMPS, MILLERS FORD STATION



GENERAL LAYOUT OF PIPING IN TURBINE ROOM BASEMENT, MILLERS FORD STATION



CROSS SECTION THROUGH MAIN UNITS AND AUXILIARY EQUIPMENT, MILLERS FORD STATION



HIGH TENSION SWITCHBOARD, MILLERS FORD STATION.

RIVERSIDE STATION

Municipal Gas Company

Albany, New York



RIVERSIDE STATION, ALBANY, N. Y.

RIVERSIDE STATION

MUNICIPAL GAS COMPANY

ALBANY, NEW YORK

Capacity: 15,000 kw.

Building: Brick with steel frame. Concrete foundations, partly on piles. Boiler Room, 121 ft. x 51 ft. Turbine Room, 50 ft. x 73 ft. Electrical Galleries, 48 ft. x 73 ft.

Boilers: Six 650 h.p. water tube with superheaters.

Stokers: One 7 retort underfeed for each boiler.

Stoker Drive: Two 6 x 7 vertical engines with variable speed transmissions.

Forced Draft: Two 80,000 cu. ft. turbine-driven geared blowers, 7 in. static pressure.

Stacks: Two 9 ft., 6 in. diameter, steel, unlined. Height above boiler floor, 174 ft.

Coal Handling: Traveling tower with crusher on top of boiler house. Capacity, 45 tons per hour. Locomotive crane for storage.

Ash Handling: Dump cars.

Generating Equipment: Two 7500 kw., 80% p.f., 12,000 volt, 3 phase, 40 cycle, 2400 r.p.m., turbo-generators with direct connected exciters.

Steam Conditions: 200 lbs. pressure and 100° F. superheat.

Condensing Equipment: Two 8,000 sq. ft. surface condensers with turbine-driven auxiliaries.

Traveling Crane: One 50-ton electric with 10-ton auxiliary hoist.

Feed Pumps: Two 500 g.p.m. centrifugal pumps, turbine-driven.

Heaters: Two 6,000 h.p. open heaters.

Service Pumps: Two 500 g.p.m. centrifugal pumps, turbine-driven.

Exciters: Two 55 kw., direct connected. One 100 kw., steam-driven.

Transformers: Two 1,000 kv.a., 3 phase, 12000/2400 volt. One 40 kw., single phase, 2400/240/120 volt. Three 100 kw., 3 phase, 2400/240 volt.

Motor Generators: One 10 kw. battery charging.

Switching Equipment: Electrically operated oil switches.

Storage Battery: 120 cells, 240 volt, 60 amp. for one hour.

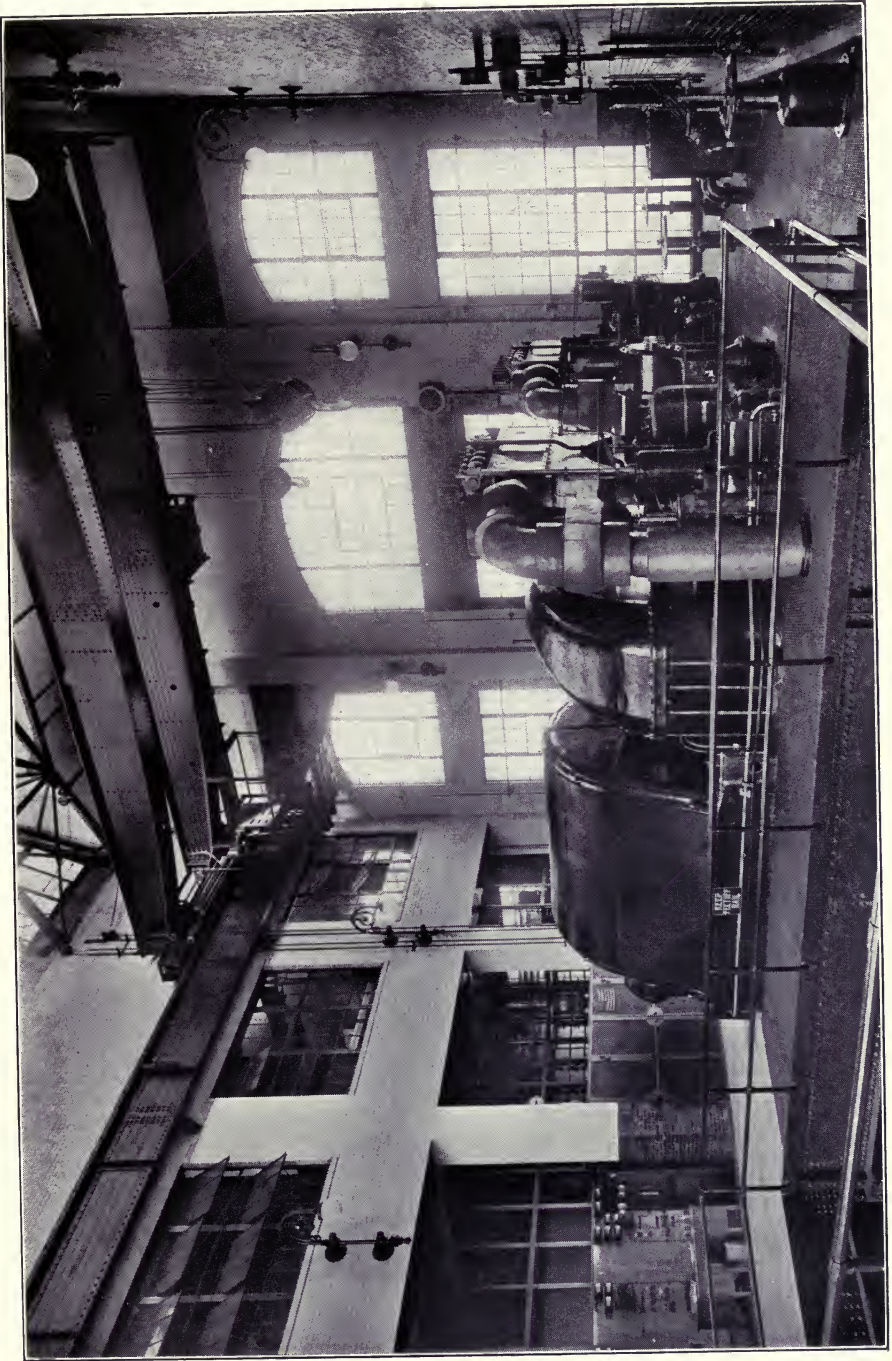
Reactance Coils: For 12,000 volt feeders and transformer banks.

District Served: Albany and outlying suburbs. Connections made with Cohoes Power and Light Corporation.

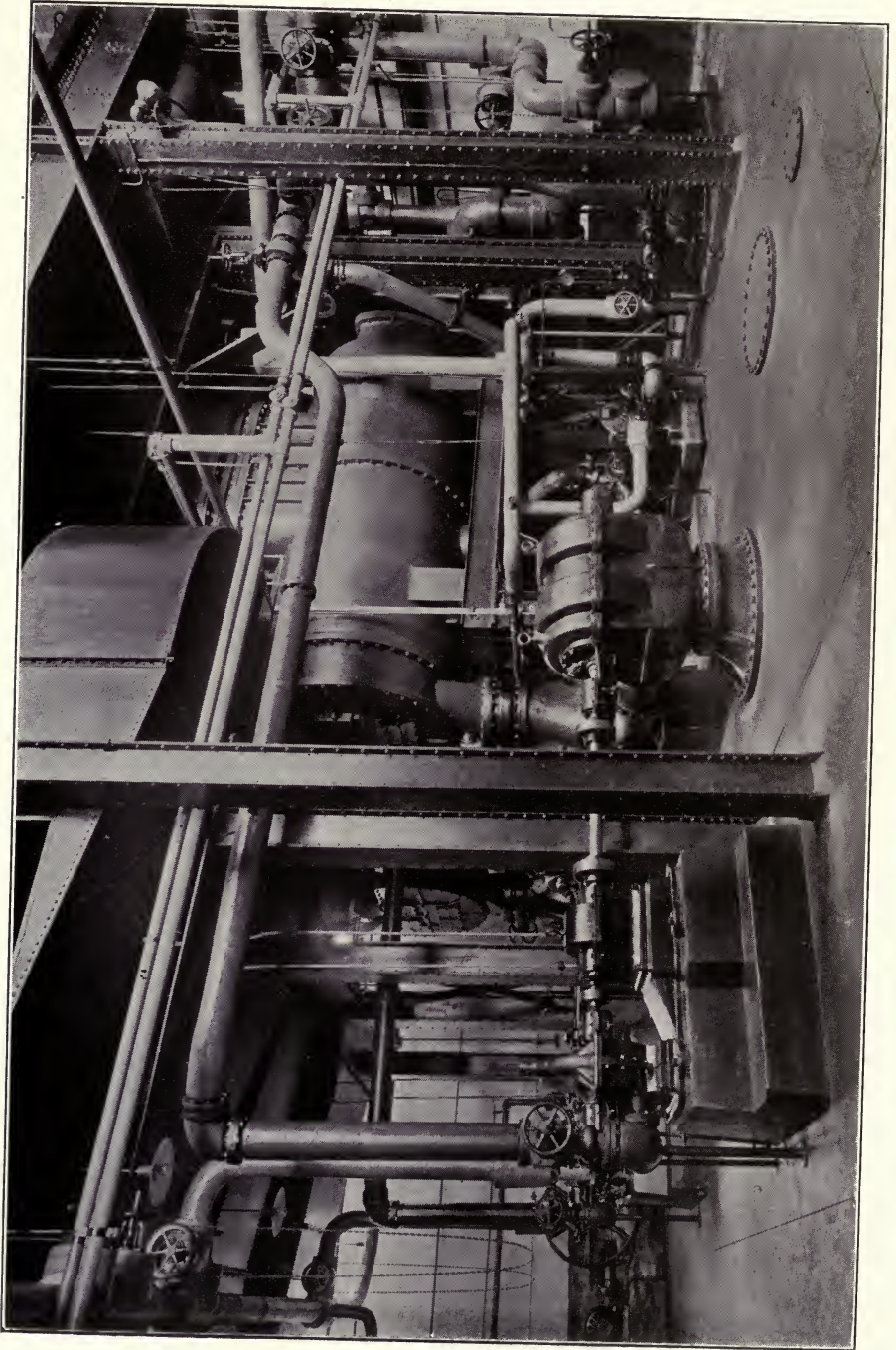
Station Built: In 1915.



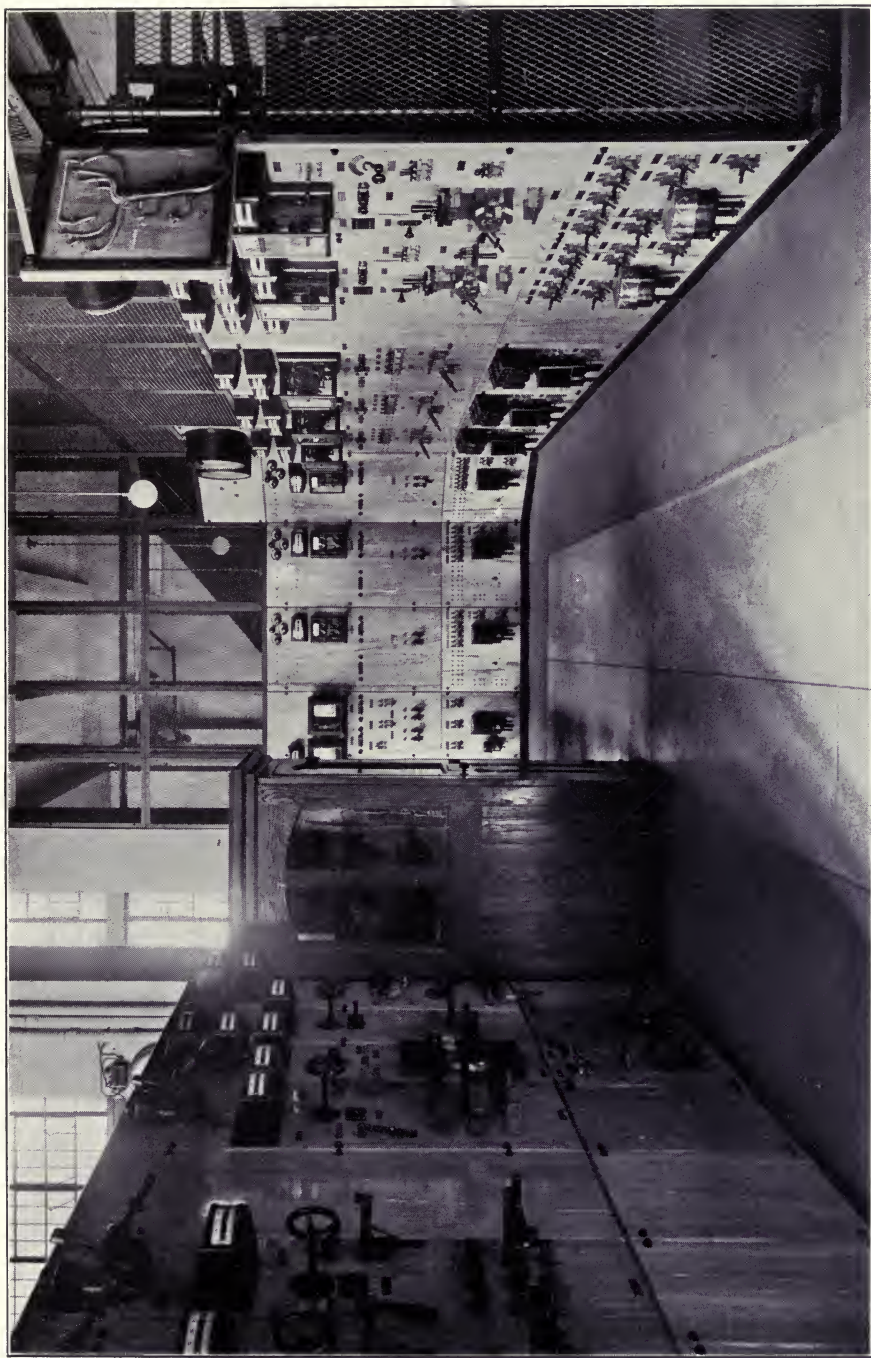
FIRING AISLE, RIVERSIDE STATION



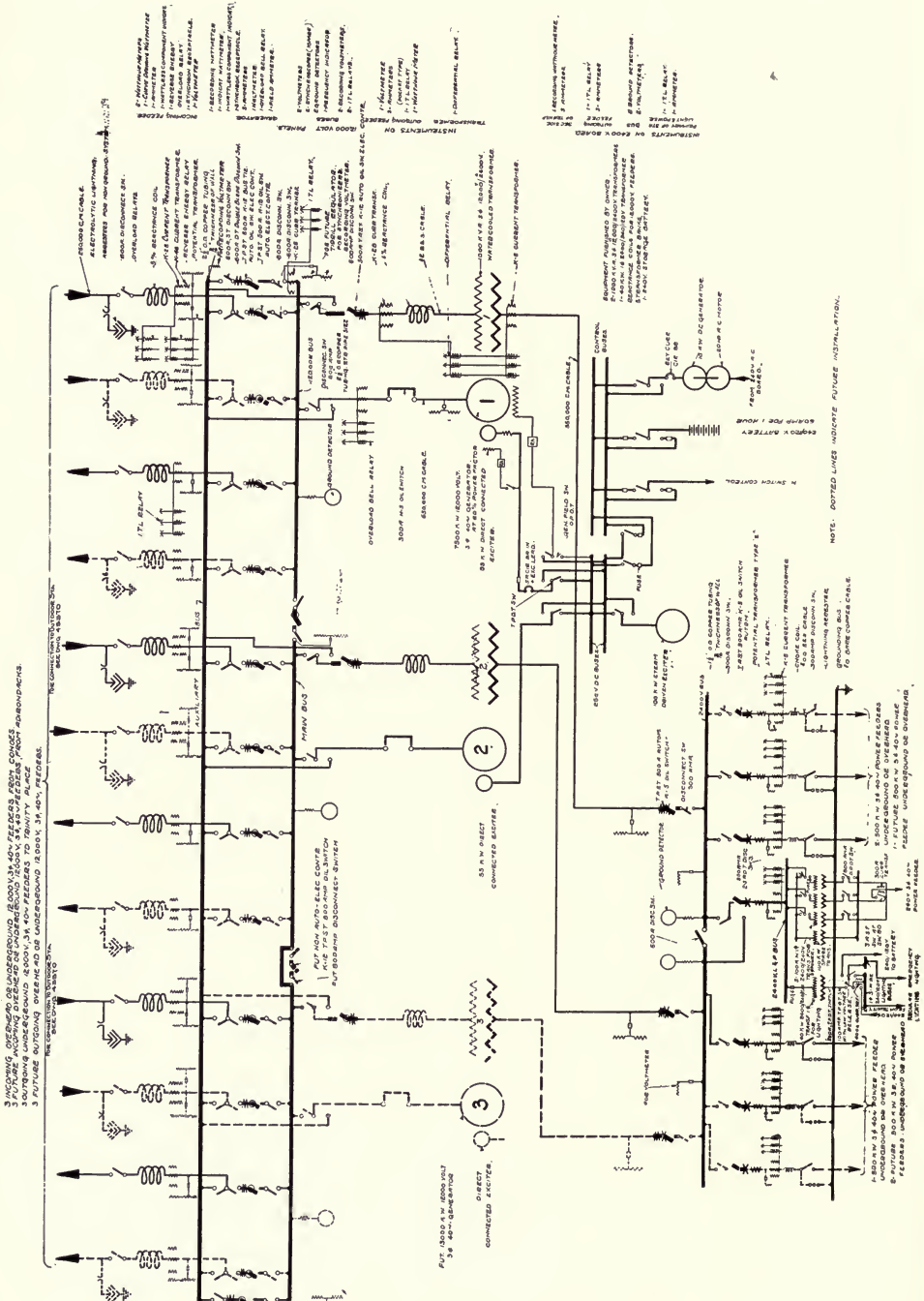
TURBINE ROOM, RIVERSIDE STATION



CONDENSING APPARATUS, RIVERSIDE STATION



HIGH TENSION SWITCHBOARD, RIVERSIDE STATION



ONE LINE DIAGRAM OF ELECTRICAL CONNECTIONS, RIVERSIDE STATION

SHERMAN CREEK STATION

The United Electric Light and Power Company
New York City



SHERMAN CREEK STATION, NEW YORK CITY

SHERMAN CREEK STATION

THE UNITED ELECTRIC LIGHT AND POWER COMPANY

201ST STREET, NEW YORK

Capacity: 151,600 kw.

Building: Brick with steel frame on concrete foundations.
Boiler Room, 209 ft. x 199 ft. Operating Room, 199 ft. x 71 ft. Electrical Galleries, seven floors, 170 ft. x 48 ft.

Boilers: Forty-four 650 h.p. water tube, with superheaters and equipped with Metropolitan Cinder Catchers.

Stokers: Seven retort underfeed.

Stoker Drive: Thirty h.p. induction motors with variable speed transmissions.

Forced Draft: Fifteen double inlet turbine-driven blowers each having a capacity of 80,000 cu. ft. per minute at 7 in. static pressure.

Stacks: Four 20 ft. 6 in., steel lined with brick, 300 ft. above first floor.

Coal Handling: Two one-man towers each equipped with 1½ ton buckets, capacity 300 tons per hour.

Ash Handling: Dump cars and electric locomotives.

Steam Conditions: 200 lbs., 100° F. superheat.

Condensers: Three 2 pass, 20,000 sq. ft. surface with turbine-driven auxiliaries. Two radial flow, 30,000 sq. ft. surface with turbine-driven auxiliaries. Three 40,000 sq. ft. surface with turbine-driven auxiliaries.

Feed Pumps: Three 1,000 g.p.m. turbine-driven. One 500 g.p.m., motor-driven. Two 1,000 g.p.m. motor driven.

Heaters: Four 600,000 lbs. steam per hour, open type.

Service Pumps: Three 1,000 g.p.m., turbine-driven.

Generating Equipment: Three 15,200 kw., 7500 volt, 60 cycle, 3 phase horizontal turbo-generators. Two 20,000 kw. 6600 volt, 25 cycle, 3 phase horizontal turbo-generators. Three 22,000 kw., 7500 volt, 60 cycle, 3 phase, horizontal turbo-generators.

Exciters: Six 200 kw., 250-275 volt, motor-driven.

Motor Generators: One 7500 kw., frequency changer 25 cycle, 6600 volt, 60 cycle, 7800 volt.

Switching Equipment: Remote control electrically operated oil switches.

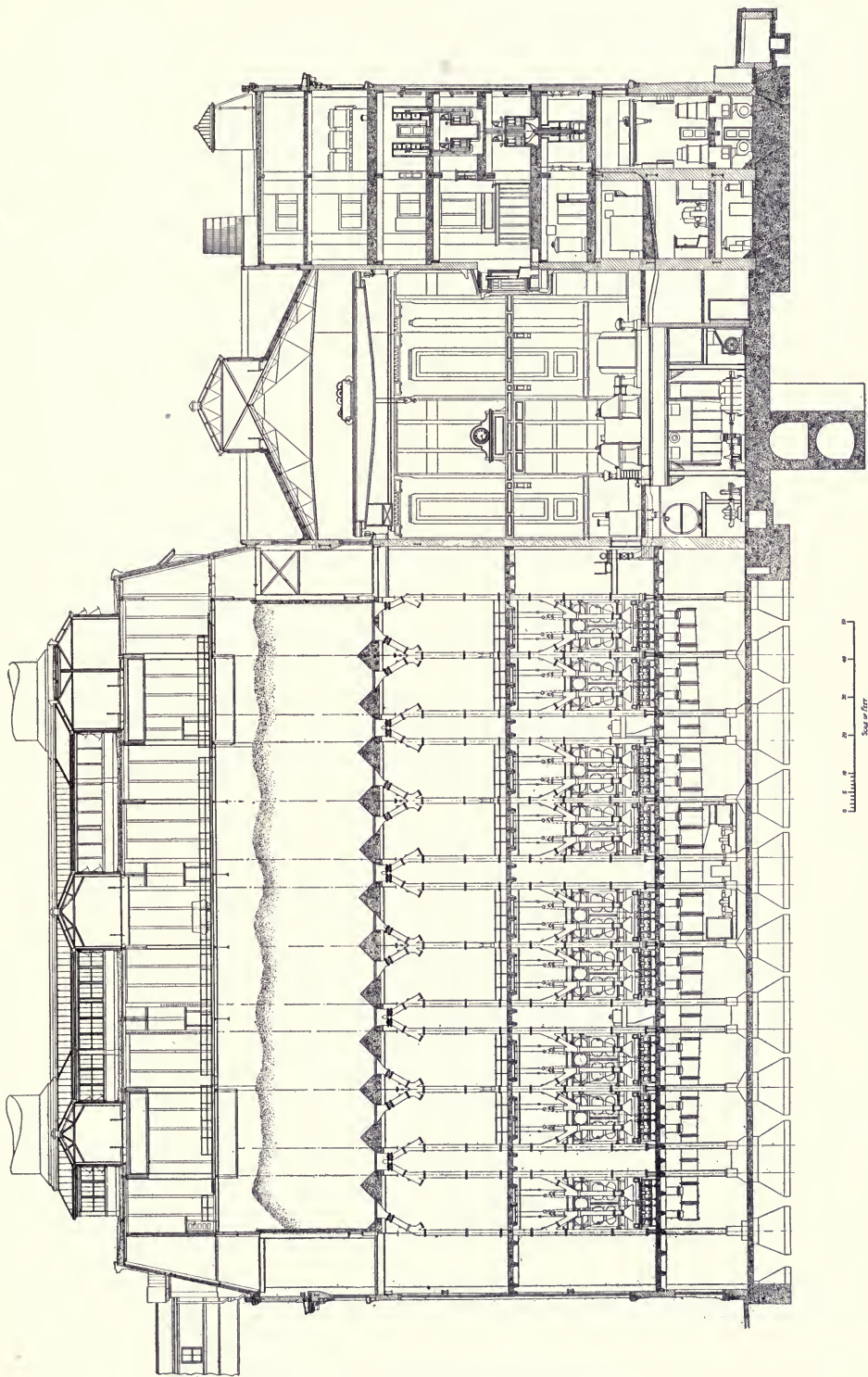
Storage Battery: One 142 cell, 3500 amp., for one hour.

Reactance Coils: Exciters, five sets of three coils, 2.5 kv.a., 15 amp., 7800 volt. Feeders, 23 sets of two coils, 80 kv.a., 300 amp., 7800 volt. Bus ties, three sets of three coils, 1624 kv.a., 2,000 amp., 7800 volt.

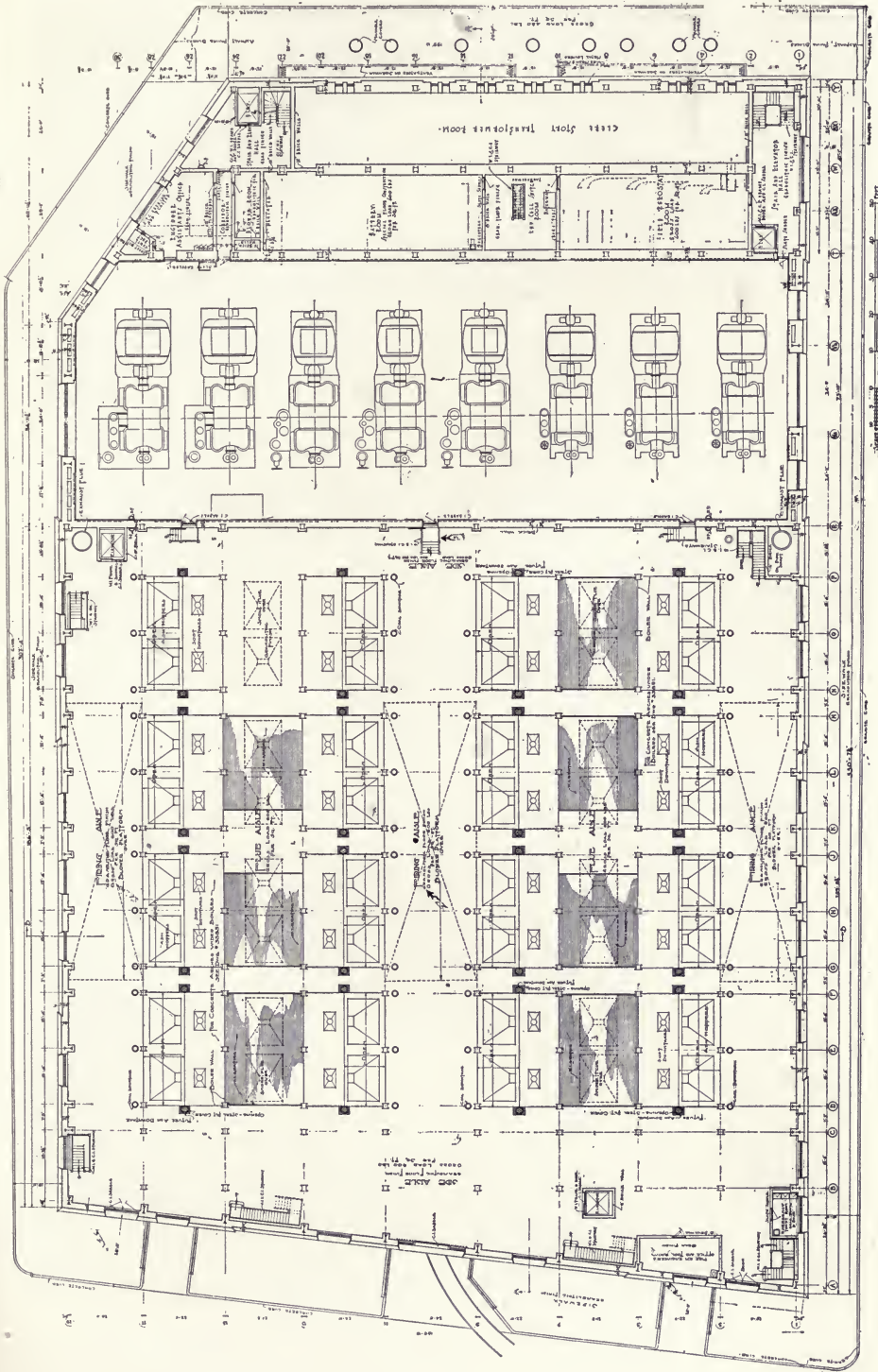
Traveling Crane: Four motor 75-ton crane with 10-ton auxiliary hoist.

District Served: 60 cycle service in Boroughs of Manhattan, Queens and Bronx, and in Westchester County. 25 cycle service to the N. Y., N. H. & H. Railroad.

Station Built: 1913.



CROSS SECTION THROUGH BOILER ROOM, OPERATING ROOM AND ELECTRICAL GALLERIES, SHERMAN CREEK STATION



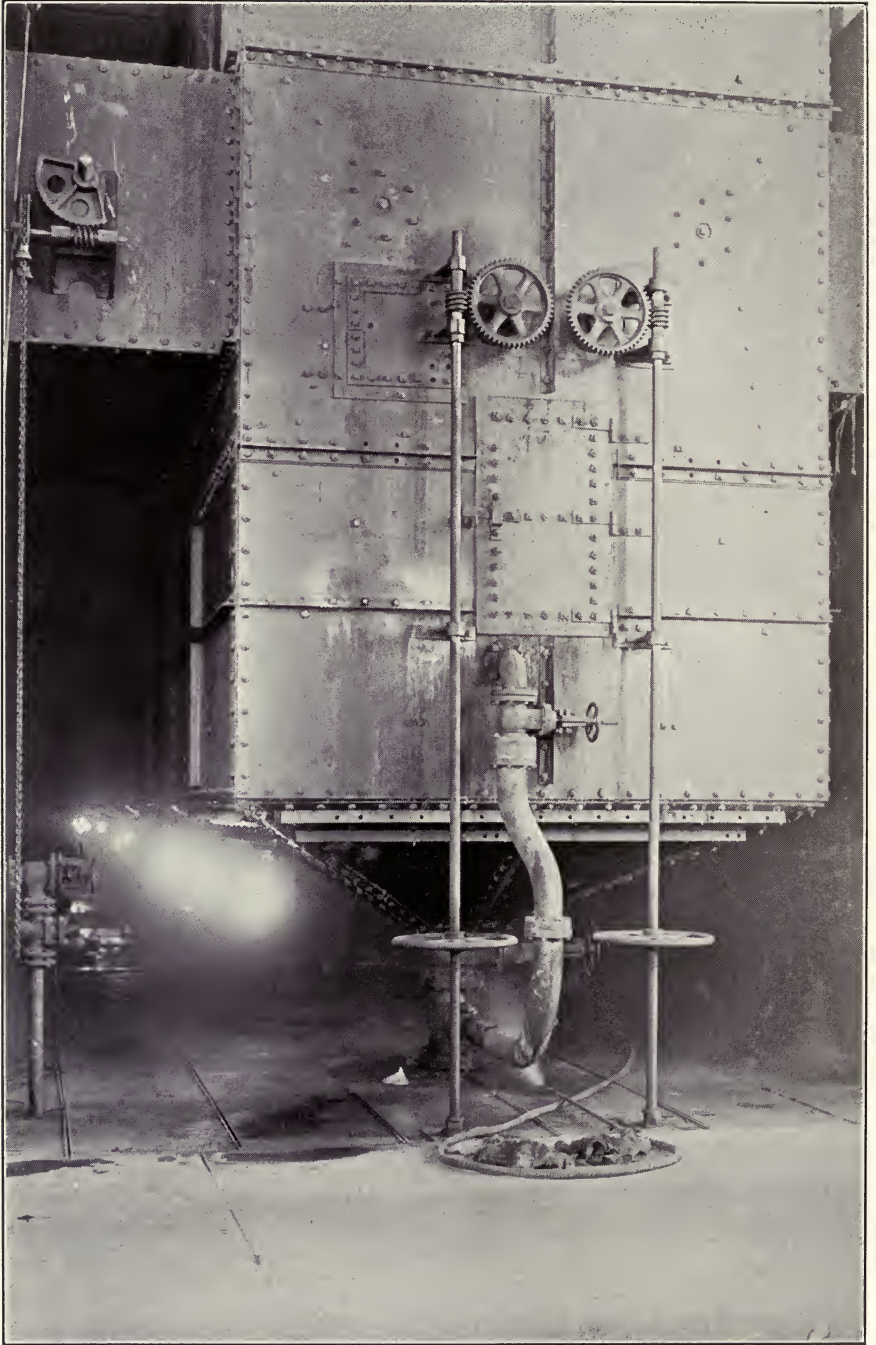
MAIN FLOOR PLAN, SHERMAN CREEK STATION



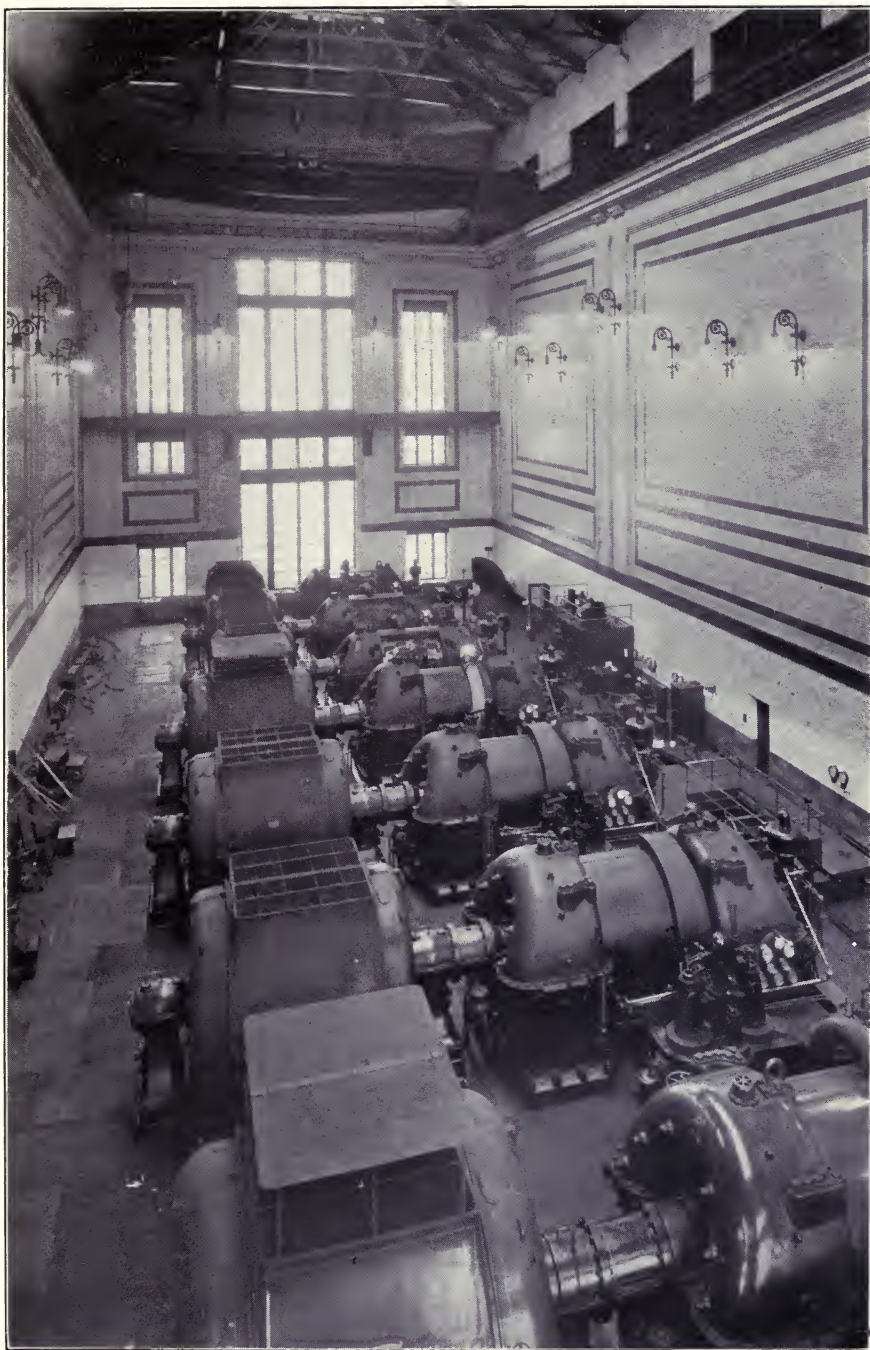
FIRING AISLE, SHERMAN CREEK STATION



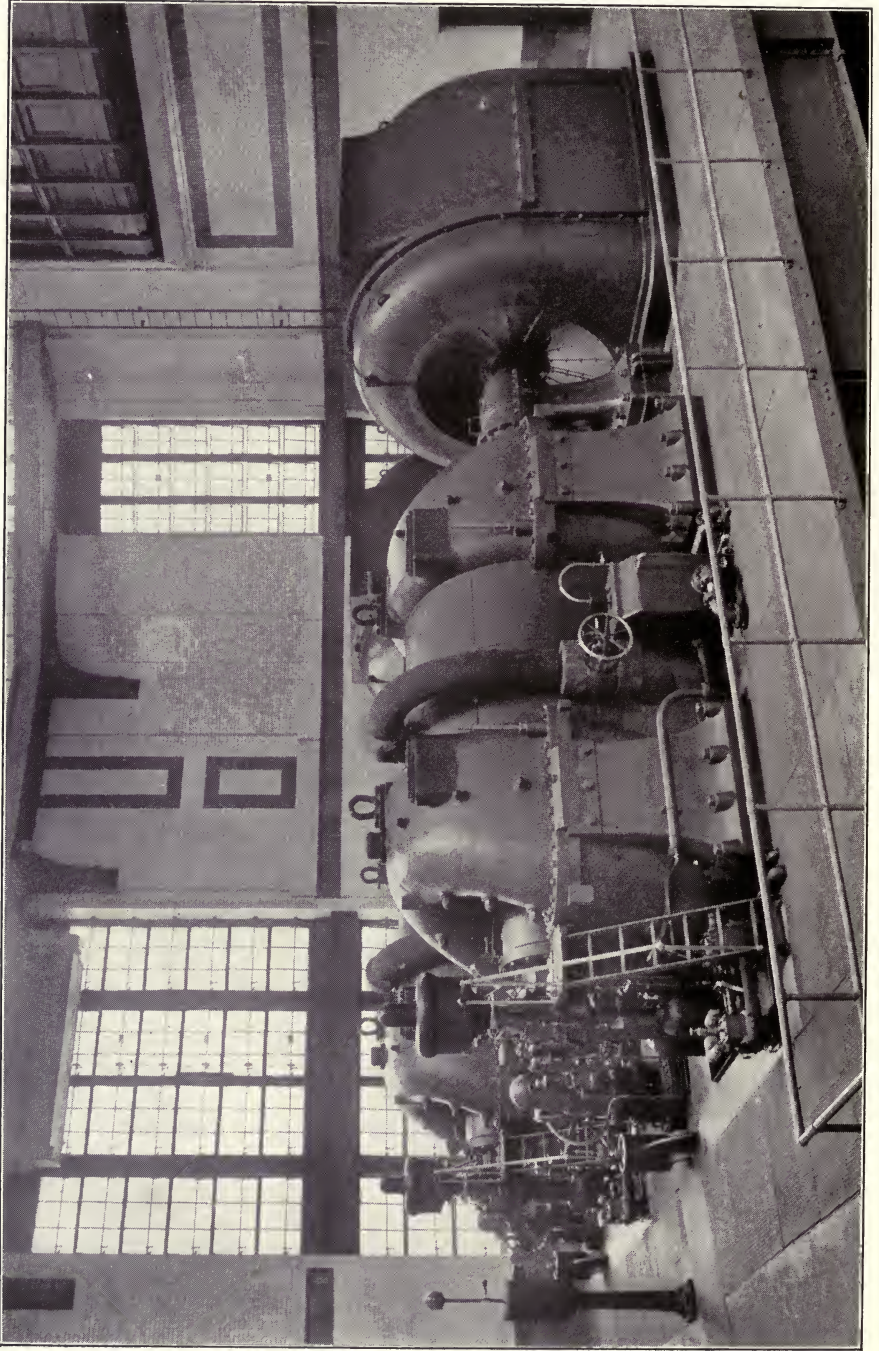
ASH HANDLING EQUIPMENT, SHERMAN CREEK STATION



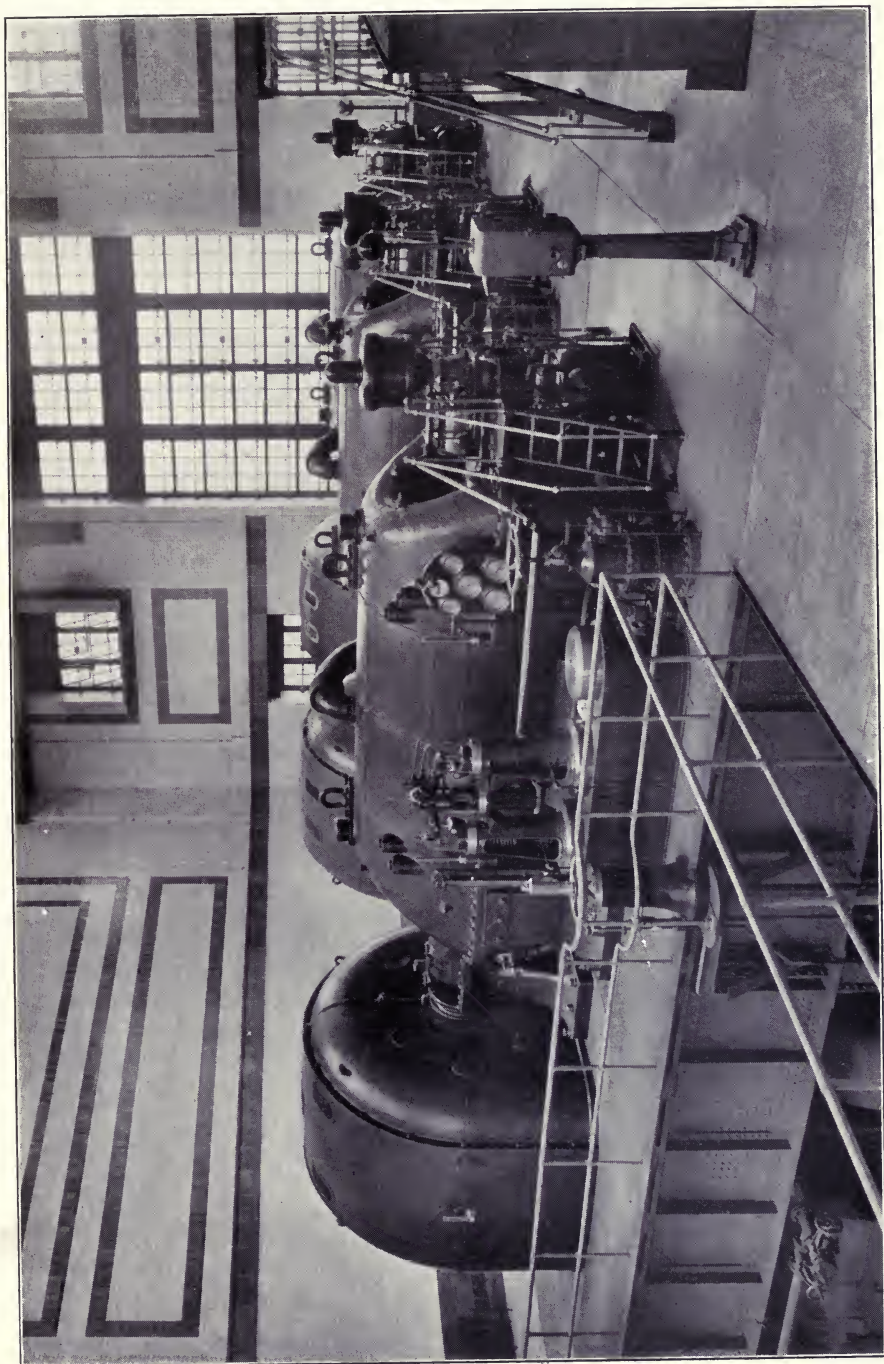
METROPOLITAN CINDER CATCHER, SHERMAN CREEK STATION



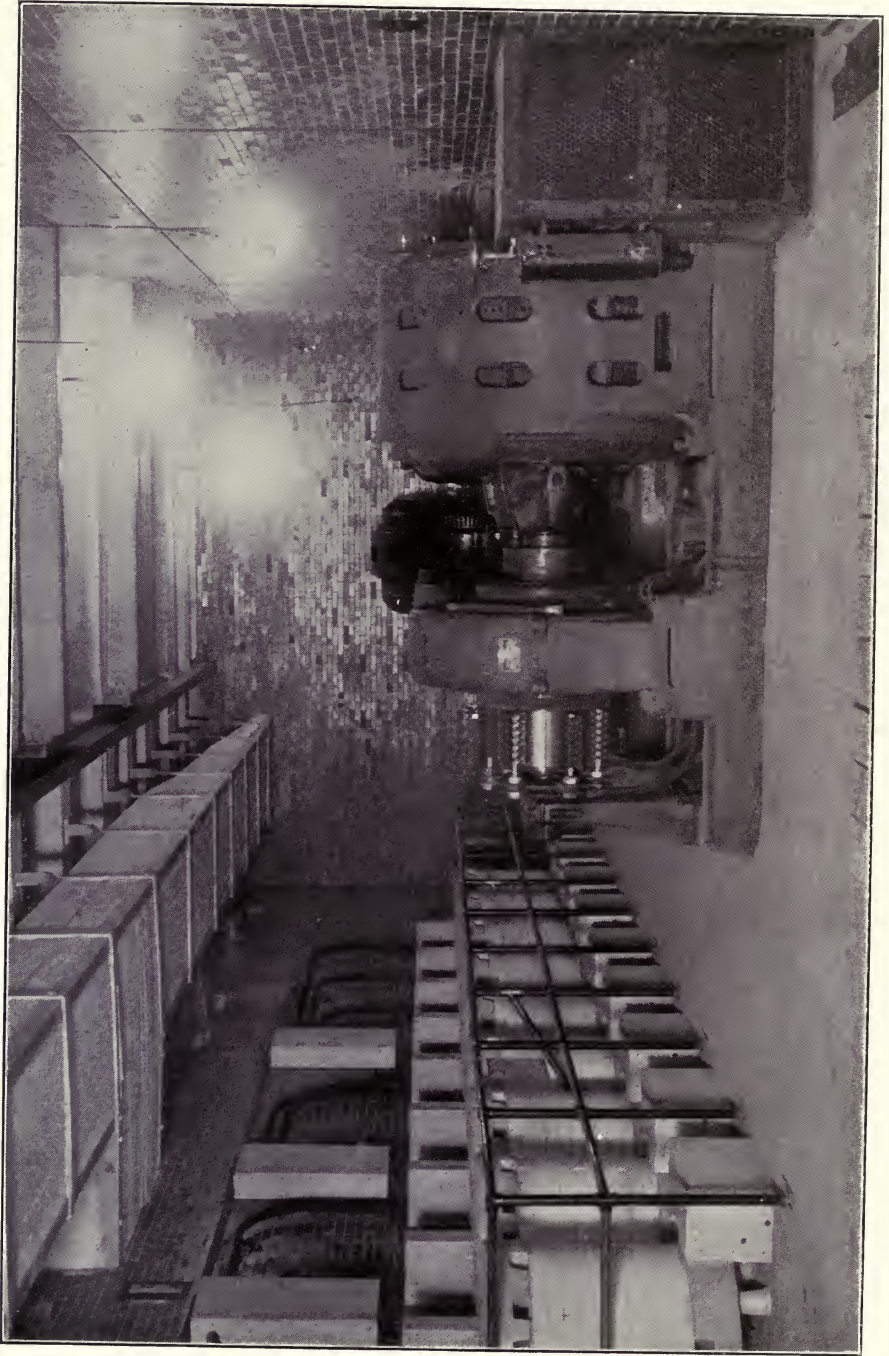
TURBINE ROOM, SHERMAN CREEK STATION



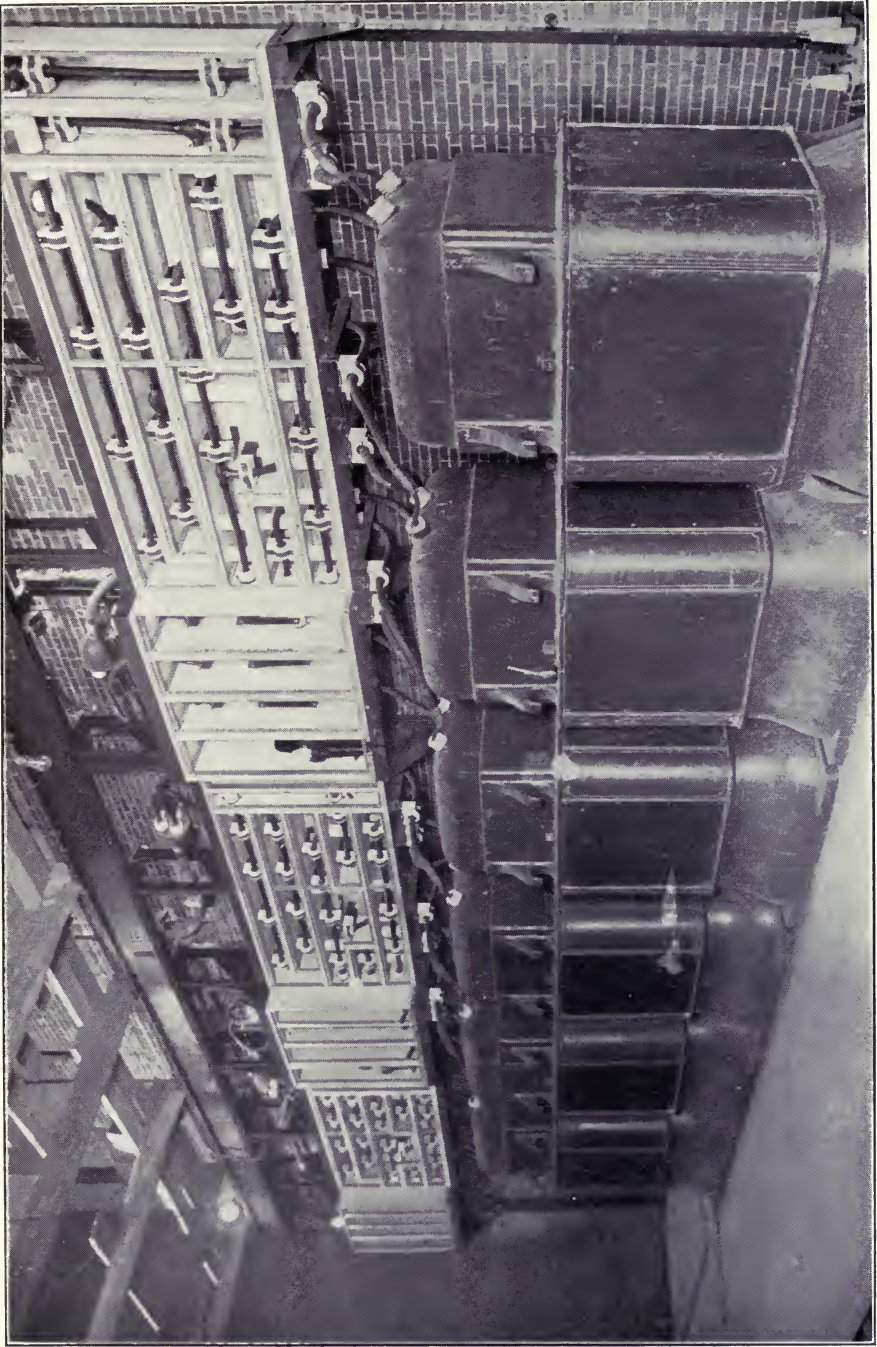
25 CYCLE UNITS, SHERMAN CREEK STATION



60 CYCLE UNITS, SHERMAN CREEK STATION



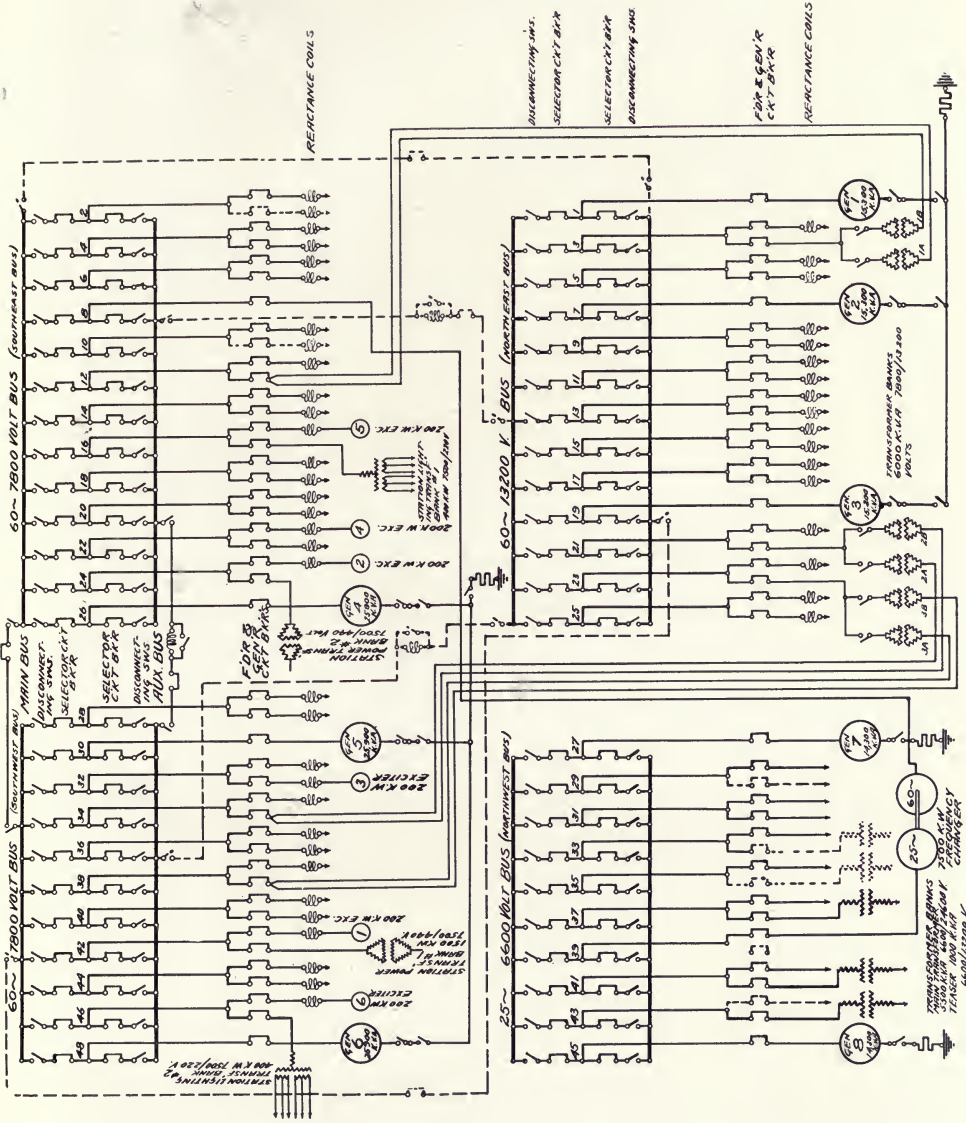
EXCITERS, REACTANCE COILS AND HIGH TENSION SET, SHERMAN CREEK STATION



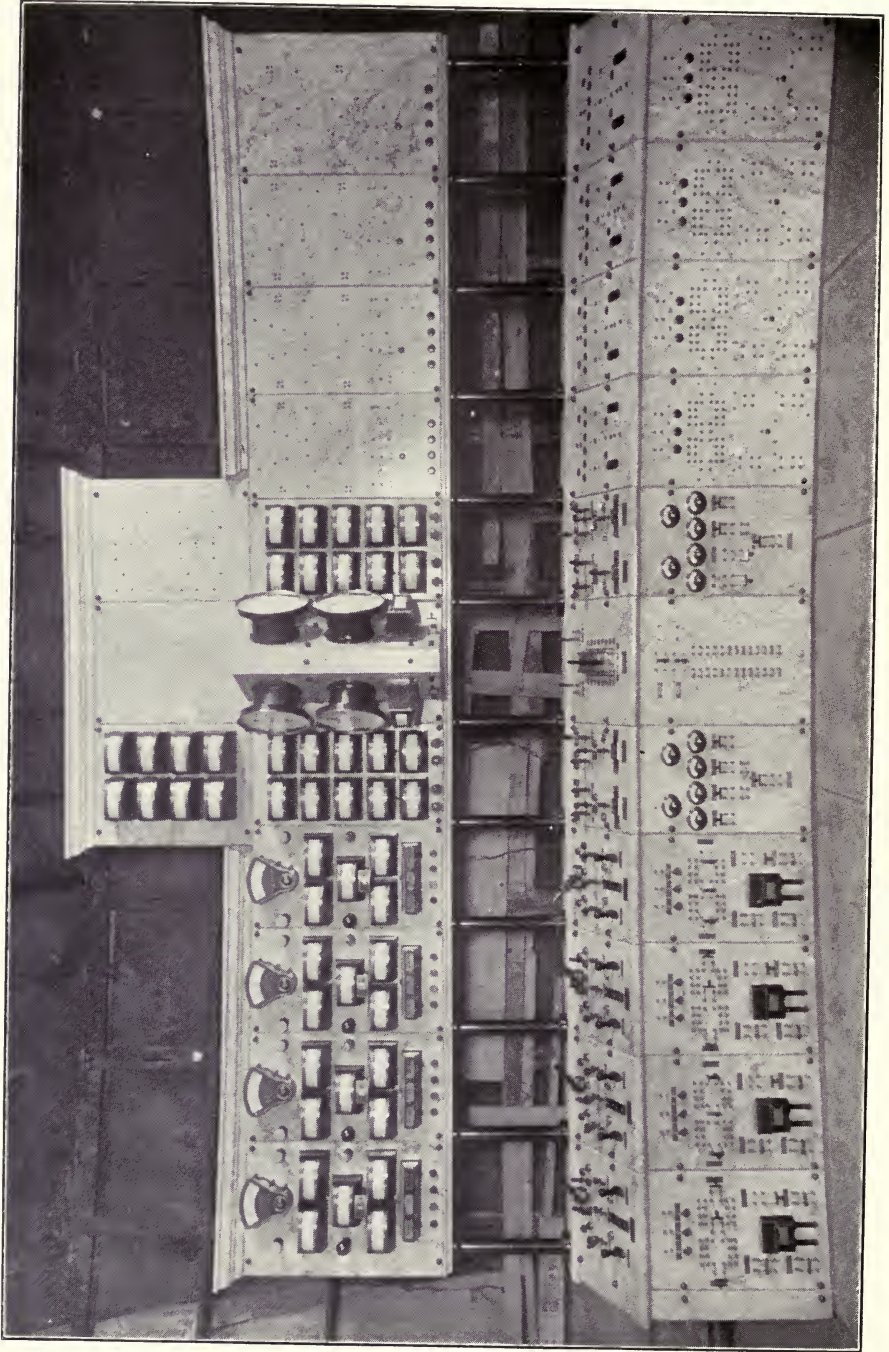
STEP-UP TRANSFORMERS FOR WATERSIDE STATION TIES, SHERMAN CREEK STATION



SWITCH COMPARTMENTS, SHERMAN CREEK STATION



ONE LINE DIAGRAM OF ELECTRICAL CONNECTIONS, SHERMAN CREEK STATION



GENERATOR CONTROL BOARD, SHERMAN CREEK STATION

EXPLOSIVES PLANT "C"

United States Government

Nitro, West Virginia



BOILER HOUSES AND POWER PLANT, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"

EXPLOSIVES PLANT "C"

UNITED STATES GOVERNMENT
NITRO, WEST VIRGINIA

Capacity: Turbo-generators 3,000 kw., boilers 35462 h.p.

Buildings: Power House, brick with steel frame on concrete foundation. Boiler Houses are galvanized corrugated iron with steel frames on concrete foundations. Boiler houses, two, 564 ft. x 49 ft.; power house, 165 ft. x 40 ft.; Electrical Galleries, 165 ft. x 34 ft.

Boilers: Thirty-four 1043 h.p. water tube. Four with superheaters. Metropolitan Cinder Catchers.

Stokers: One ten retort underfeed for each boiler.

Stoker Drive: Twelve 7 x 8 vertical reciprocating engines.

Forced Draft: Ten turbine-driven blowers each having a capacity of 100,000 cu. ft. per minute, 6 in. static pressure.

Stacks: Four 16 ft. unlined steel stacks, 264 ft. above boiler-house floor.

Coal Handling: Three 200-ton per hour locomotive cranes each having a 5 cu. yd. bucket. Coal picked up by cranes and dropped into crusher cars on top of building.

Ash Handling: Industrial railway having three-ton battery locomotives and side dump cars.

Service Pumps: Eight 6,000 g.p.m. turbine-driven, supplying water to station and plant in general. Three 2500 g.p.m. turbine-driven centrifugal pumps for fire service. Two 2500 g.p.m. turbine-driven centrifugal pumps for town supply.

Feed Pumps: Six 1,000 g.p.m. three-stage centrifugal pumps turbine-driven.

Heaters: Three open feed water heaters each 600,000 lbs. per hour.

Generating Equipment: Three 1,000 kw., 6600 volt, 3 phase, 60 cycle turbo-generators.

Steam Conditions: 200 lbs. saturated for general use in plant and 200 lbs. with 100° F. superheat for power house.

Exciters: One 25 kw. turbine-driven. Three 12.5 kw. direct connected.

Series Lighting Circuits: Four 34 kv.a. series lighting circuits.

Transformers: Six 150 kv.a. 6600/240 volts. Five 34 kw. Constant current 6.6 amps.

Motor Generator: One 10 kw. 125 volt.

Switching Equipment: Remote control electrically operated oil circuit breakers.

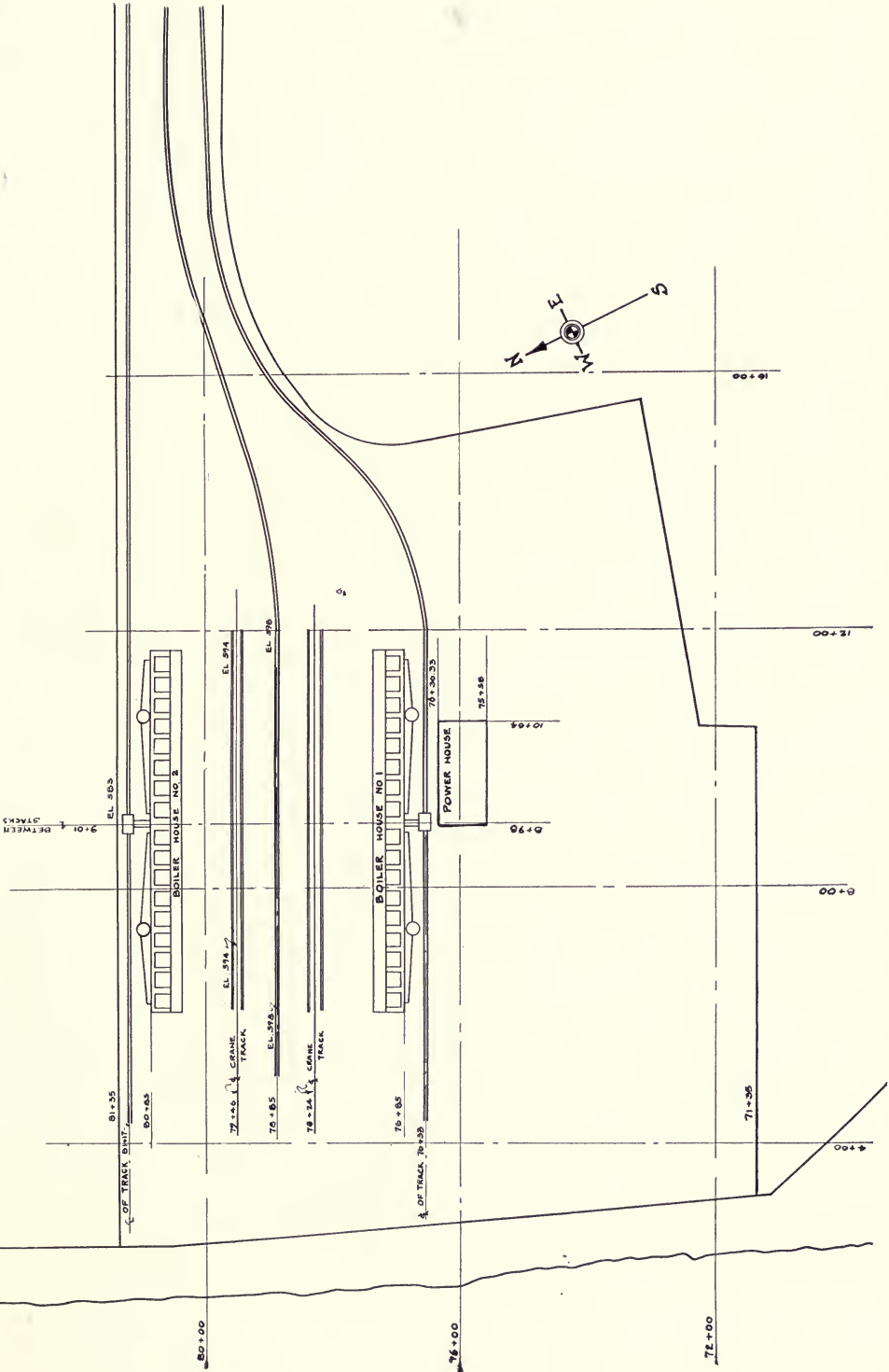
Storage Battery: One 60-cell, 200 amp. for one hour.

Reactance Coils: Six single-phase, 6 kv.a. 26 amp., 60 cycle, 6600 volt.

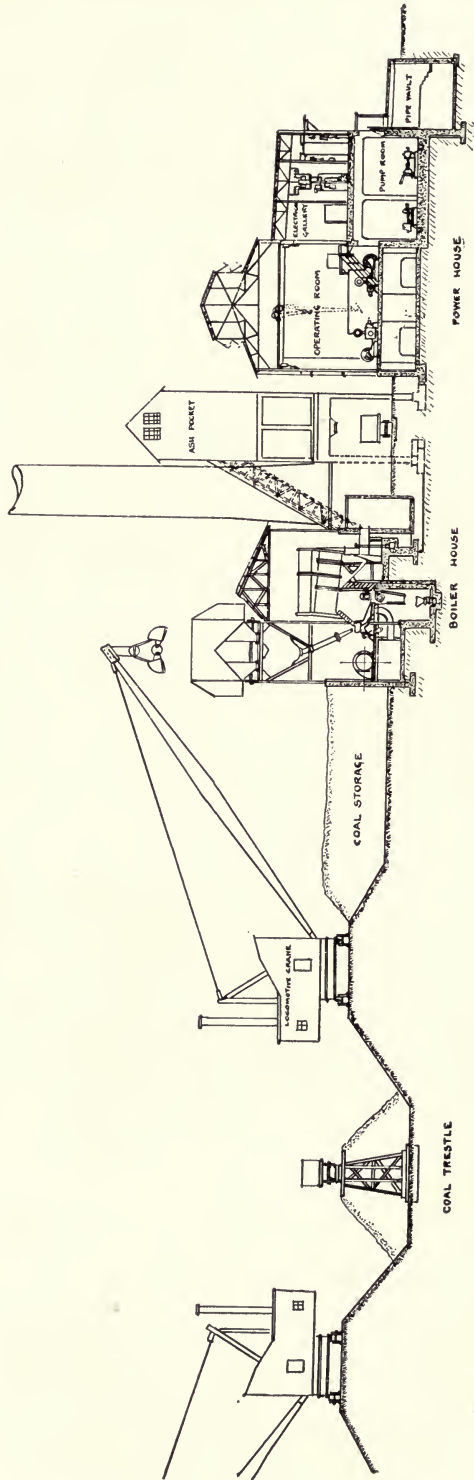
Traveling Crane in Power House: Hand operated.

District Served: Explosives Plant "C."

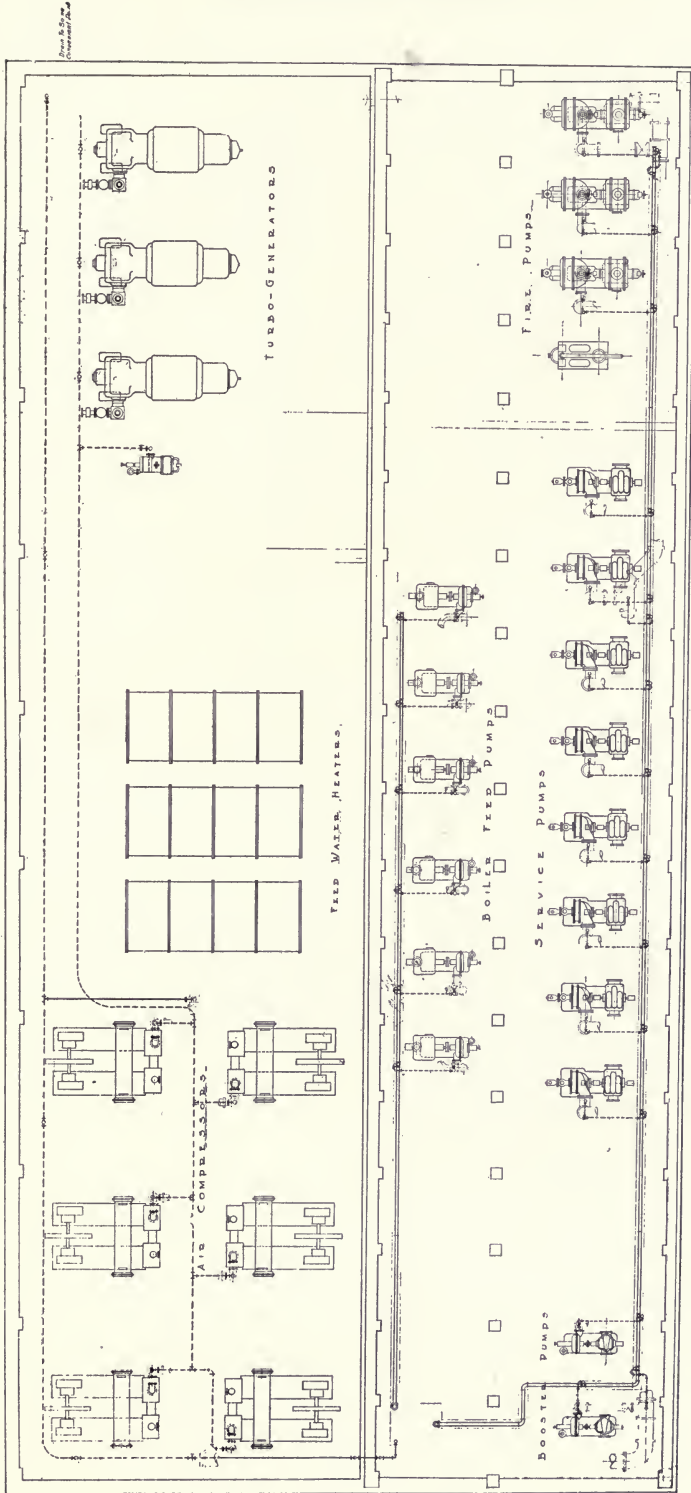
Built: 1918.



LOCATION DRAWING FOR BOILER HOUSES AND POWER PLANT, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



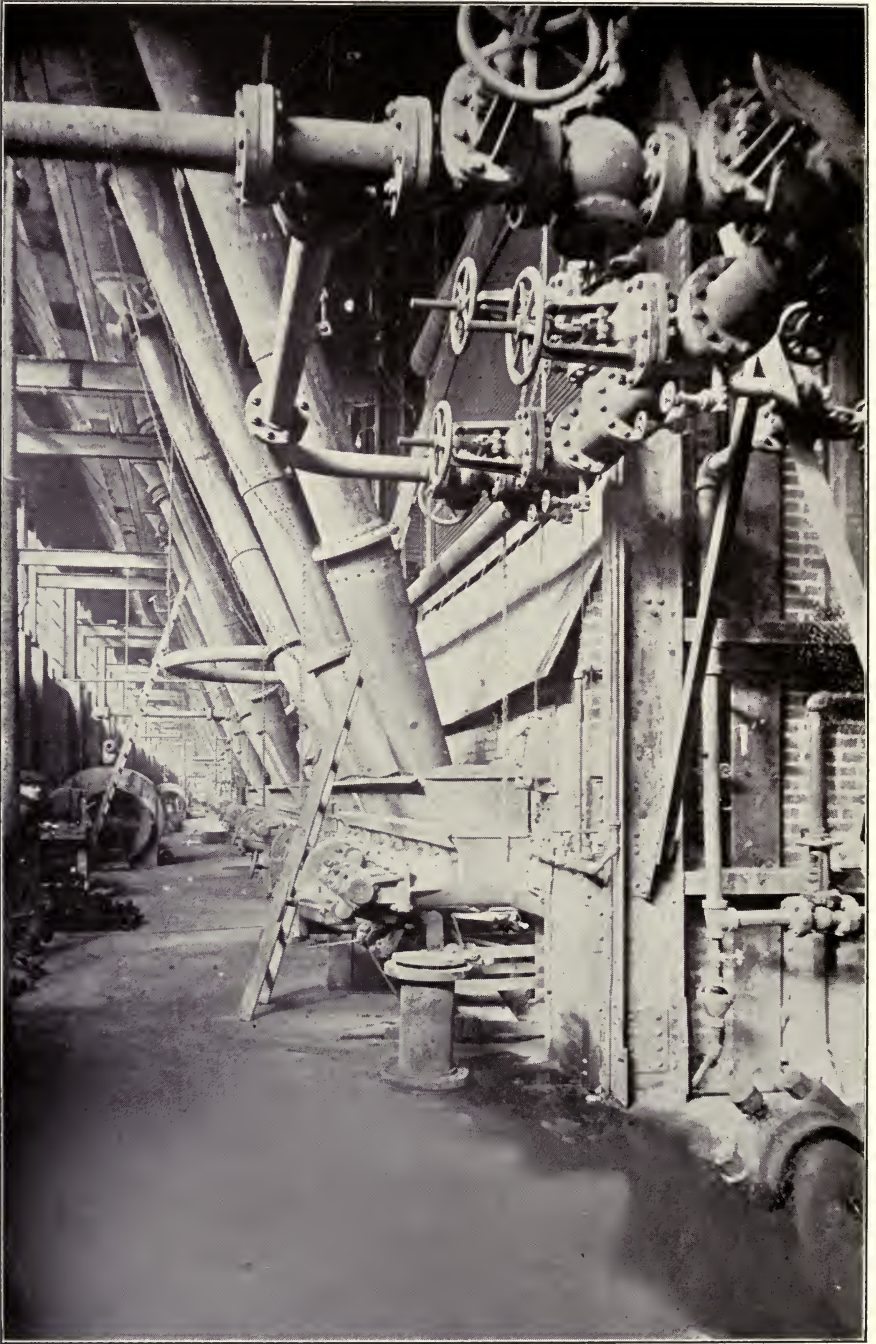
CROSS SECTION THROUGH SOUTH BOILER HOUSE AND POWER PLANT, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



PLAN OF POWER HOUSE, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



BOILER HOUSE, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



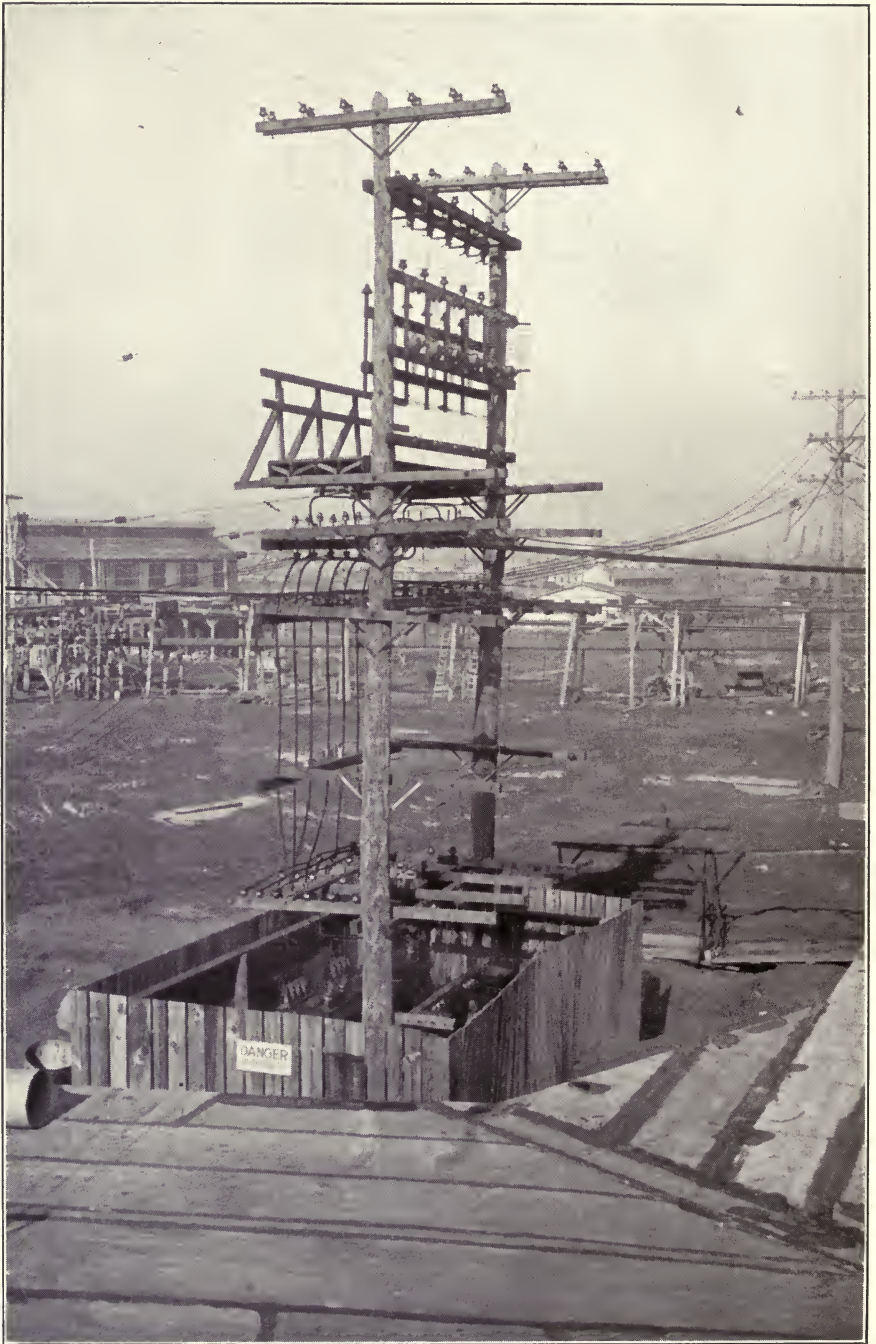
FIRING AISLE IN BOILER HOUSE, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



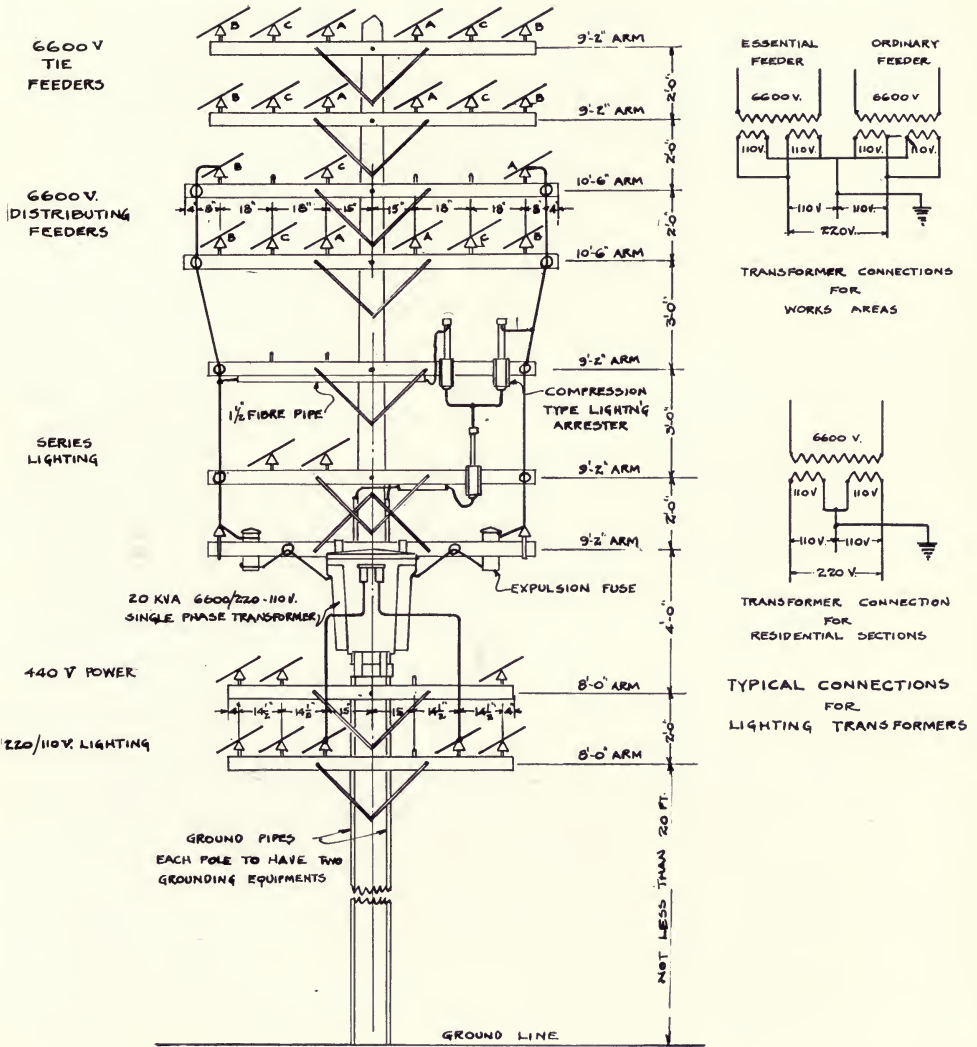
LOCOMOTIVE CRANES, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



COAL HANDLING EQUIPMENT, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



OUTDOOR TRANSFORMER STATION, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"



TYPICAL POLE DIAGRAM, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"

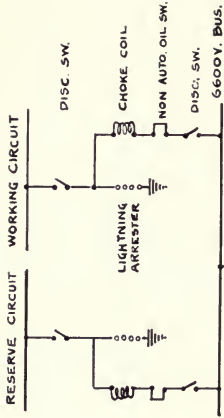
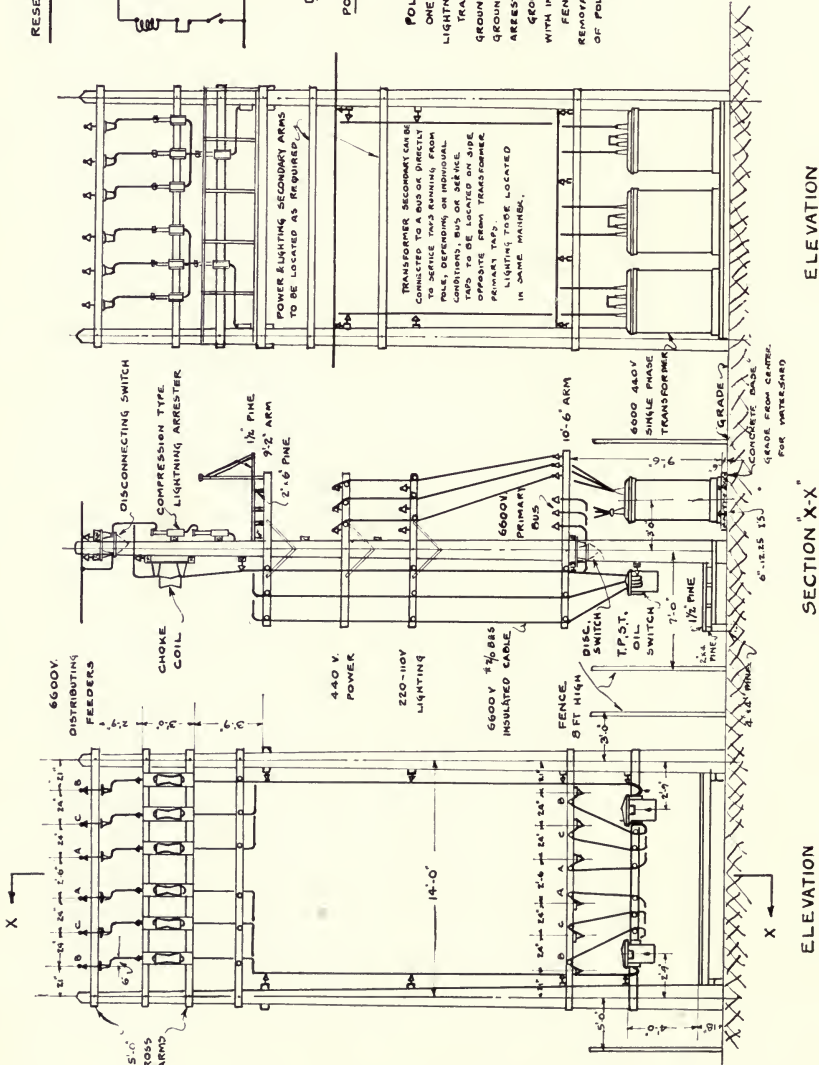


DIAGRAM OF CONNECTIONS FOR POWER TRANSFORMER BANK.

NOTES.

POLES TO BE STEPPED ONE GROUNDING EQUIPMENT ON EACH POLE FOR LIGHTNING ARRESTERS.
 TRANSFORMER AND OIL SWITCH CASES TO BE GROUNDED, USE LIGHTING SECONDARY NEUTRAL AS GROUND OR MAKE CONNECTION SEPARATE FROM LIGHTING ARRESTER GROUND.
 GROUND WIRE ON POLE TO BE MECHANICALLY PROTECTED WITH INSULATING MATERIAL (ROBE PIPE OR EQUIVALENT) FENCE TO BE CONSTRUCTED 50 AS TO BE EASILY REMOVABLE AND TO HAVE DOOR ON OIL SWITCH SIDE OF POLES, DOOR TO OPEN OUT.



ELEVATION

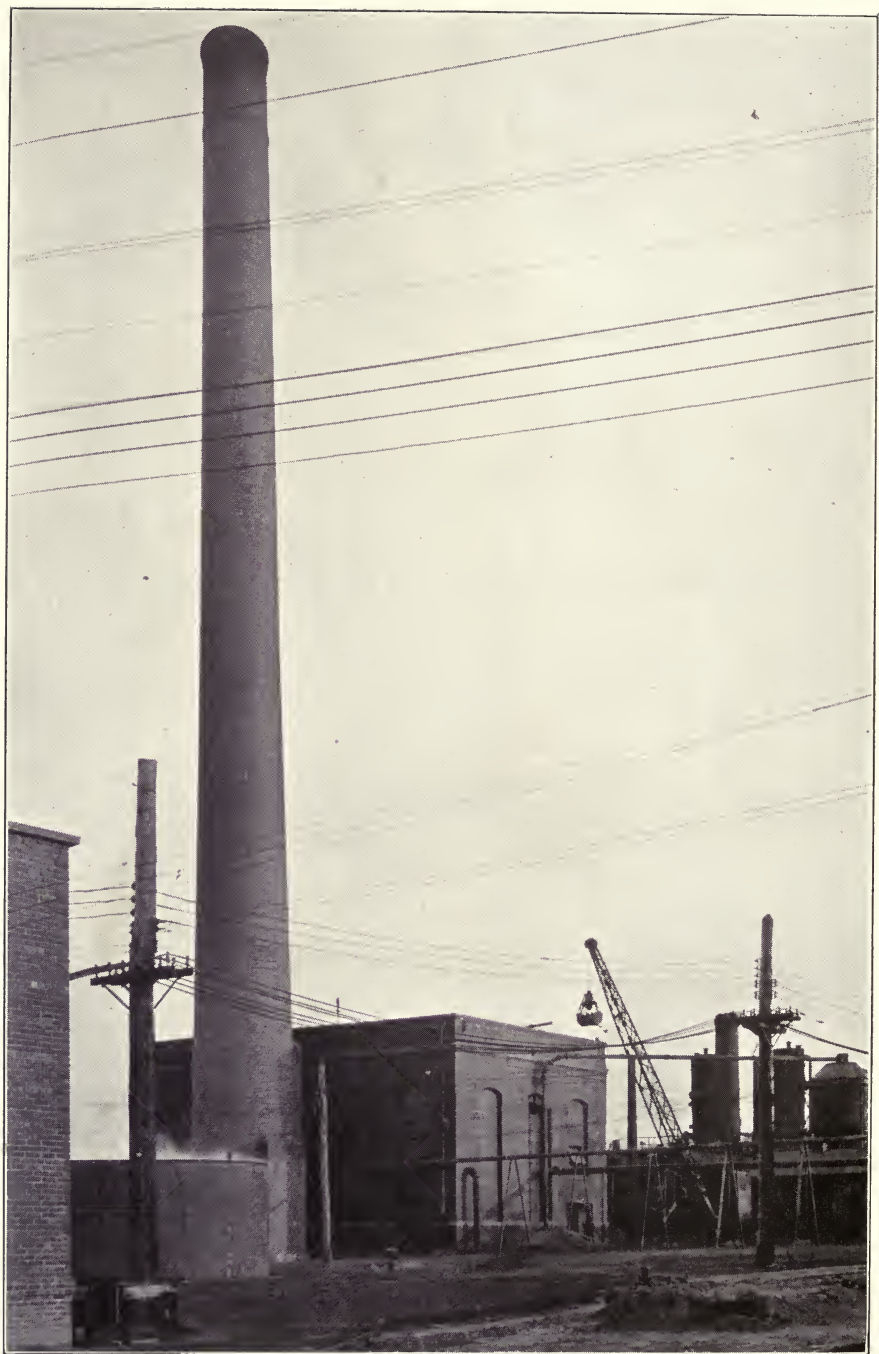
SECTION X-X

ELEVATION

TYPICAL POWER TRANSFORMER BANK, UNITED STATES GOVERNMENT EXPLOSIVES PLANT "C"

PRUDENTIAL OIL CORPORATION

Baltimore, Maryland



BOILER HOUSE, PRUDENTIAL OIL CORPORATION

PRUDENTIAL OIL CORPORATION

CURTIS BAY (BALTIMORE, MD.)

Capacity: 3900 boiler h.p.

Building: Concrete foundations, brick walls and steel roof trusses.

Boilers: Six 650 h.p. water tube boilers with combination stoker and gas or oil firing. One 1,000 h.p. gas-fired superheater.

Stokers: Seven retort underfeed for each boiler.

Stoker Drive: Two single cylinder and one two-cylinder non-condensing engines driving line shaft.

Forced Draft: Two 80,000 cu. ft. turbine-driven blowers.

Stacks: Two radial brick stacks each 9 ft. diameter, 200 ft. above boiler room floor.

Coal Handling: 20-ton locomotive crane raises coal from cars to hopper.

Ash Handling: 8 in. steam jet ash-conveyor.

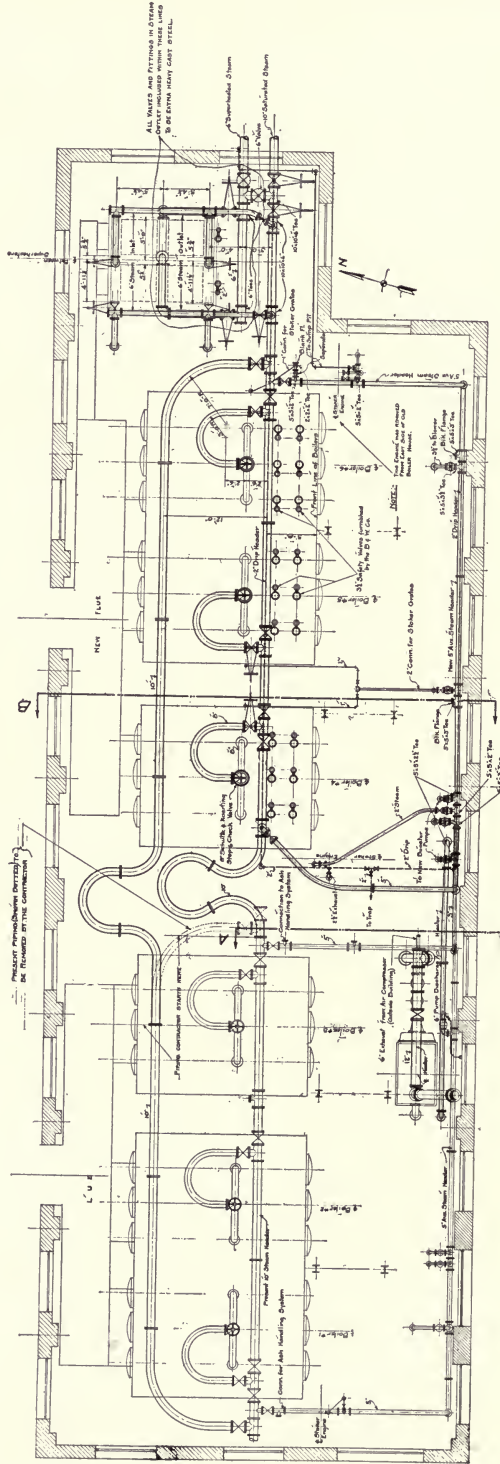
Steam Conditions: 135 lb. pressure.

Feed Pump: Two 250 g.p.m. and one 600 g.p.m. centrifugal pumps, turbine-driven.

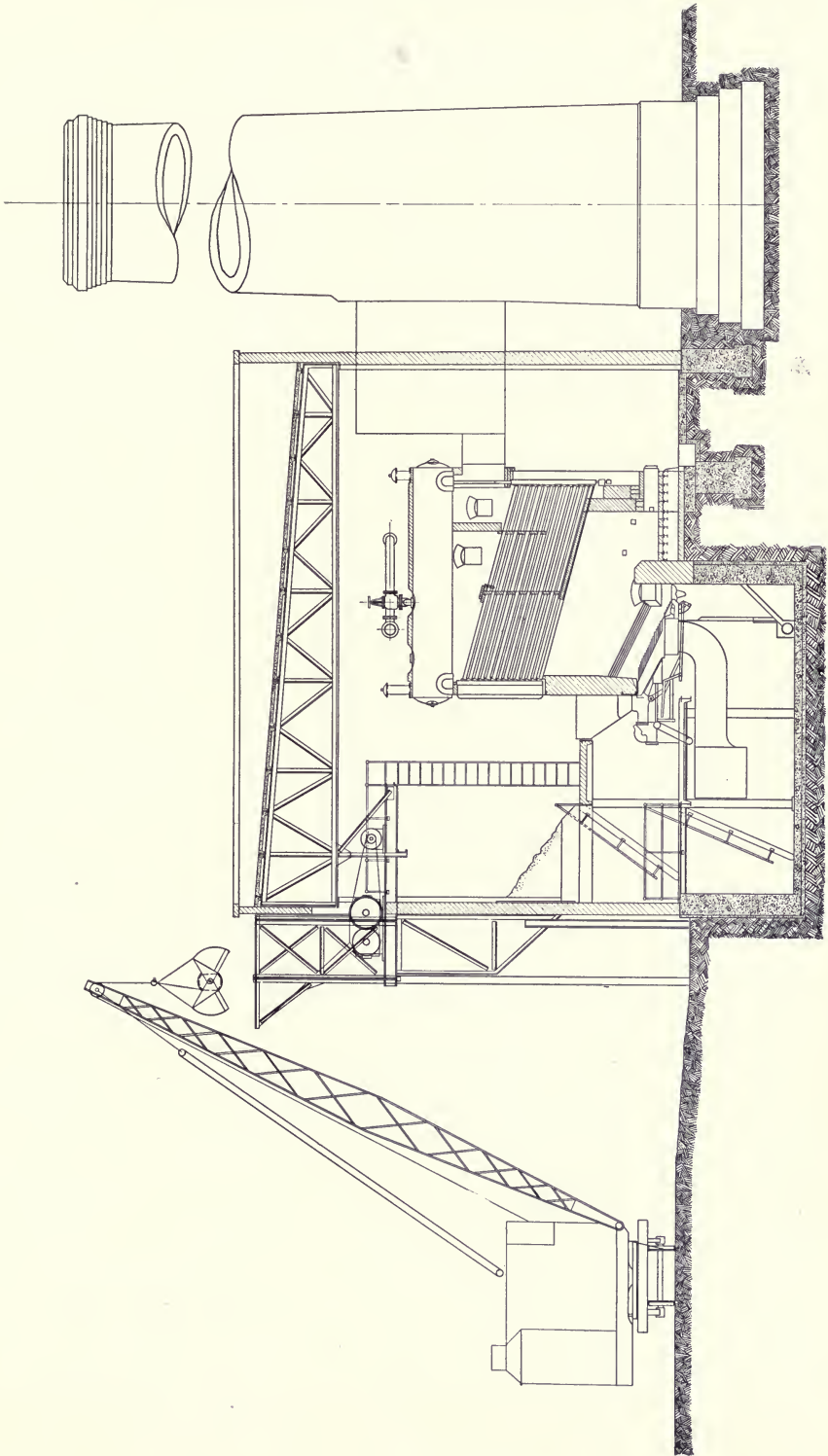
Heaters: One open-feed water heater, 4,000 h.p.

District Served: Supplies steam to oil refinery.

Built: 1915. Extension added in 1920.



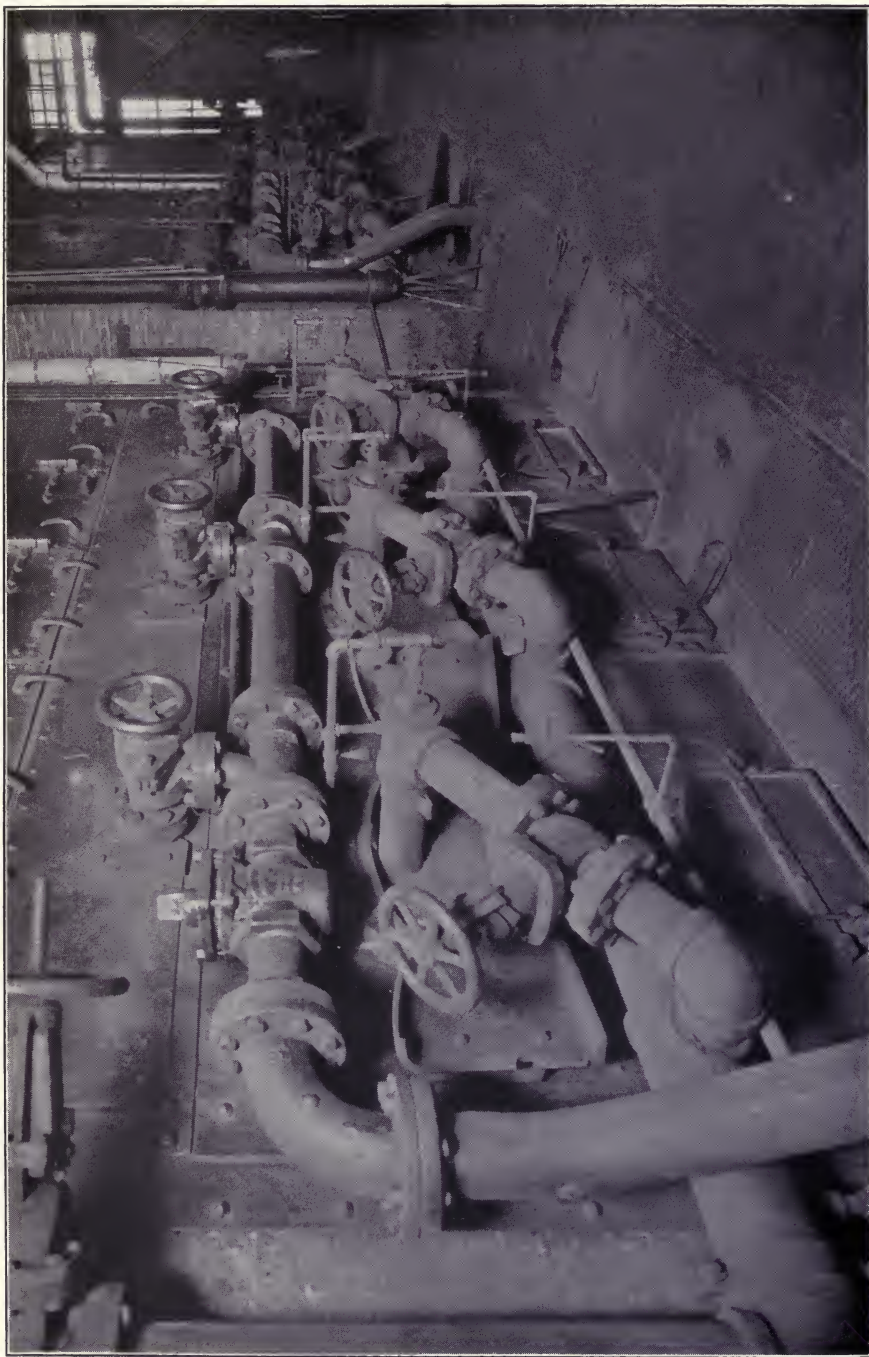
GENERAL ARRANGEMENT OF PIPING AND FLOOR PLAN, PRUDENTIAL OIL CORPORATION



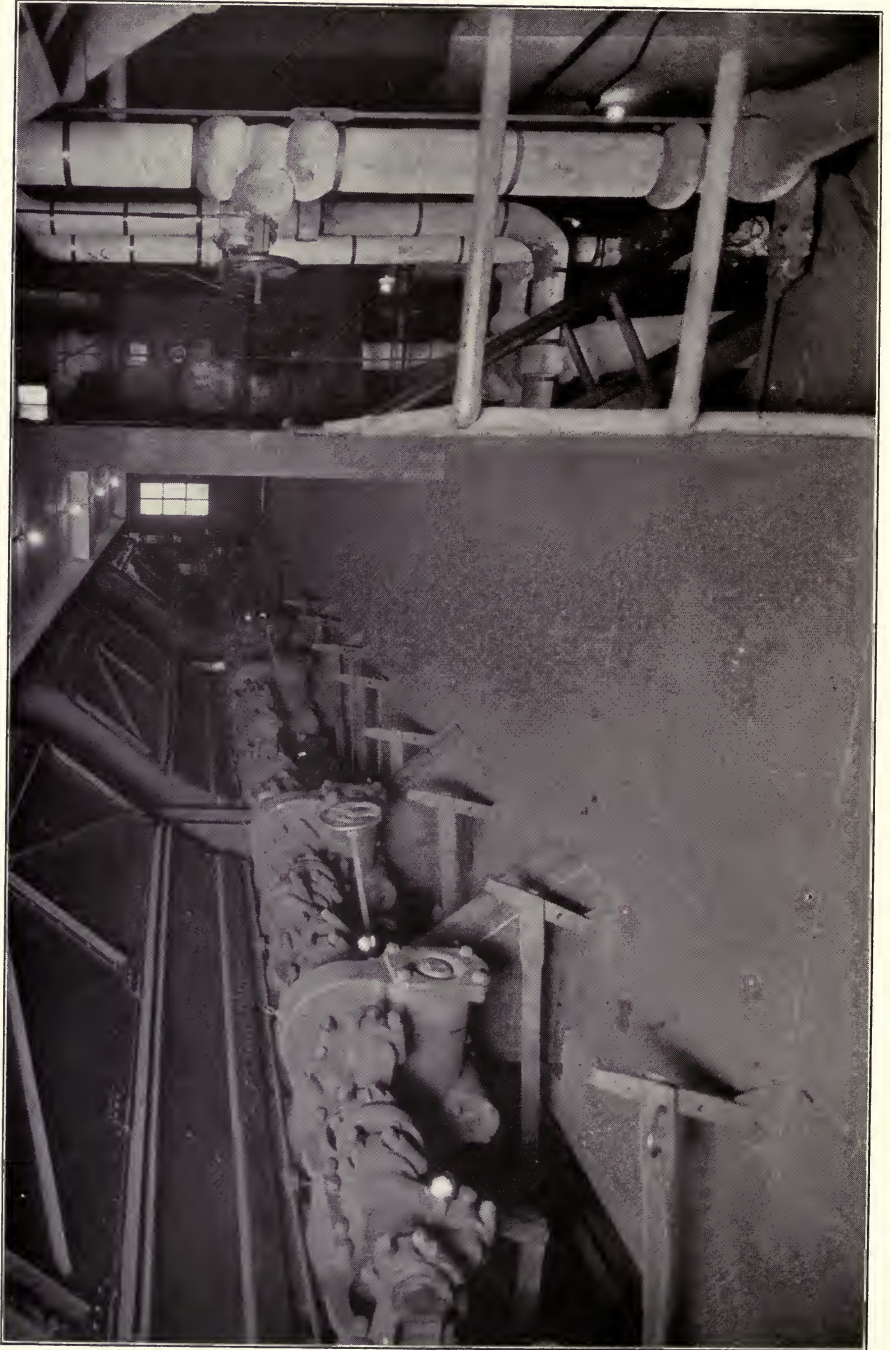
CROSS SECTION OF BOILER HOUSE, PRUDENTIAL OIL CORPORATION



FIRING AISLE, PRUDENTIAL OIL CORPORATION



GAS BURNER INSTALLATION, PRUDENTIAL OIL CORPORATION



STOKER FLOOR IN BOILER HOUSE, PRUDENTIAL OIL CORPORATION

**WILLIAMSBURG POWER STATION
ANNEX**

Brooklyn Rapid Transit Company
Brooklyn, New York



WILLIAMSBURG POWER STATION ANNEX, BROOKLYN, N. Y.

WILLIAMSBURG STATION ANNEX

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y.

Capacity: 70,000 kw.

Building: Brick with steel frame on concrete foundations.
Turbine room, 126 ft. x 75 ft.

Generating Equipment: Two 35,000 kw., 11,000 volt, 25 cycle, 3 phase, horizontal turbo-generators.

Condensing Equipment: Two 50,000 sq. ft. surface condensers with turbine-driven auxiliaries.

Feed Pumps: Three 8 in., 1,000 g.p.m. five-stage turbine-driven.

Heaters: Two open-type, 1,000,000 lbs. per hour.

Service Pumps: One 1,000 g.p.m. turbine-driven.

Traveling Crane: One 100 ton, four motor.

Exciters: Two 135 kw. direct connected to generators.

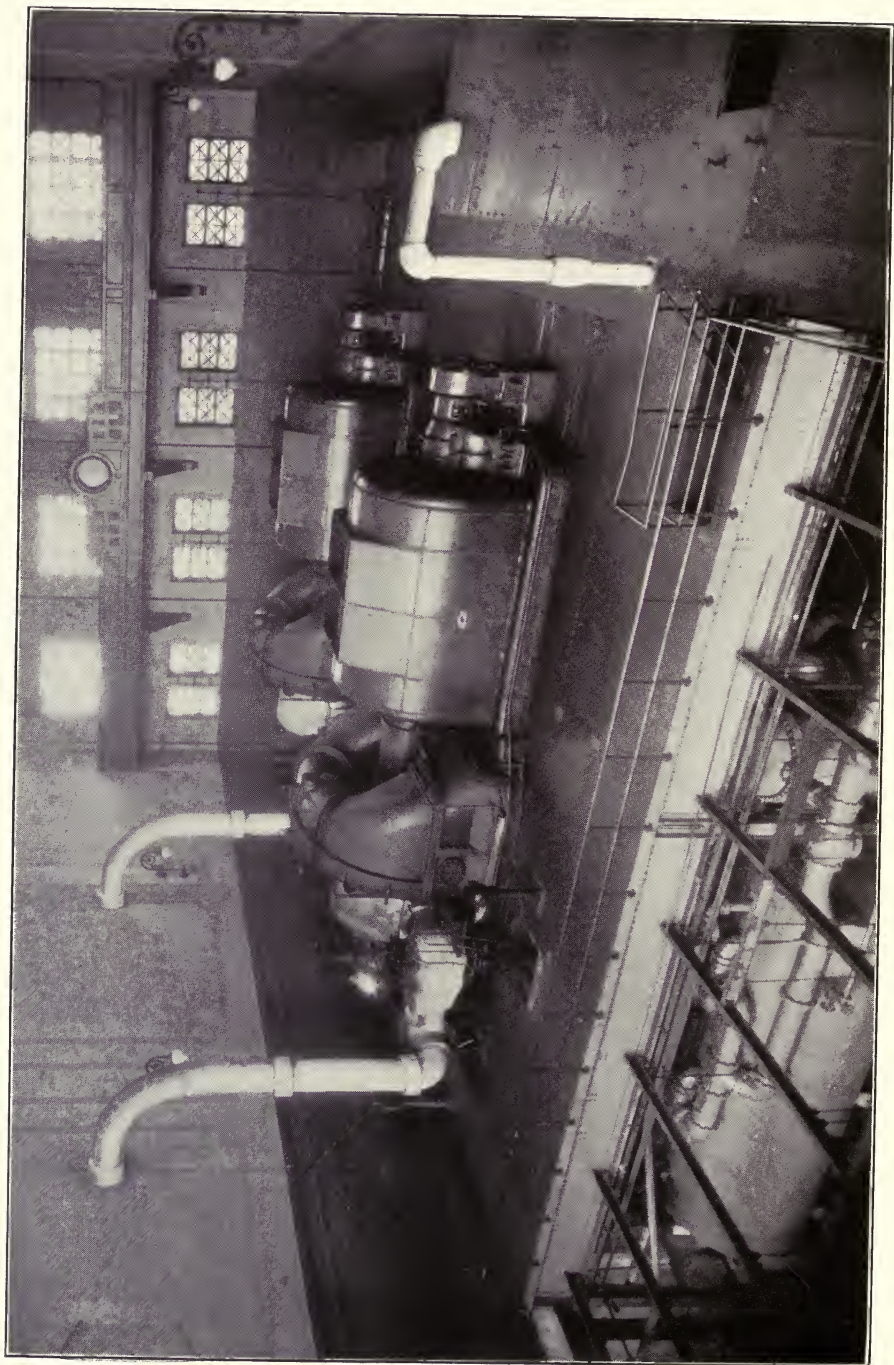
Switching Equipment: Remote control electrically operated oil switches.

Storage Battery: One 59 cell, 320 for one hour.

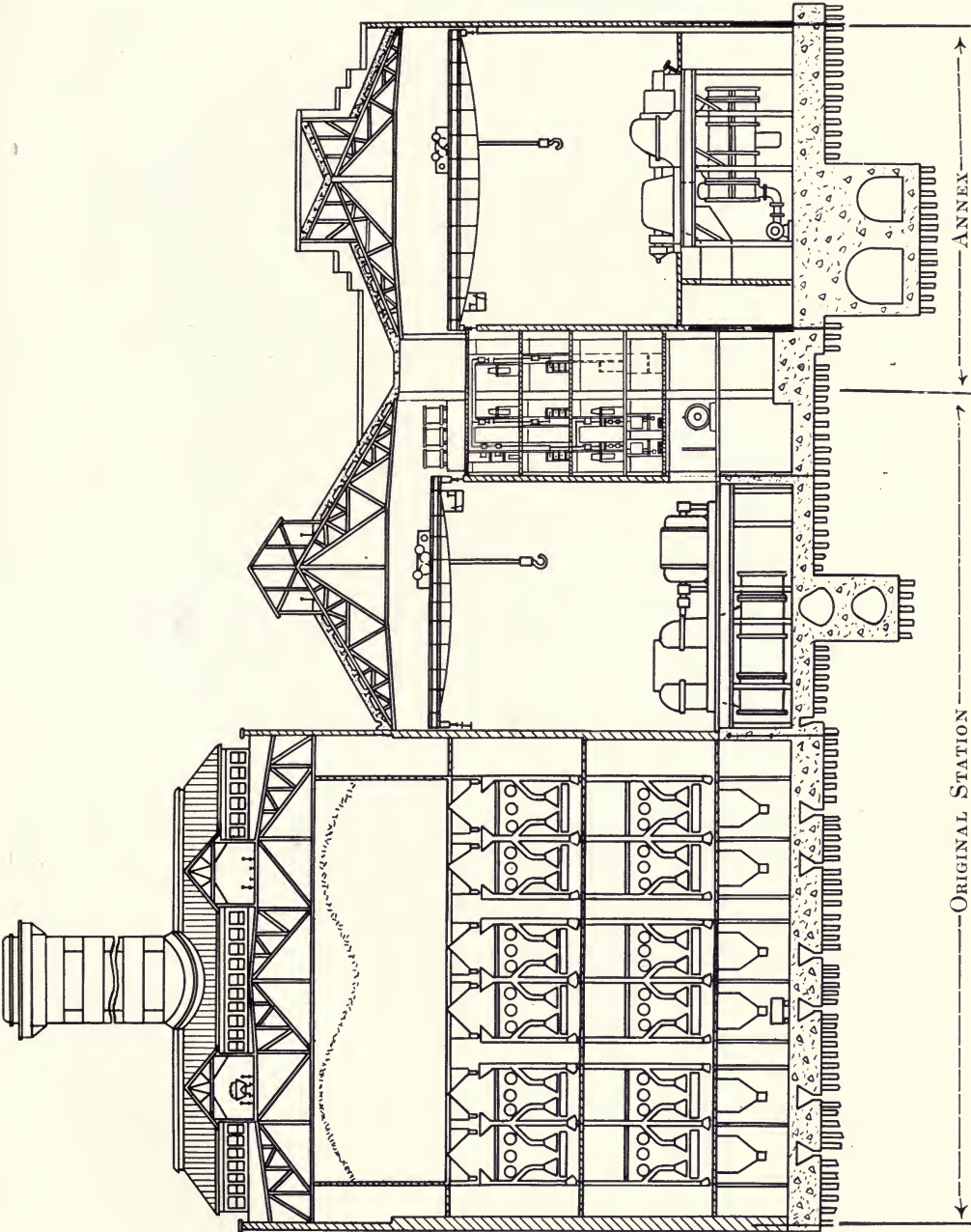
Reactance Coils: On feeders and bus.

District Served: Railway System of Brooklyn.

Built: 1920.



TURBINE ROOM, WILLIAMSBURG STATION ANNEX

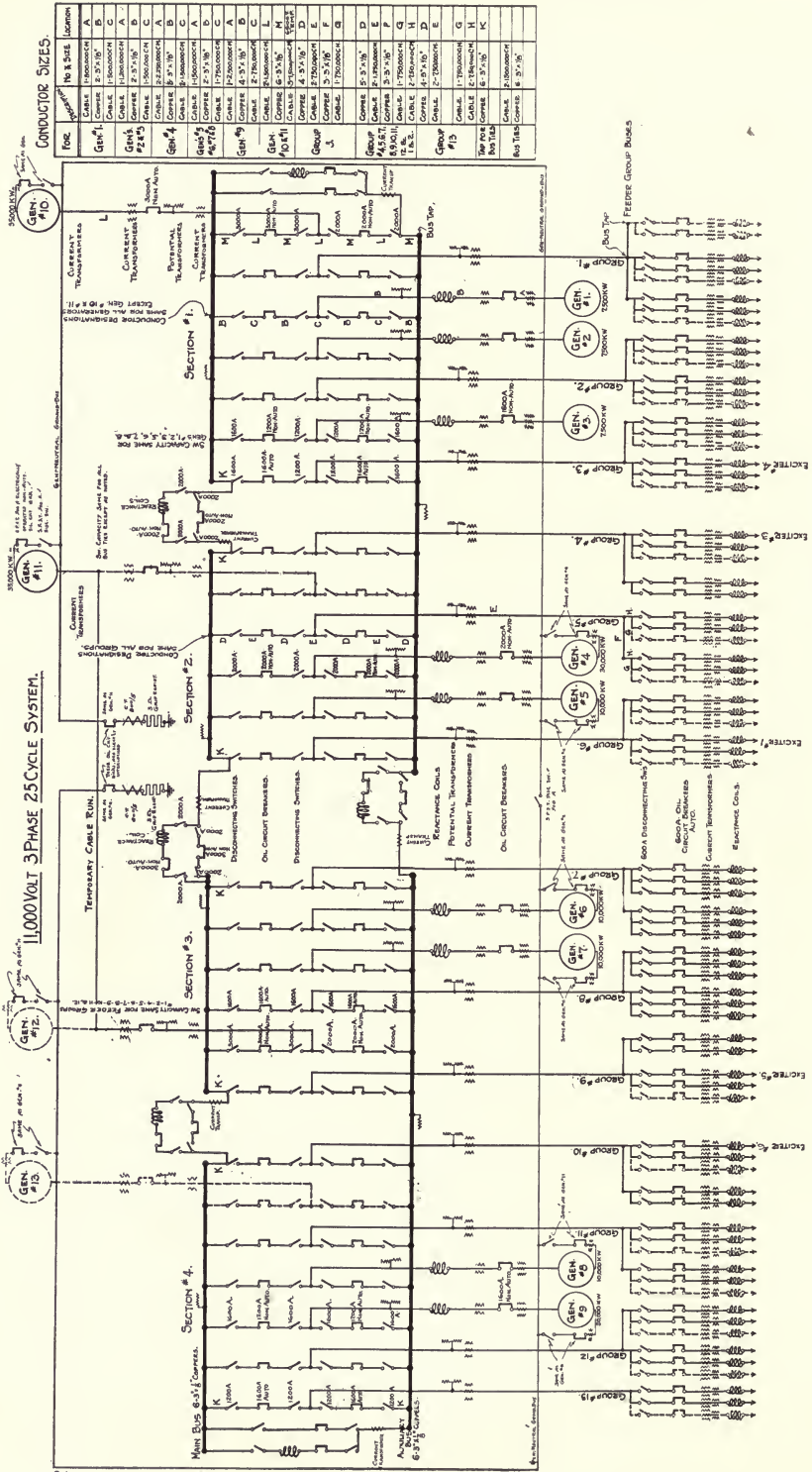


ORIGINAL STATION

ANNEX

CROSS SECTION OF WILLIAMSBURG STATION AND ANNEX

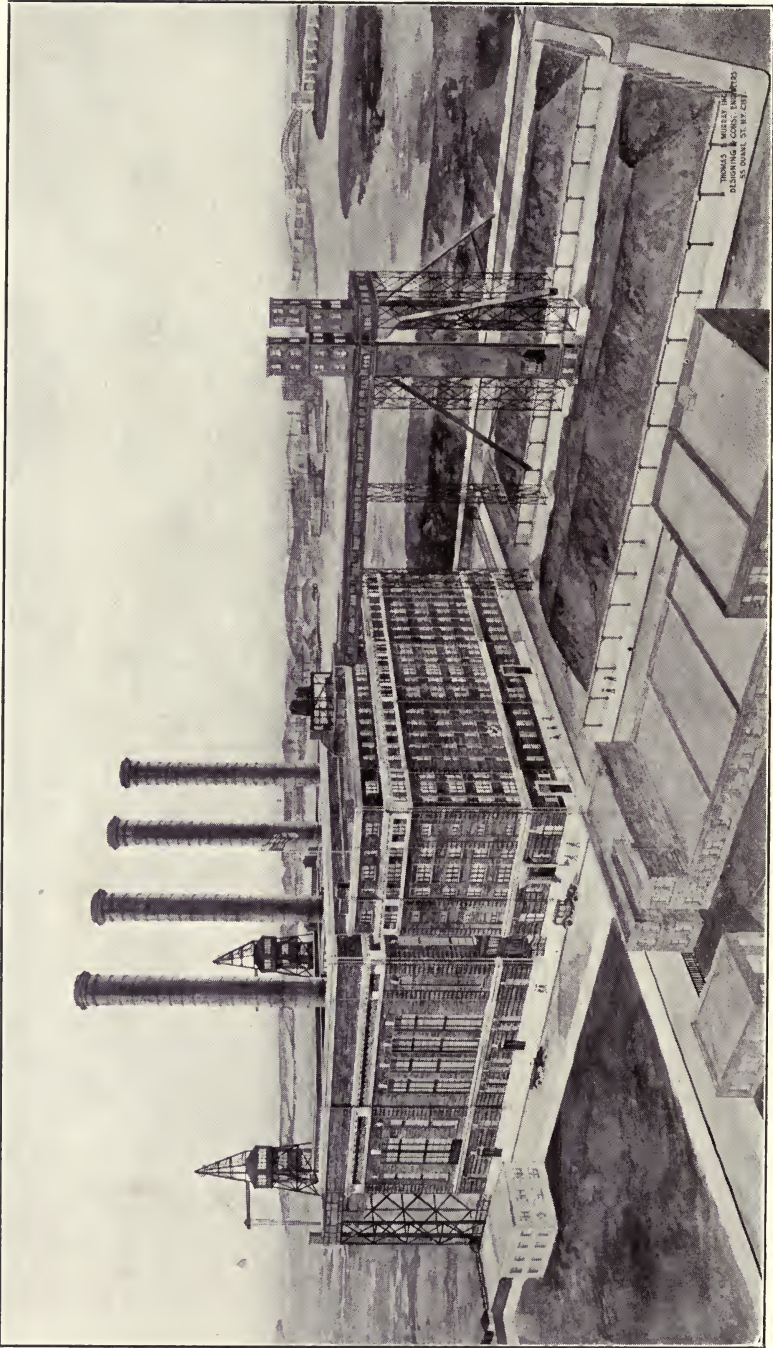
WILLIAMSBURG STATION ANNEX



ONE LINE DIAGRAM OF MAIN ELECTRICAL CONNECTIONS, WILLIAMSBURG STATION ANNEX

HELL GATE STATION

The United Electric Light and Power Company
New York City



THOMAS & MURPHY ARCHITECTS
DESIGNING & CONSTRUCTING
157 BROADWAY, N.Y.C.

HELL GATE STATION, NEW YORK CITY

HELL GATE STATION

THE UNITED ELECTRIC LIGHT AND POWER COMPANY
NEW YORK, N. Y.

Capacity: Initial, 150,000 kw. Ultimate, 300,000 kw.

Building: Brick with steel frame, concrete foundation; Boiler Room, 133 ft. x 369 ft.; Turbine Room, 100 ft. x 369 ft.; Electrical Galleries, reinforced concrete with bearing walls, 105 ft. x 211 ft.

Boilers: Initial, 12, 1890 h.p., water tube with 2135 sq. ft. superheated surface per boiler.

Stokers: Initial, two 14 retort (double end) for each boiler.

Stoker Drive: Constant speed A.C. motors with variable speed transmission.

Forced Draft: Initial, eight double inlet motor-driven blowers each having a capacity of 120,000 cu. ft. per minute at 7 in. static pressure.

Stacks: Four 22 ft. dia. steel brick-lined, 258 ft. above boiler floor.

Coal Handling: Two two-ton electrically operated steel towers (grab buckets raise coal from barges to hoppers and crushers at top of tower), cable cars to bunkers. Skip hoist and drag scraper for coal storage.

Ash Handling: Hydraulic trough system with traveling grab buckets over pits.

Generating Equipment: Initial, two 40,000 kw. 13200 volt, 60 cycle, 3 phase, horizontal turbo-generators, 90% P.F. Two 35,000 kw. 11400 volt, 25 cycle, 3 phase, horizontal turbo-generator unity power factor. Two 2,000 kw. 2350 volt, 60 cycle, 3 phase, non-condensing horizontal house turbines, 80% P.F.

Steam Conditions: 250 lbs. pressure, 200° F. superheat.

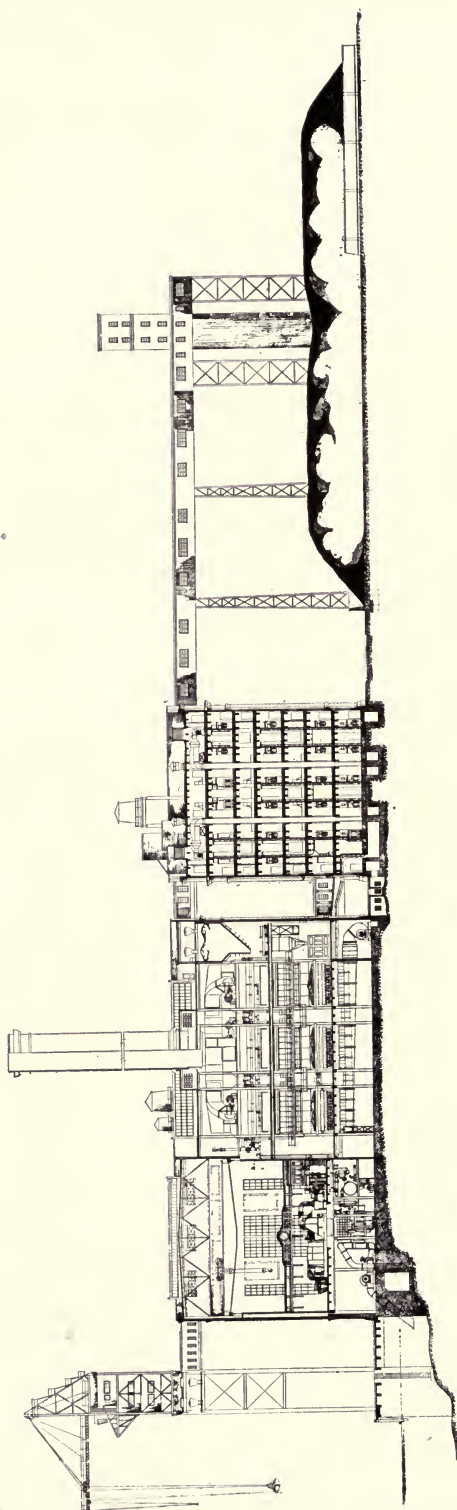
- Condensers:** Initial, four 2 pass, 50,000 sq. ft. surface with 70,000 g.p.m. pumping equipment for each.
- Circulating Pumps:** Initial, two 35,000 g.p.m. pumps for each condenser.
- Condensate Pumps:** Four 1200 g.p.m. and four 1350 g.p.m. motor-driven.
- Traveling Crane:** Initial, one 4 motor 110 ton with 10 ton auxiliary hoist. One 90 ton with 50 ton auxiliary hoist on separate trolley.
- Feed Pumps:** Initial, four 1,000 g.p.m. motor-driven and two 1,000 g.p.m. steam-driven.
- Fire Pumps:** One 1,000 g.p.m., turbine-driven.
- Booster Pumps:** Four 750 g.p.m., motor-driven.
- Closed Heater Condensate Pumps:** Four 200 g.p.m., motor-driven.
- Fresh Water Pumps:** Two 100 g.p.m., motor-driven.
- Ash Handling Pumps:** Three 5,000 g.p.m., motor-driven.
- Service Pumps:** Initial, two 1,000 g.p.m., motor-driven.
- Heaters:** Initial, two open cylindrical type, 1,000,000 lbs. per hour. Four 1750 sq. ft., closed type.
- Exciters:** Initial, one 165 kw., direct connected to each 60 cycle turbine. One 135 kw., direct connected to each 25 cycle turbine. Two 25 kw., 250 volt D.C., motor-driven, and two 25 kw., 250 volt D.C., turbine-driven, for house alternators.
- Transformers:** Initial, two banks of three 2500 kv.a., 13200/2300 volts.
- Motor Generators:** Initial and ultimate, six 50 kw., 250 volt D.C. for switch control and emergency lighting.
- Switching Equipment:** Remote control, isolated phase, electrically operated oil switches.
- Storage Batteries:** Initial, two 118 cell, 240 ampere hour, batteries for switch control. One 104 cell, 240 ampere hour, storage for emergency lighting.

Reactance Coils: Initial, generators (5% each) 2 sets of 1920 amp., 60 cycle, single phase, 13200 volt, 730 kv.a. Two sets of 1840 amp., 25 cycle, single phase, 11,000 volts, 585 kv.a. Bus ties (5% each), 2 sets of 1920 amps., 60 cycle single phase, 13200 volt, 730 kv.a. Two sets of 1840 amp., 25 cycle, single phase, 11,000 volts, 585 kv.a. Feeders (3%), 34 sets of 350 amperes, single phase, 67 and 80 kv.a. Interstation ties (5%), 12 sets of 350 amperes, single phase, 111 and 134 kv.a. House transformer (12%), 2 sets 263 amps., 60 cycle, single phase, 13200 volt, 256 kv.a. 2300 volt bus ties (20%), 1 set 1510 amps., 400 kv.a.

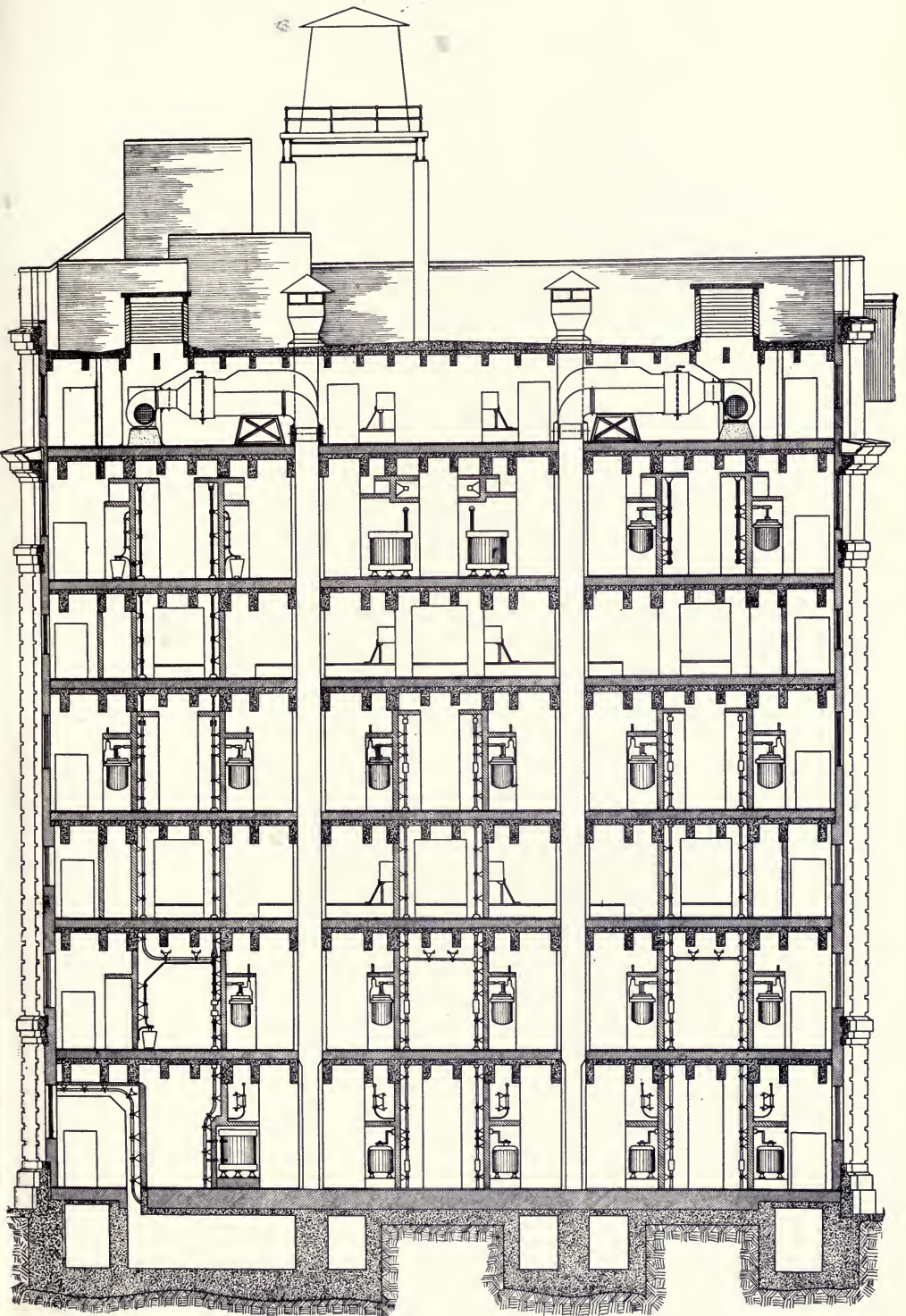
District Served: Borough of Manhattan, Queens and the Bronx, and County of Westchester.

Station Built: 1921.

HELL GATE STATION

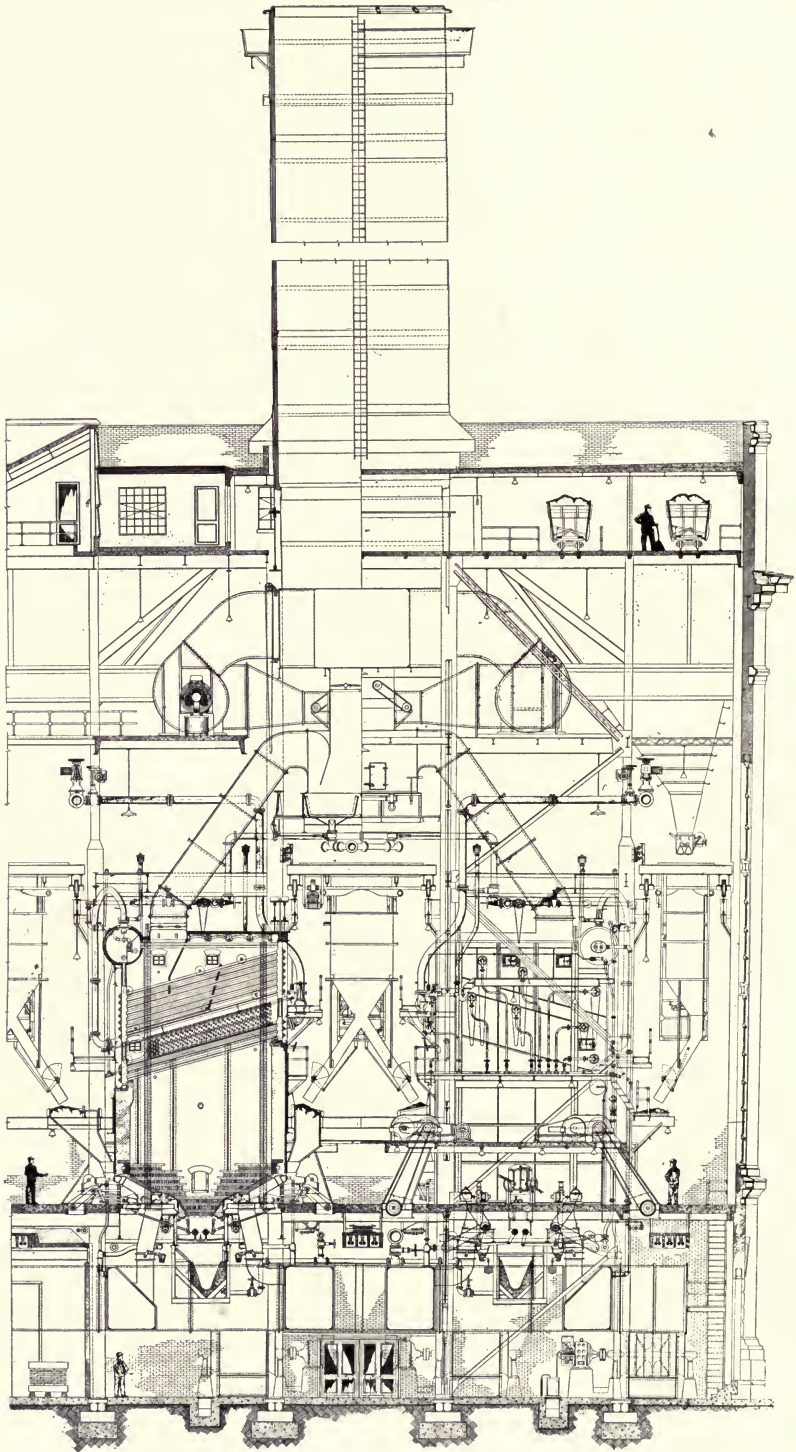


CROSS SECTION THROUGH ENTIRE PLANT, HELL GATE STATION

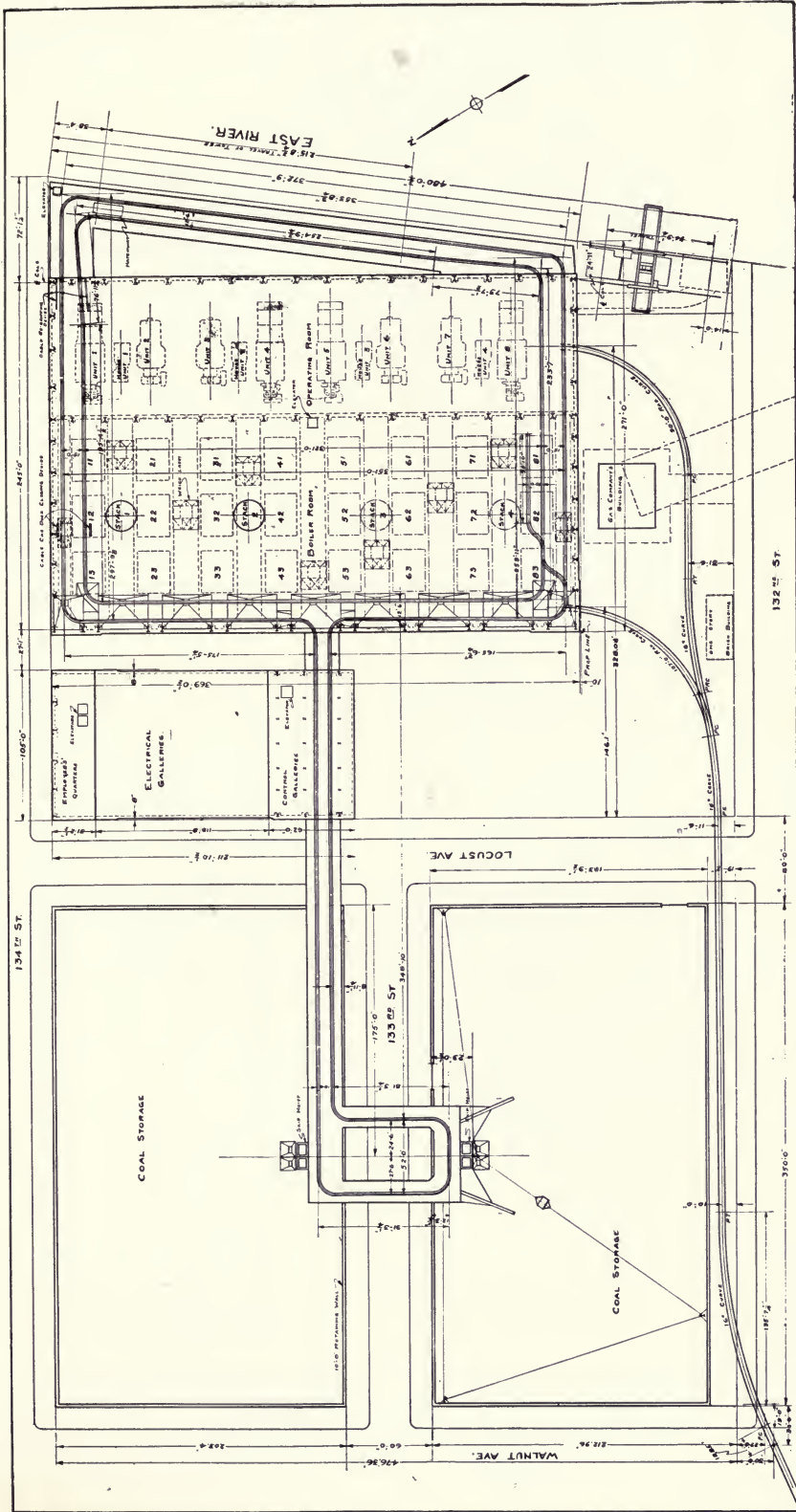


CROSS SECTION THROUGH ELECTRICAL GALLERIES, HELL GATE STATION

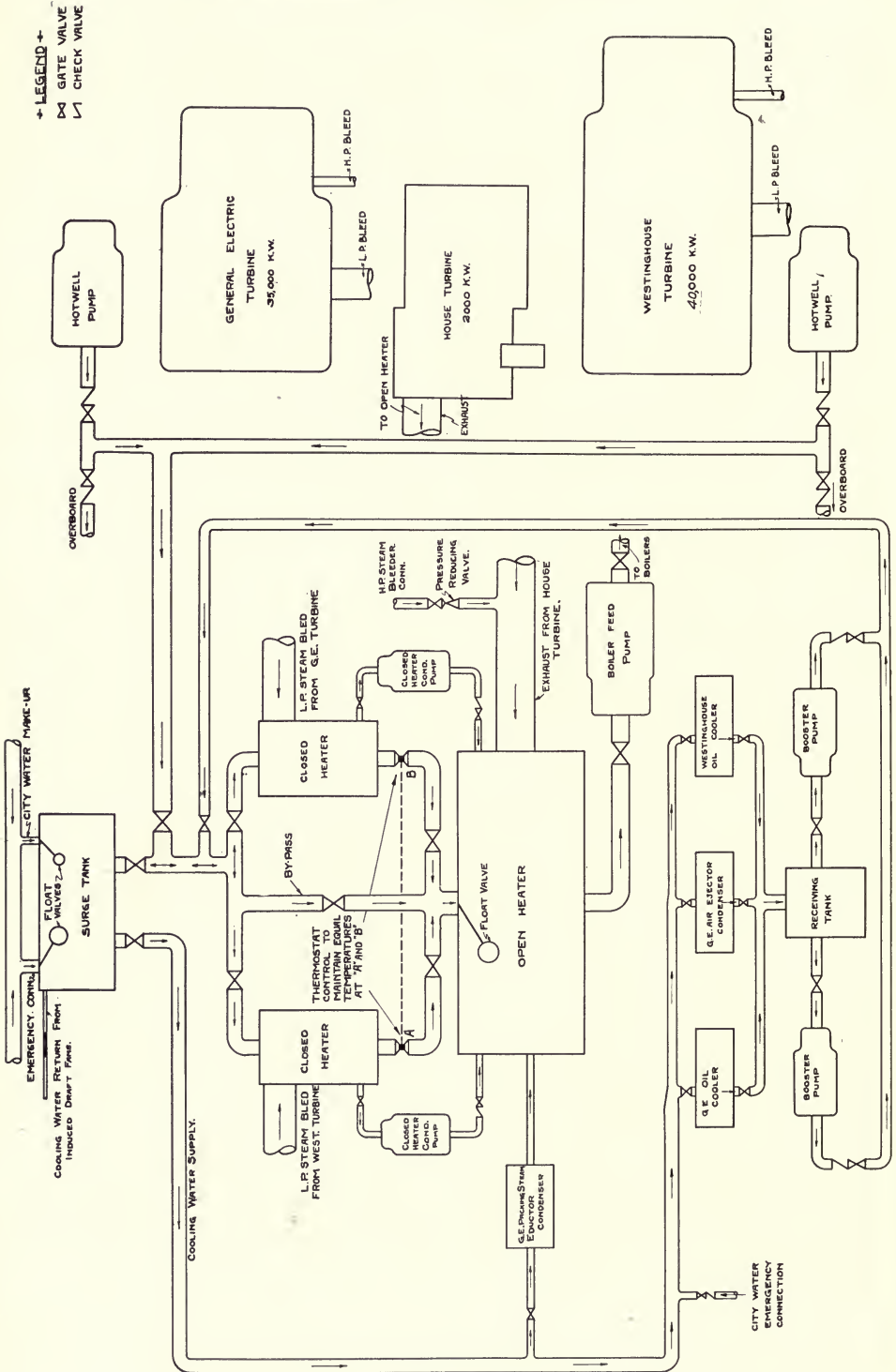
HELL GATE STATION



CROSS SECTION THROUGH FIRING AISLE, HELL GATE STATION



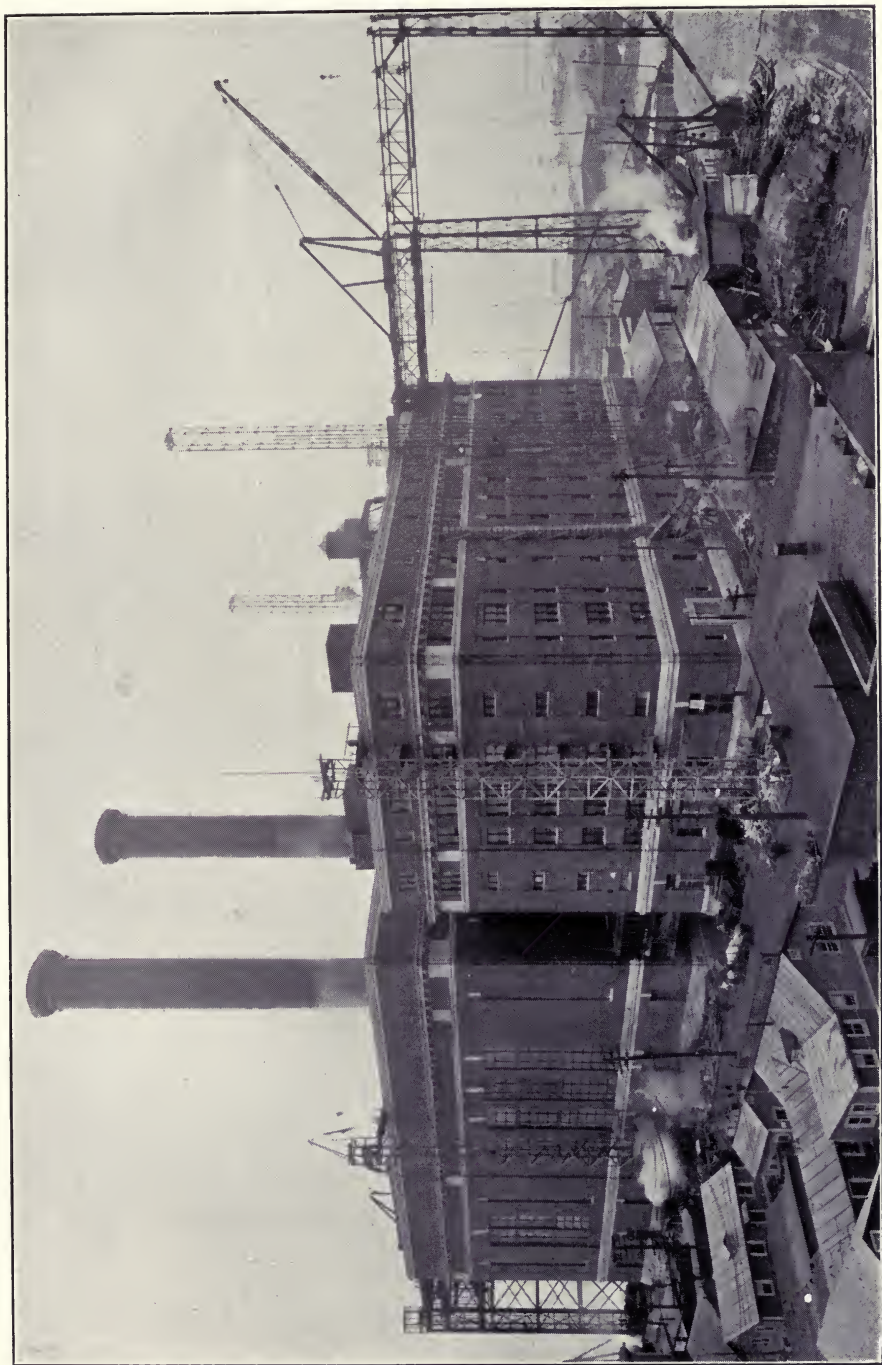
PLAN OF MAIN FLOOR AND COAL STORAGE YARD, HELL GATE STATION



FEED WATER CONNECTIONS, HELL GATE STATION



HELL GATE STATION, JANUARY 15TH, 1921



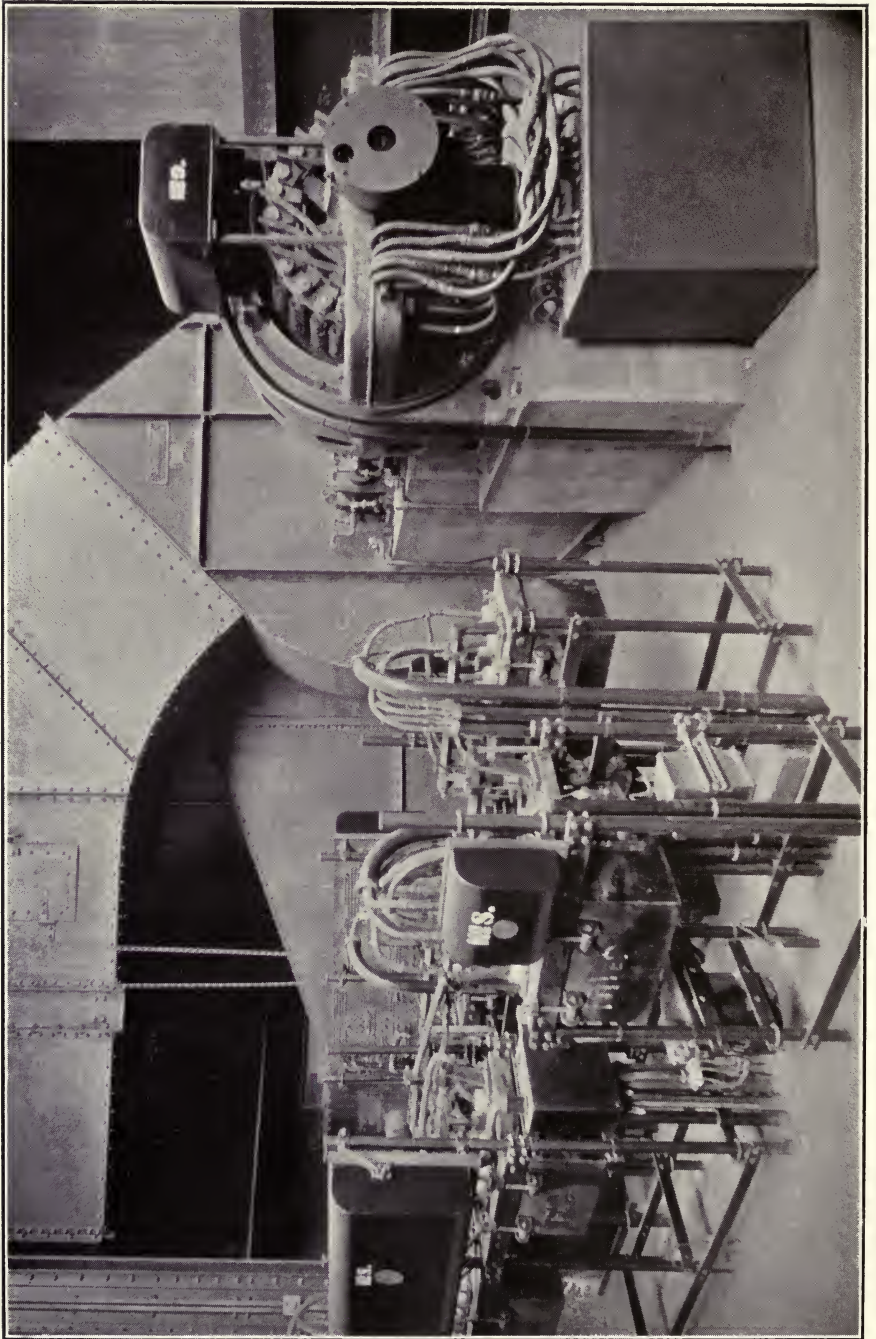
HELL GATE STATION SEVEN MONTHS AFTER STARTING STEEL WORK



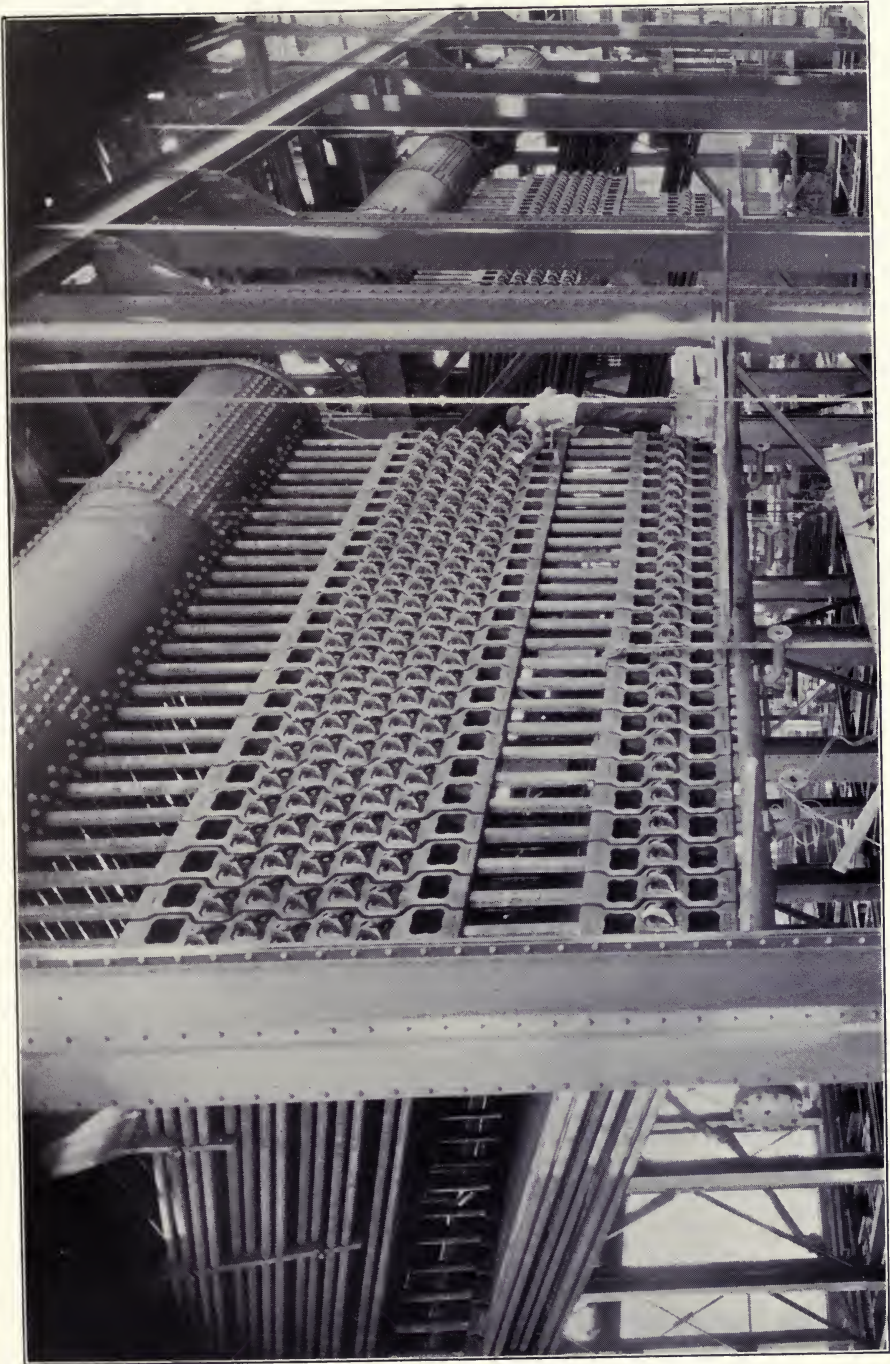
INSIDE OF SEA WALL AND BOTTOM OF DISCHARGE TUNNEL, HELL GATE STATION



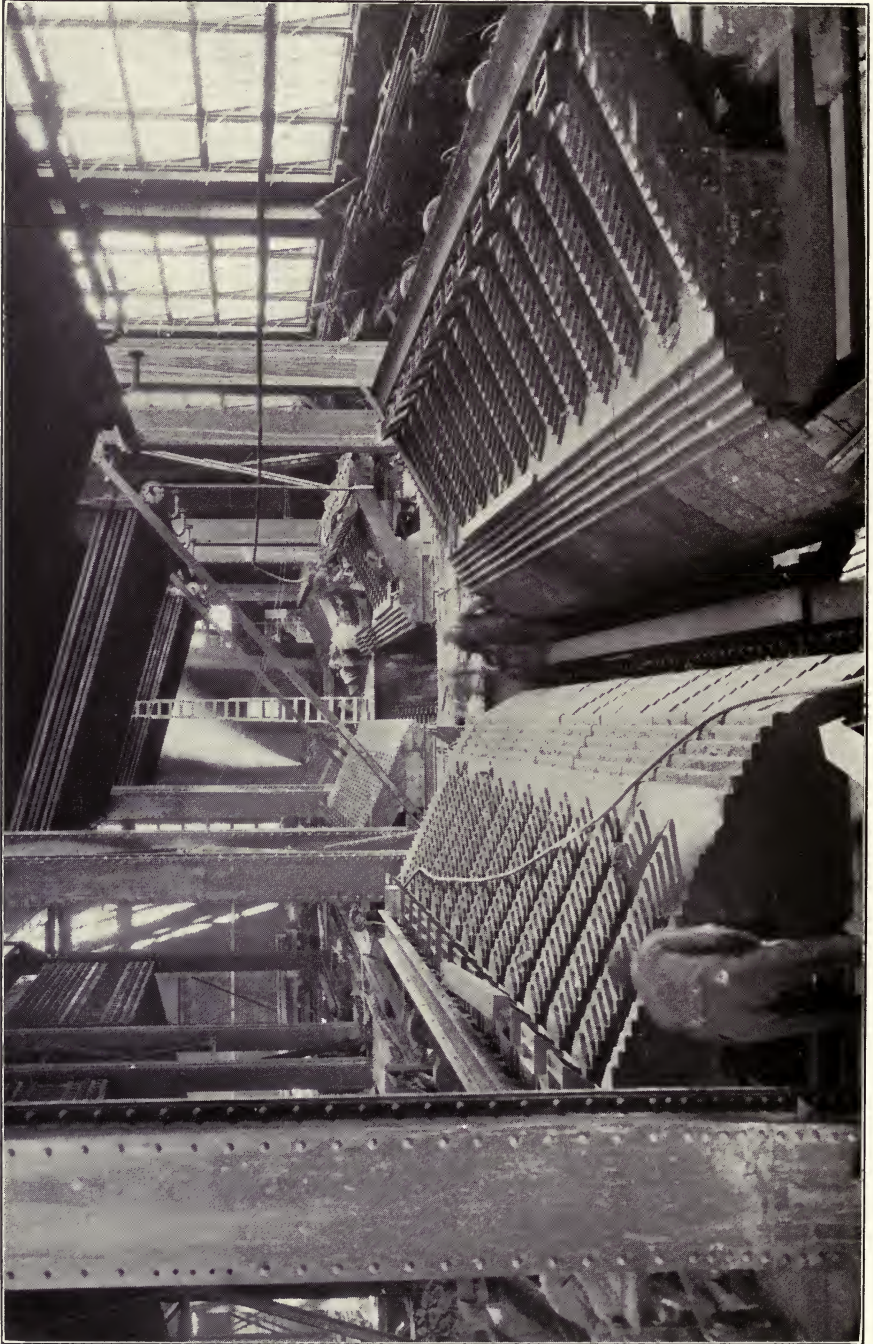
TRAVELING COAL TOWER, HELL GATE STATION



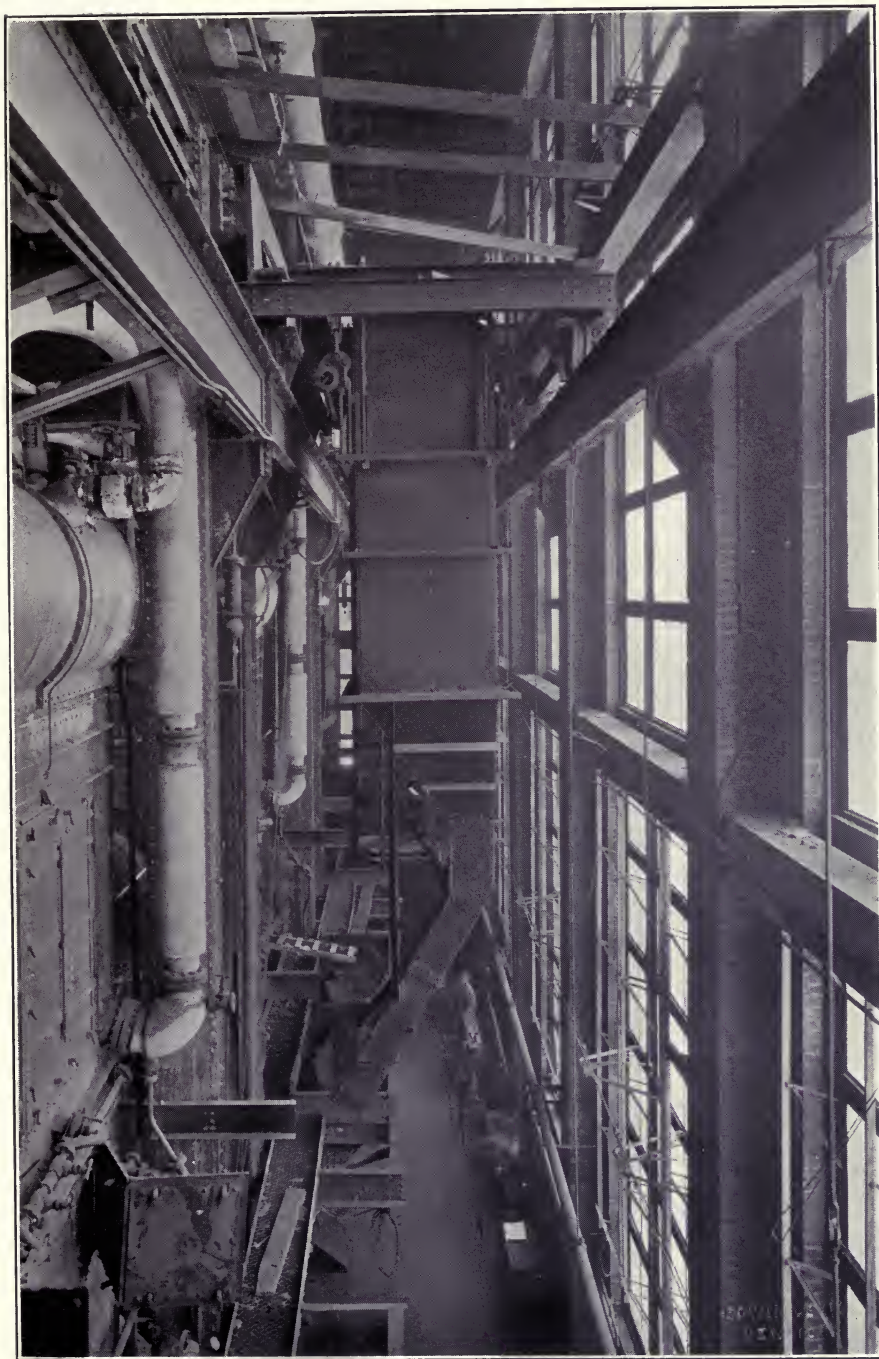
INDUCED DRAFT FAN, HELL GATE STATION



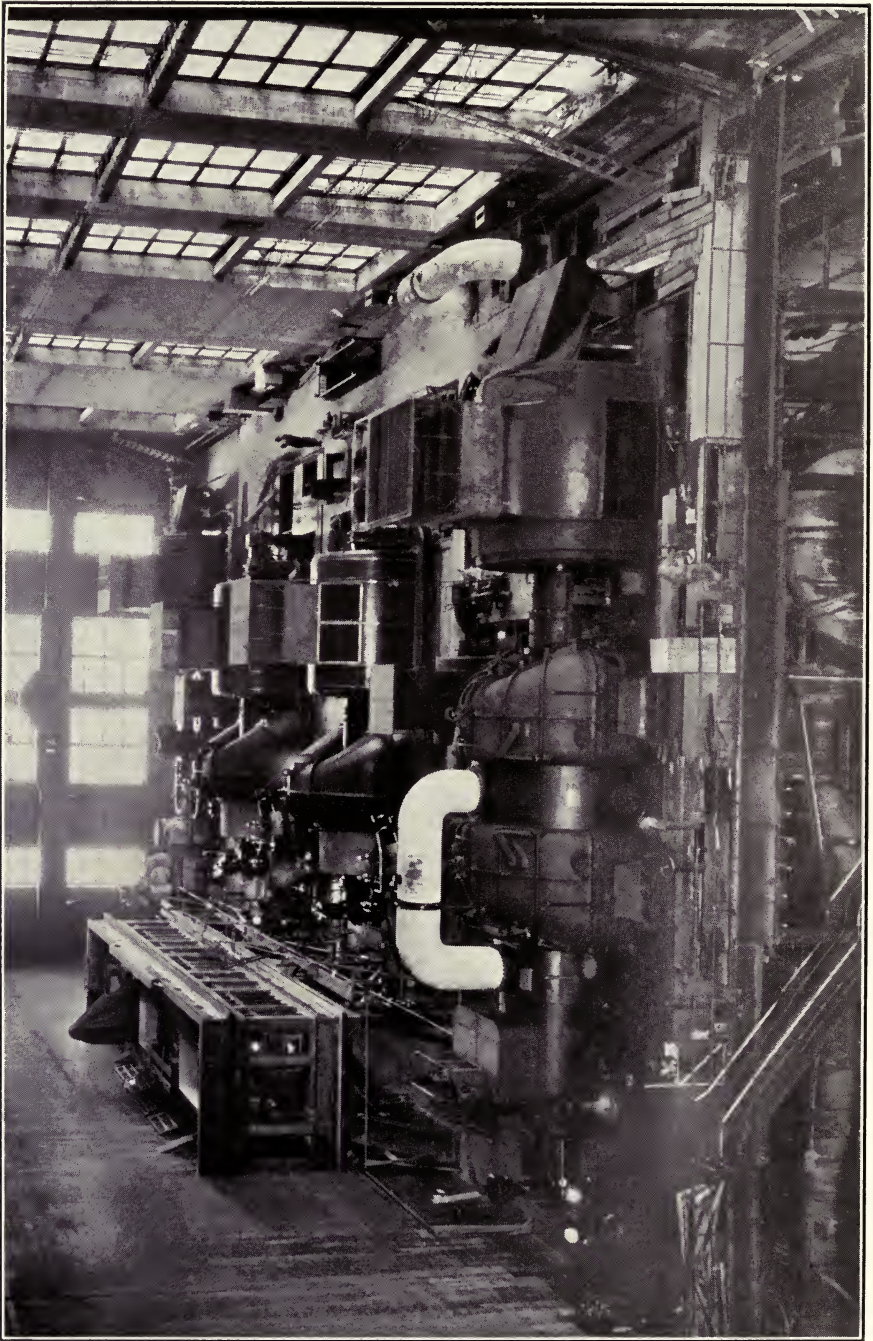
BOILERS UNDER CONSTRUCTION, HELL GATE STATION



DOUBLE STOKER INSTALLATION UNDER CONSTRUCTION, HELL GATE STATION



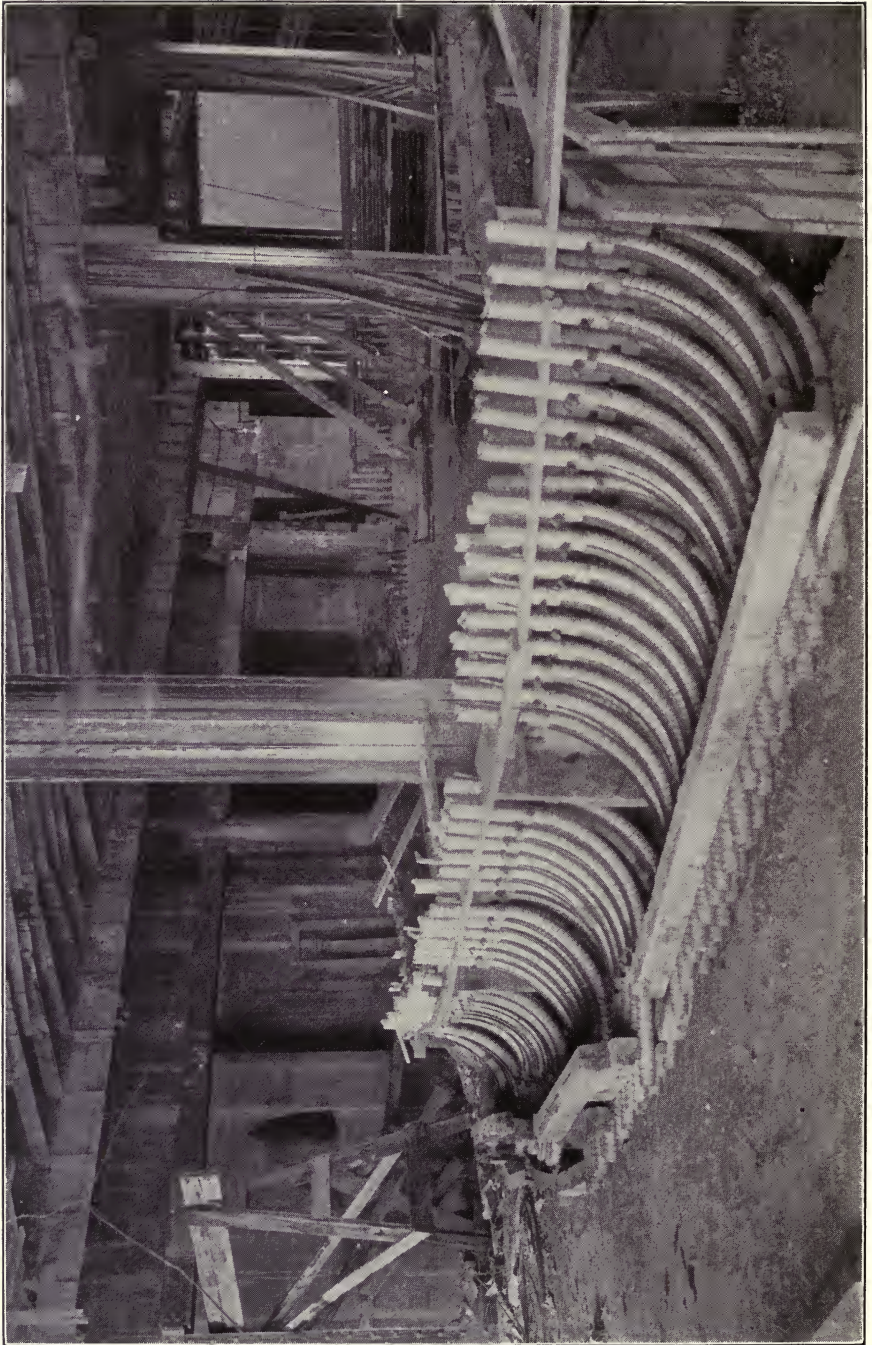
FIRING AISLE, HELL GATE STATION



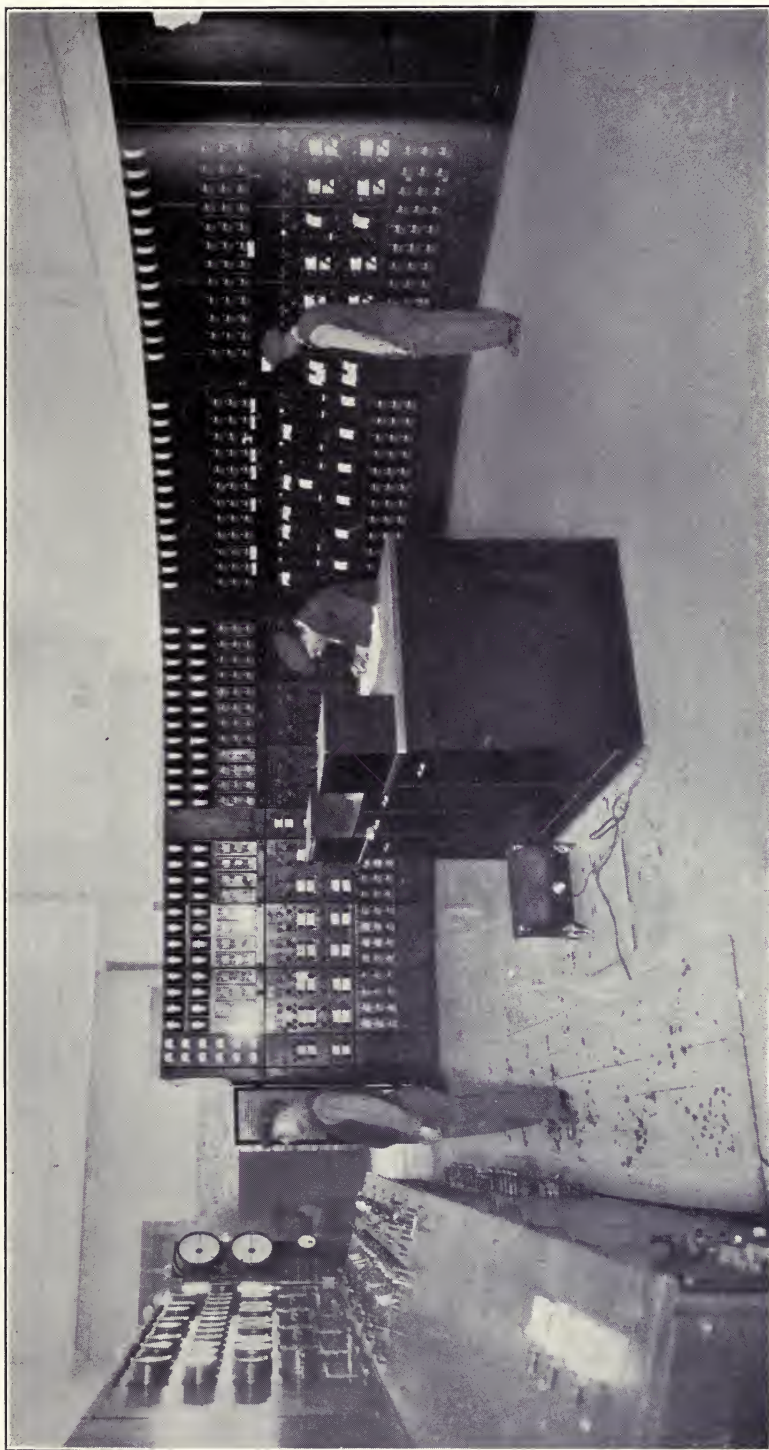
TURBINE ROOM, HELL GATE STATION



OPERATING MECHANISM FOR SWITCHES, HELL GATE STATION



CONSTRUCTION OF CONDUITS WITH PAPER DUCTS, HELL GATE STATION



HIGH TENSION CONTROL BOARD, HELL GATE STATION



REACTANCE COILS, HELL GATE STATION



FEEDEE SWITCHES, HELL GATE STATION



WATERSIDE STATION NO. 1

The New York Edison Company
New York City



WATERSIDE STATION No. 1, NEW YORK CITY

WATERSIDE STATION NO. 1

THE NEW YORK EDISON COMPANY

NEW YORK, N. Y.

Capacity: 174,000 kw.

Building: Brick with steel frame, concrete foundation resting directly on bed rock. Boiler Room, 272 ft. x 81 ft. Turbine Room, 272 ft. x 96 ft. Electrical Galleries, seven floors, 272 ft. x 19 ft.

Boilers: Fifty-four 650 h.p. water tube with superheaters. Equipped with Metropolitan Cinder Catchers, located on two floors.

Stokers: One seven retort underfeed stoker for each boiler.

Stoker Drive: Four direct current motors. Twelve single-acting double cylinder engines.

Forced Draft: 18 turbine-driven blowers.

Stacks: 17 ft. in dia., lined steel. Height above grates of lower tier boilers, 255 ft.

Coal Handling: Two one-man towers over the bulkhead for unloading barges and delivering coal to belt and bucket conveyor, thence to bunkers.

Ash Handling: Industrial cars, belt conveyor and skip hoist.

Steam Conditions: 200 lbs. pressure 110-115° F. superheat.

Condensers: Two 2 pass, 50,000 sq. ft. surface. Three 30,000 sq. ft. surface (base type). Three 3 pass, 19,253 sq. ft. surface. One 2 pass, 18,000 sq. ft. surface.

Feed Pumps: Six 1,000 g.p.m., turbine-driven.

Heaters: Two cylindrical feed water with a capacity of 2,400,000 lbs. per hour.

Service Pumps: Two 1,000 g.p.m. centrifugal pumps, turbine-driven.

Generating Equipment: Two 35,000 kw., 6600 volt, 25 cycle, 1500 r.p.m. horizontal turbo-generators. Three 20,000 kw., 6600 volt, 3 phase, 25 cycle, 750 r.p.m., vertical turbo-generators. Two 10,000 kw., 6600 volt, 3 phase, 25 cycle, 500 r.p.m., vertical turbo-generators. One 9,000 kw., 7500 volt, 3 phase, 60 cycle, 600 r.p.m., vertical turbo-generators. One 7500 kw., 6600 volt, 3 phase, 25 cycle, 500 r.p.m., vertical turbo-generators. One 7500 kw., 7500 volt, 3 phase, 60 cycle, 720 r.p.m., vertical turbo-generators.

Exciters: Three 150 kw., 280 volt, 536 amp., motor-driven. Four 150 kw., 280 volt, 536 amp., motor-driven. One 150 kw., 250 volt, 600 amp., motor-driven.

Transformers: Four banks, 6,000 kw., 25 cycle, 7800/15600 volt. Two banks, 8,400 kw., 25 cycle, 6600/13200 volt. Two banks, 6,000 kw., 60 cycle, 7800/15600 volt.

Motor Generator: Two 500 kw. generators, 675 h.p., induction motors.

Switching Equipment: Remote control, electrically operated, oil switches.

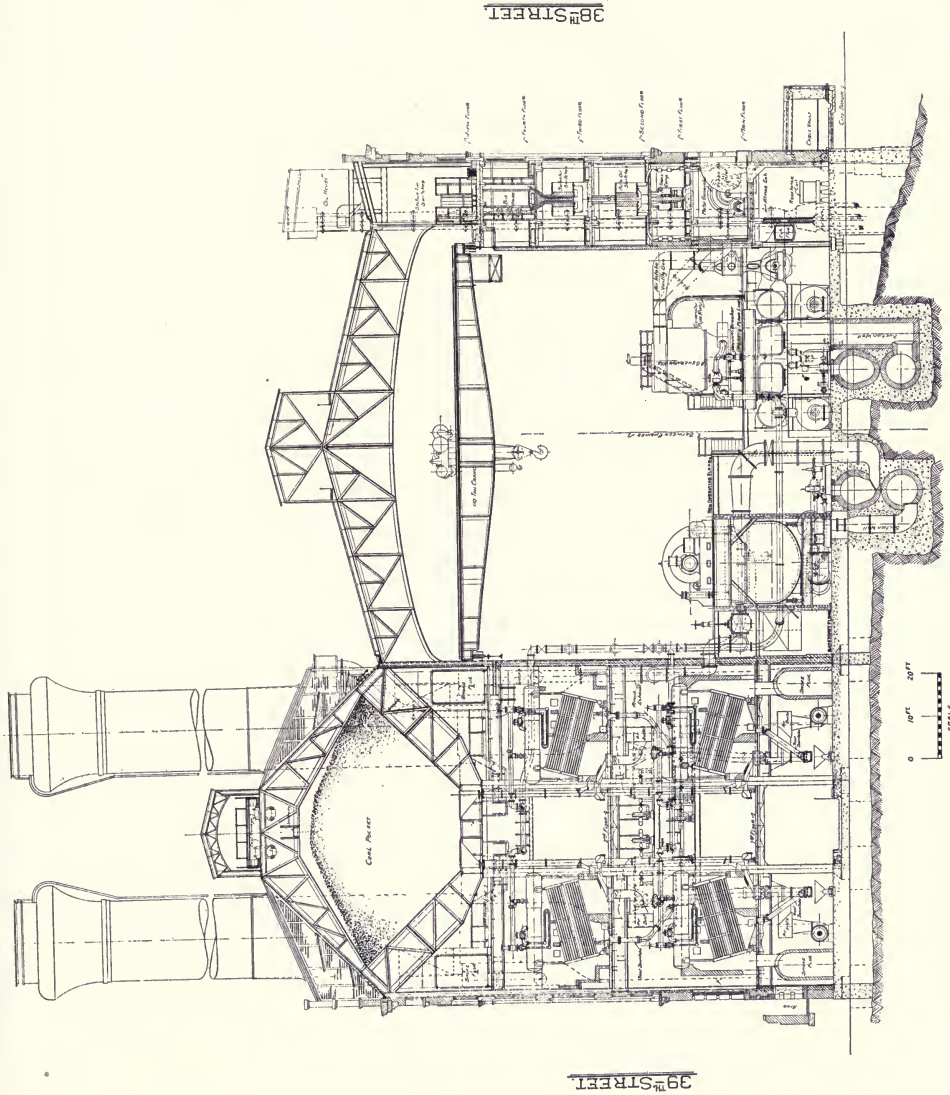
Storage Batteries: One 140 cell, 4,000 amp. for one hour. One 150 cell, 4,000 amp. for one hour.

Traveling Crane: One four-motor 110-ton electric with a ten-ton auxiliary hook, 95 ft. span. One 50-ton electric.

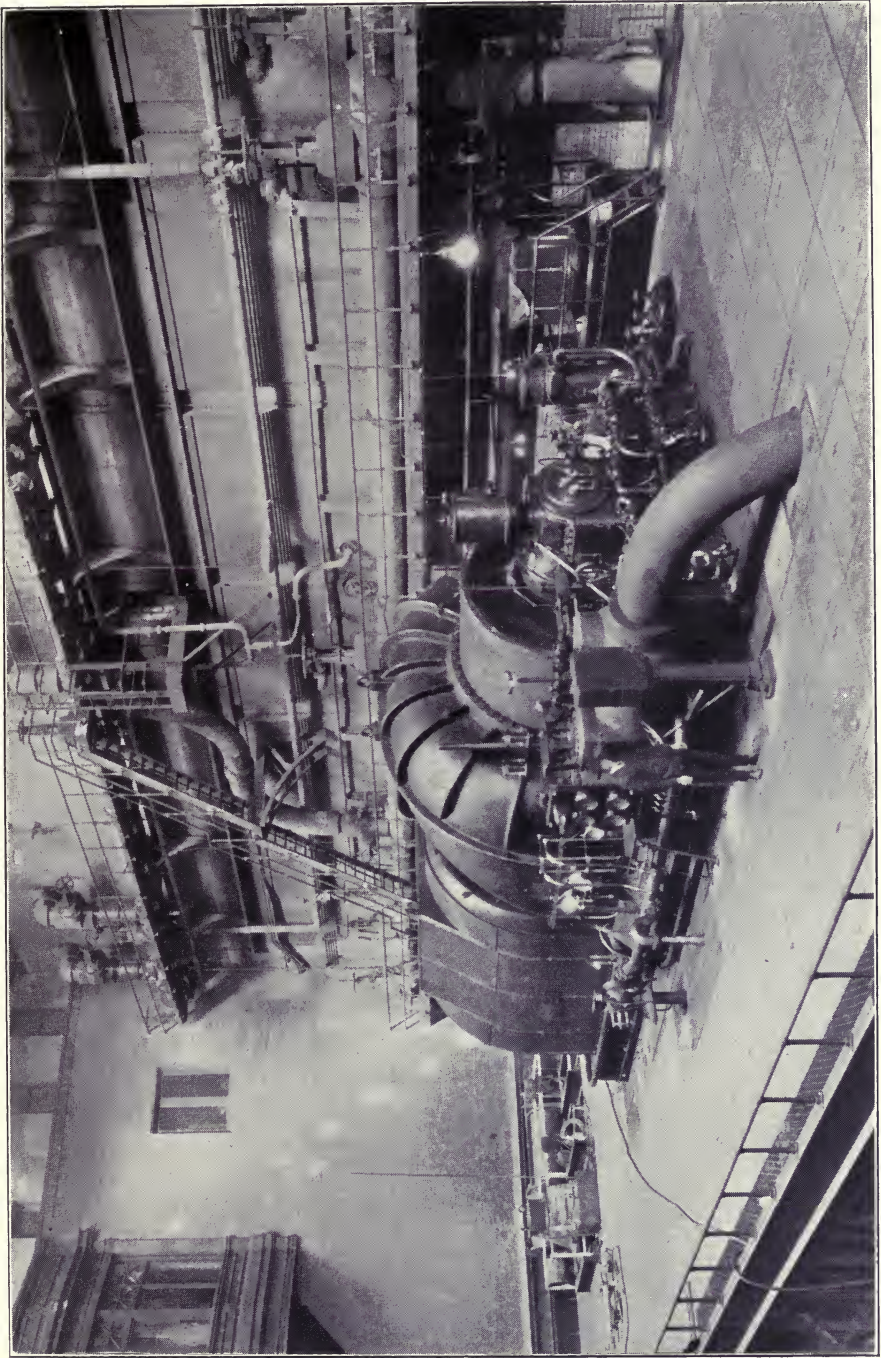
Reactance Coils: Eight sets of three each on generators. Five 3 phase coils of three each on exciters. Two 3 phase coils of three each on motor gen. Four sets of three each on station bus ties. Two sets of three each on railway bus ties. Two sets of three each on transformers. Sixty-eight 3 phase coils on feeders.

District Served: Boroughs of Manhattan and Bronx.

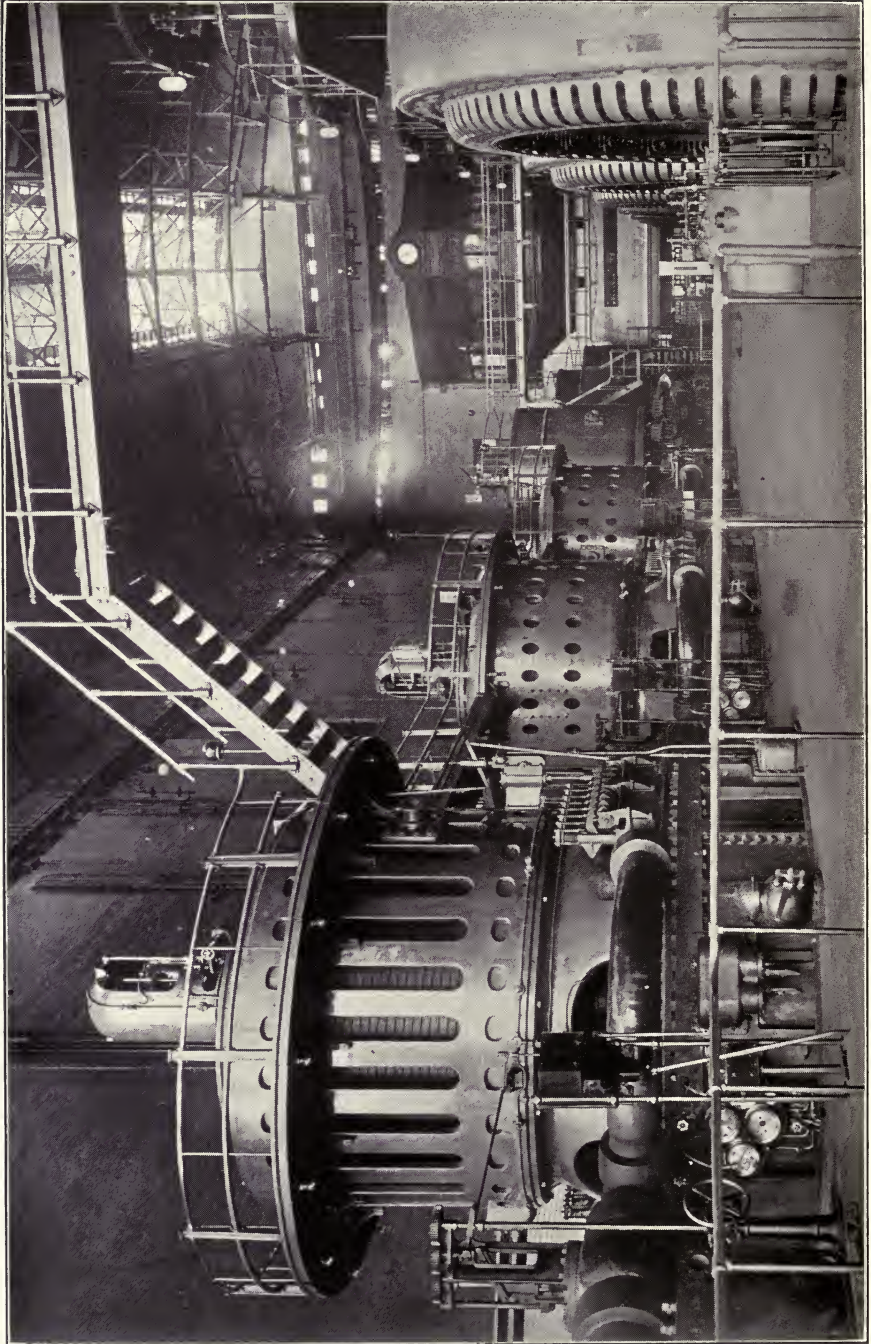
Station Built: 1901.



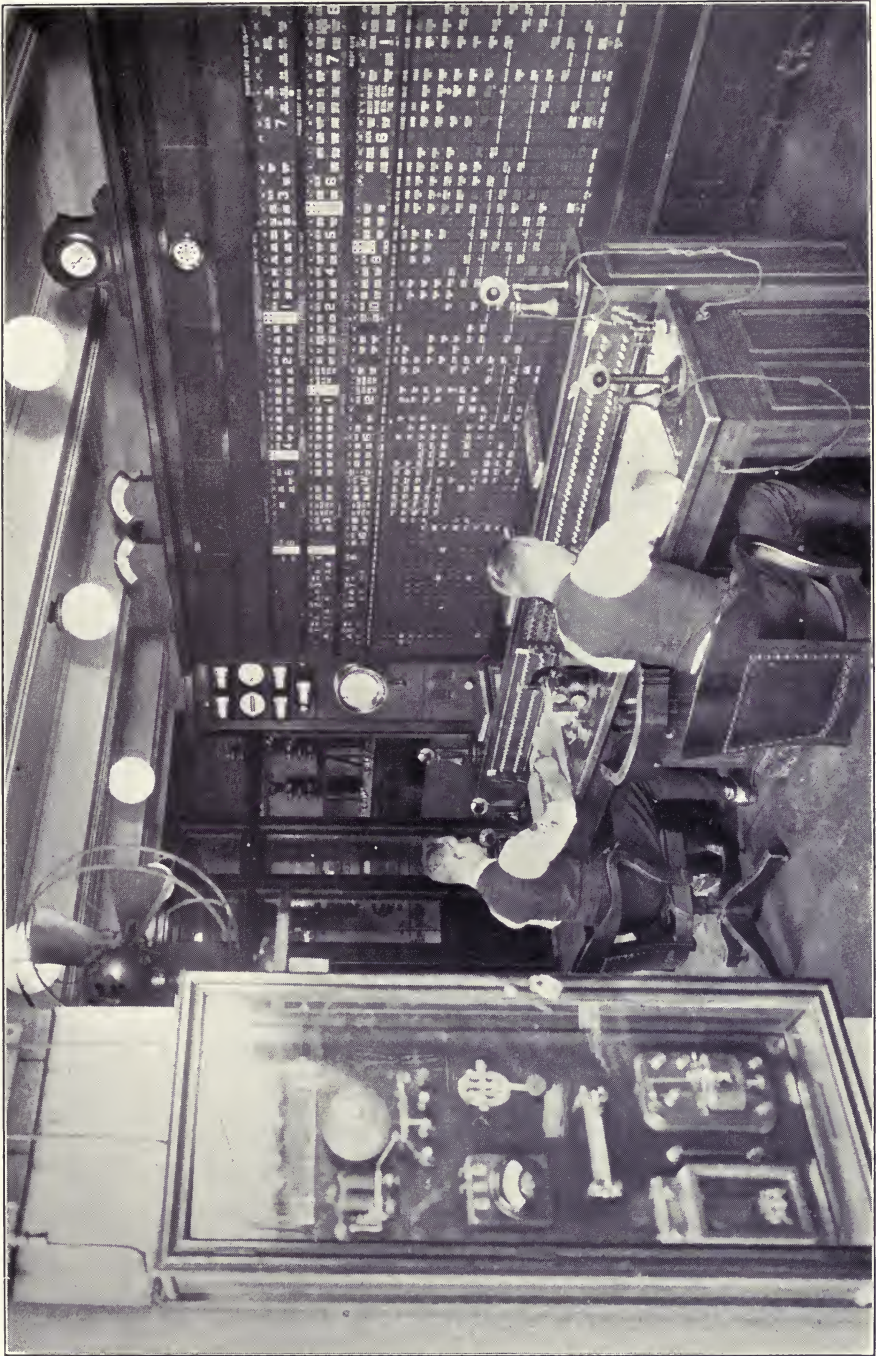
CROSS SECTION THROUGH BOILER ROOMS, OPERATING ROOM, AND ELECTRICAL GALLERIES, WATERSIDE STATION NO. 1.



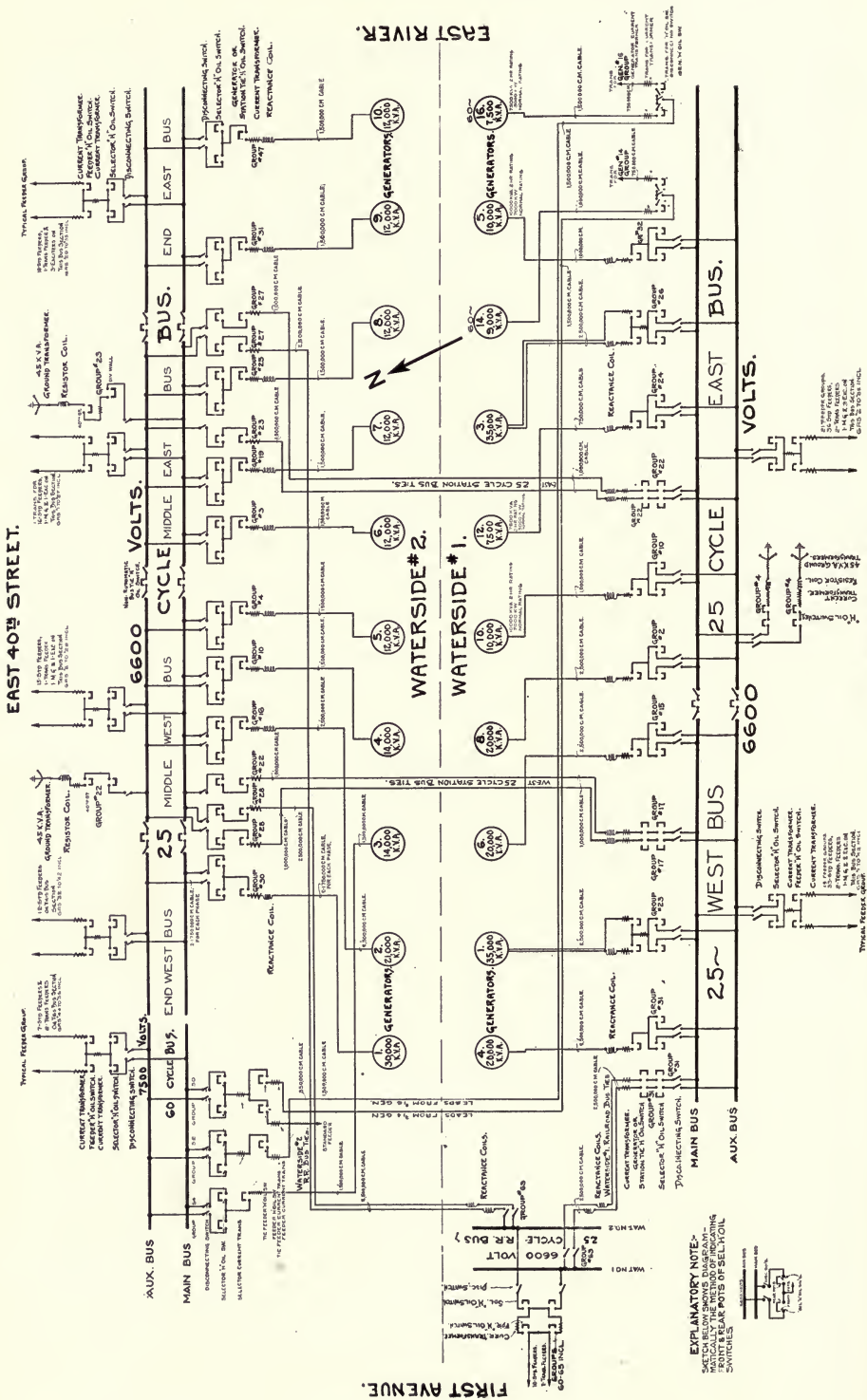
HORIZONTAL TURBO-GENERATOR UNIT, WATERSIDE STATION No. 1



VERTICAL TURBO-GENERATOR UNITS, WATERSIDE STATION NO. 1



SYSTEM OPERATOR'S BOARD, WATERSIDE STATION No. 1



ONE LINE DIAGRAM OF MAIN ELECTRICAL CONNECTIONS, WATERSIDE STATIONS No. 1 AND No. 2

EAST 40th STREET. EAST RIVER. EAST 38th STREET.

EXPLANATORY NOTE—
 PARTICULARLY THE METHOD OF INDICATING
 POINTS OF BELT-HOIL



WATERSIDE STATION NO. 2

The New York Edison Company
New York City



WATERSIDE STATION No. 2, NEW YORK CITY

WATERSIDE STATION NO. 2

THE NEW YORK EDISON COMPANY

NEW YORK, N. Y.

Capacity: 151,000 kw.

Building: Brick with steel frame, concrete foundations on solid rock. Boiler Room, 332 ft. x 122 ft. Turbine Room, 306 ft. x 57 ft. Electrical Galleries, seven floors, 306 ft. x 15 ft.

Boilers: Ninety-two 650 h.p. water tube with superheaters. Equipped with Metropolitan Cinder Catchers, located on two floors.

Stokers: Four hand-fired. One hydraulic operated. Eighty-six, line shaft, motor-driven. One chain grate.

Stoker Drive: Sixteen 7 x 6 engines and six direct current motors.

Forced Draft: Thirty-two engine-driven blowers rated at 90,000 cu. ft. per minute. Fourteen turbine-driven blowers rated at 120,000 cu. ft. per minute.

Stacks: Four 21 ft. in diam., lined steel. Height above grates of lower tier 297 ft.

Coal Handling: Two 1½ ton clamshell buckets raise coal from barges to hoppers at top of tower; cable cars to bunkers.

Ash Handling: Dump cars and electric locomotive to skip hoists discharging into bunker over bulkhead.

Steam Conditions: 200 lbs. pressure and 110°-115° F. superheat.

Condensers: One 2 pass, 50,000 sq. ft. surface. One 2 pass, 25,000 sq. ft. surface. Two 3 pass, 23,000 sq. ft. surface. Six 2 pass, 18,000 sq. ft. surface.

Exciters: Five 150 kw. motor-driven.

Transformers: One bank 6,000 kw., 60 cycle, 7800/15600 volt. One bank 8400 kw., 60 cycle, 7800/15600 volt. Two banks 12,000 kw., 25 cycle, 6500/19500 volt.

Motor Generators: One 500 kw., 300 volt, 675 h.p.^t motor. One 500 kw., 270 volt, 750 h.p. motor.

Switching Equipment: Remote control, electrically operated oil switches.

Feed Pumps: Eight 5 stage, 1,000 g.p.m., centrifugal pumps, turbine-driven.

Heaters: Four open feed water heaters, 500,000 lbs. per hour capacity.

Service Pumps: Three 4 stage, 6 inch, 1,000 g.p.m., turbine-driven.

Generating Equipment: One 30,000 kw., 3 phase, 6600 volt, 25 cycle, 1500 r.p.m., horizontal turbo-generator. One 21,000 kw., 3 phase, 6600 volt, 25 cycle, 1500 r.p.m., horizontal turbo-generator. Two 14,000 kw., 3 phase, 6600 volt, one 60 cycle and one 25 cycle, 750 r.p.m., vertical turbo-generators. Six 12,000 kw., 3 phase, 6600 volt, 25 cycle, 750 r.p.m., vertical turbo-generators.

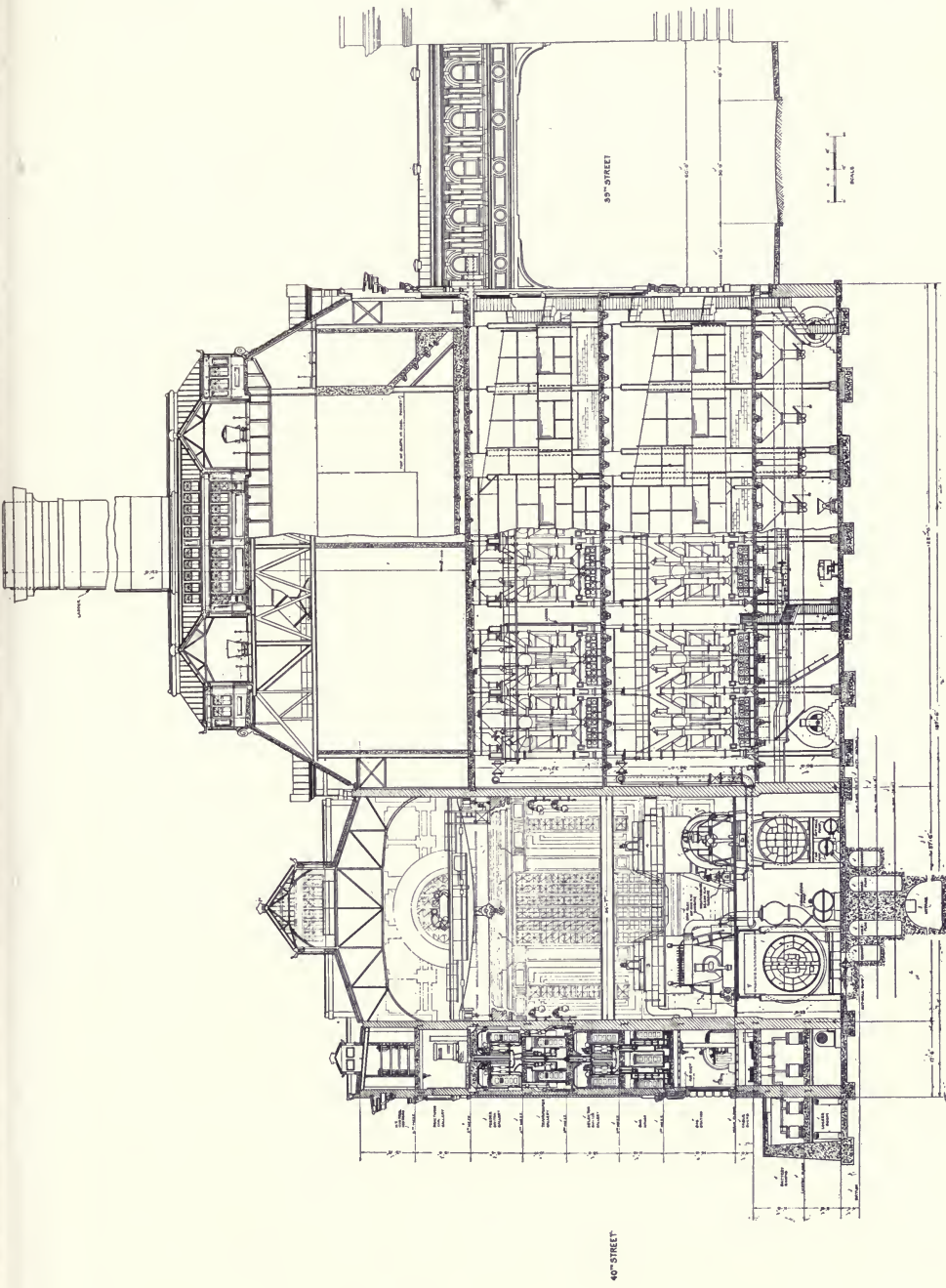
Storage Batteries: One 150 cell, 4,000 amp. for one hour. One 140 cell, 4,000 amp. for one hour.

Reactance Coils: Generators—Six sets of 3 each, 5% reactance rated on 12,000 kv.a. One set of 3 each, 5.8% reactance rated on 14,000 kv.a. One set of 3 each, 6% reactance rated on 32,000 kv.a. One set of 3 each, 6% reactance rated on 30,000 kv.a. Sixty-three 3 phase, 2% reactance rated on 6500 kv.a. Exciters, 5 sets of 3 each, 2% reactance rated on 150 kw. Mot. gen., 2 sets of 3 each, 3% reactance rated on 2500 kw.

Traveling Crane: One 50-ton electric. One 75-ton electric.

District Served: Manhattan Island connections with Waterside No. 1, Third Avenue R.R. and United Electric Light and Power Company Station.

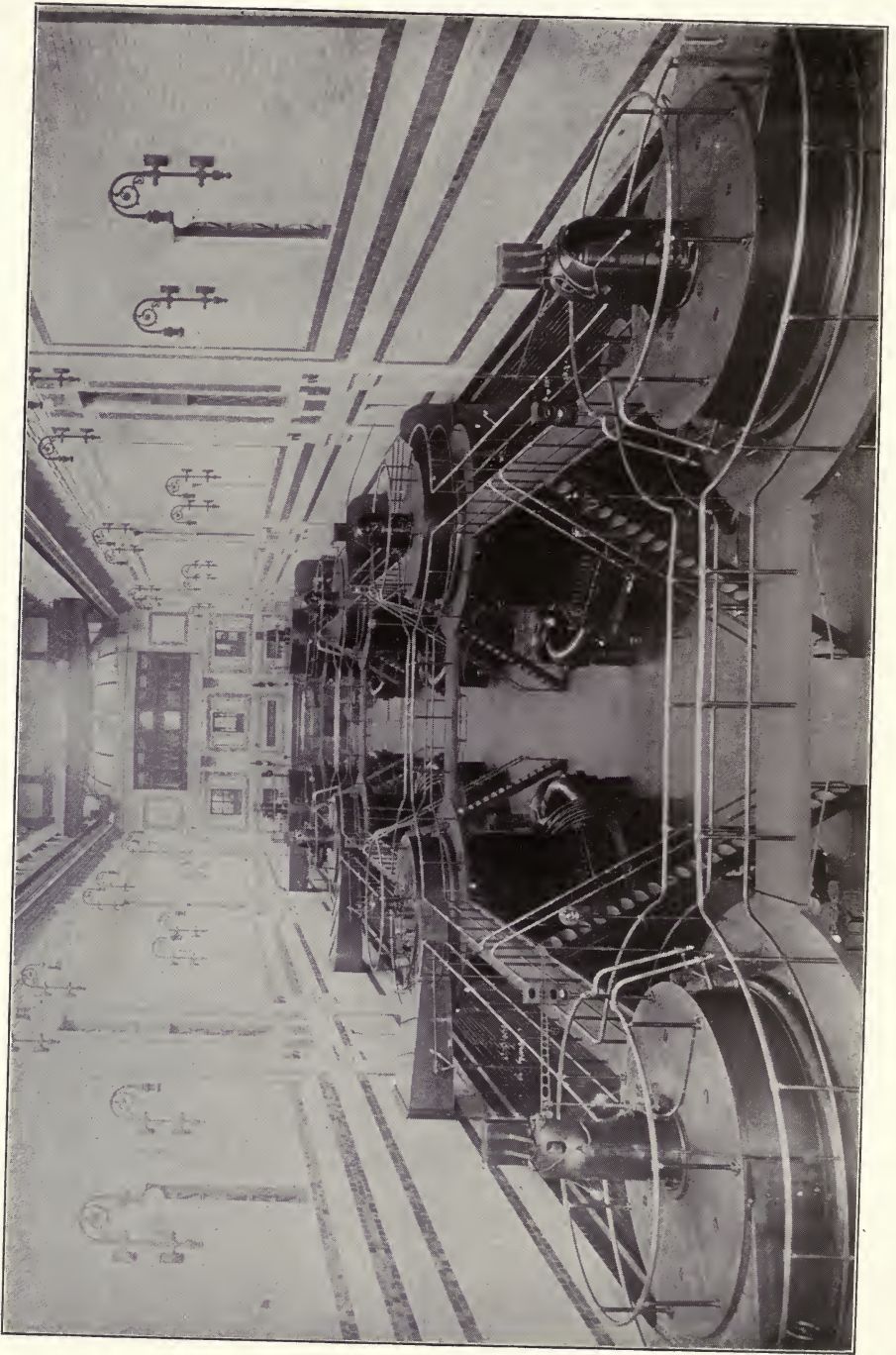
Built: 1907.



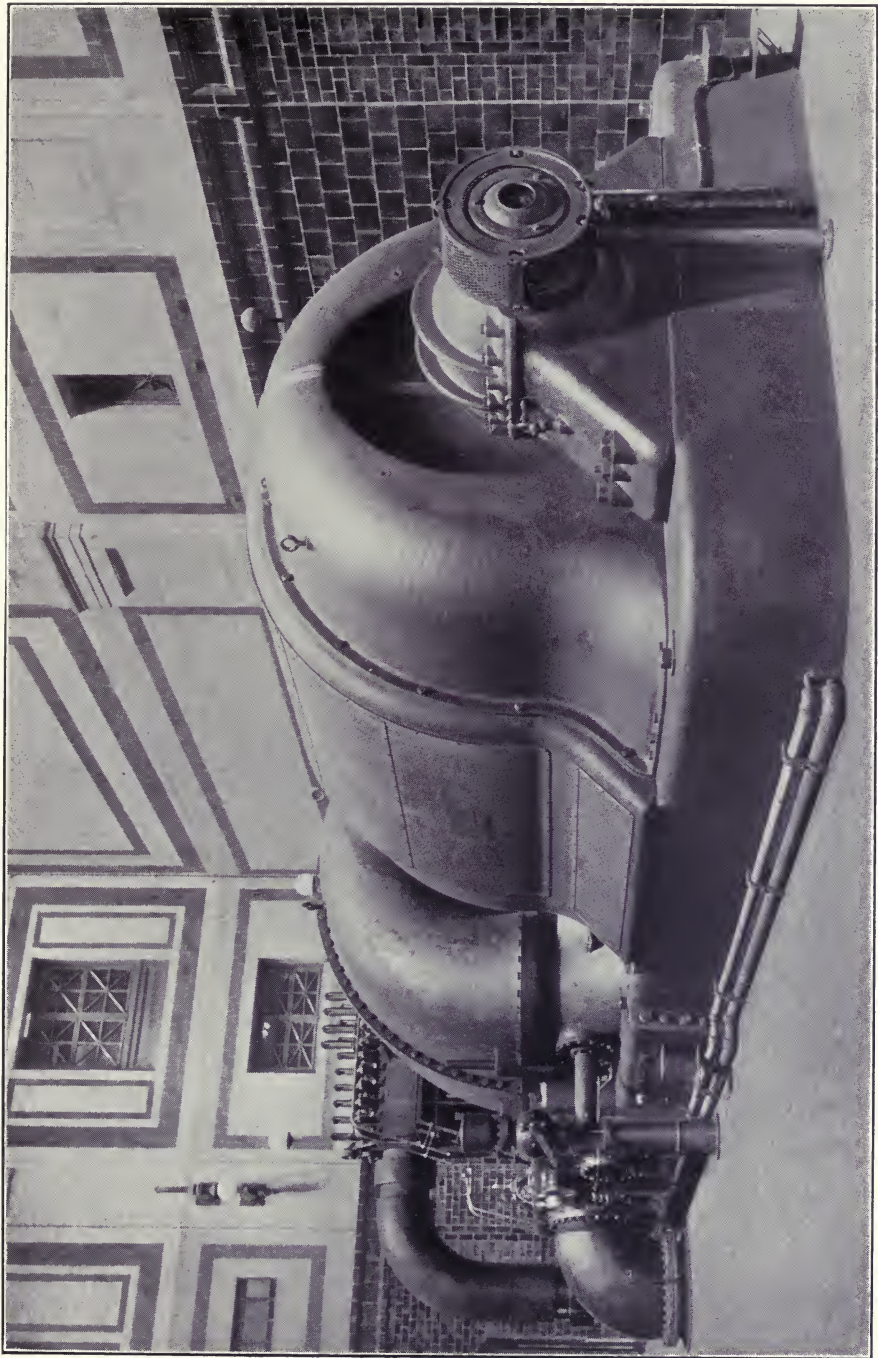
CROSS SECTION, WATERSIDE STATION NO. 2



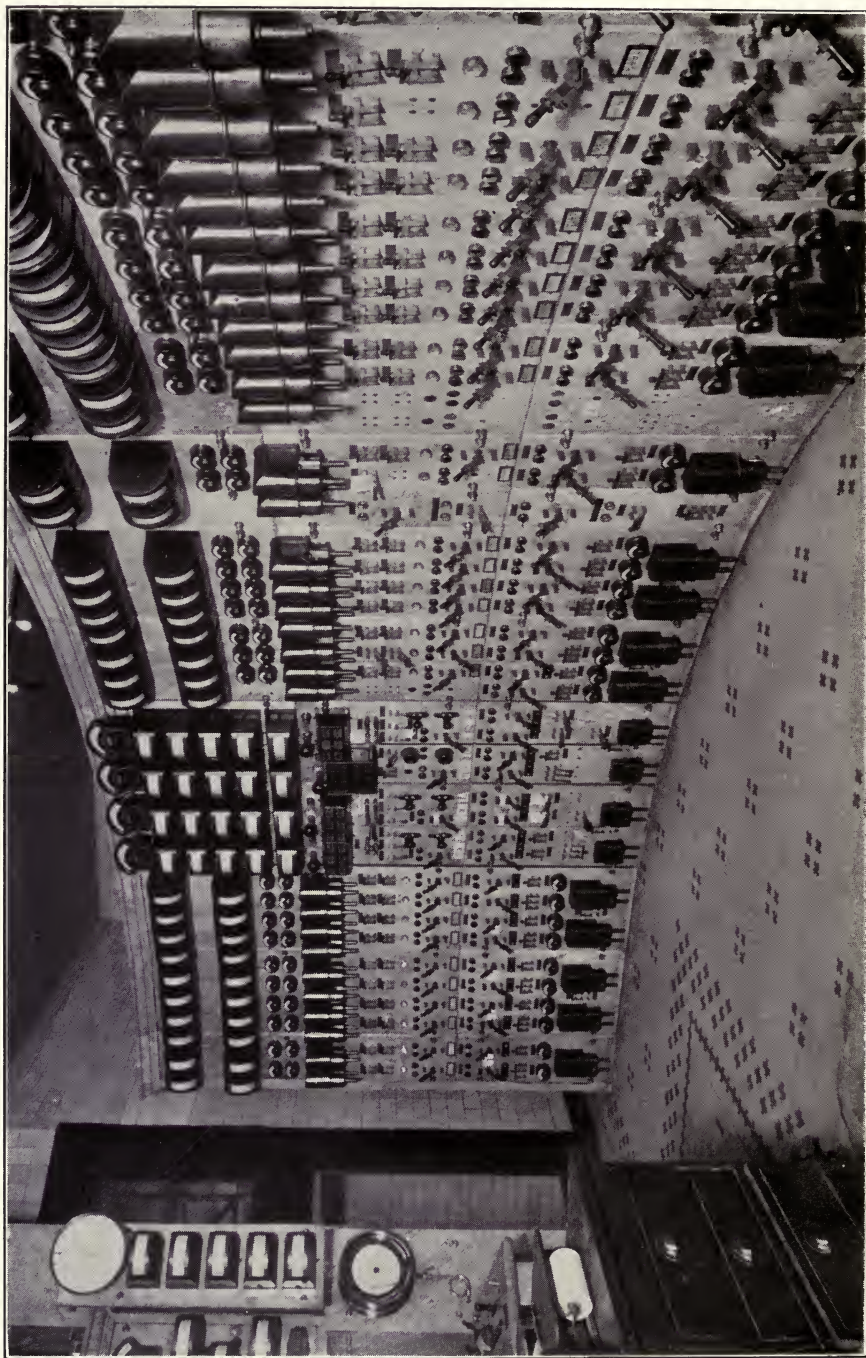
FIRING AISLE, WATERSIDE STATION NO. 2



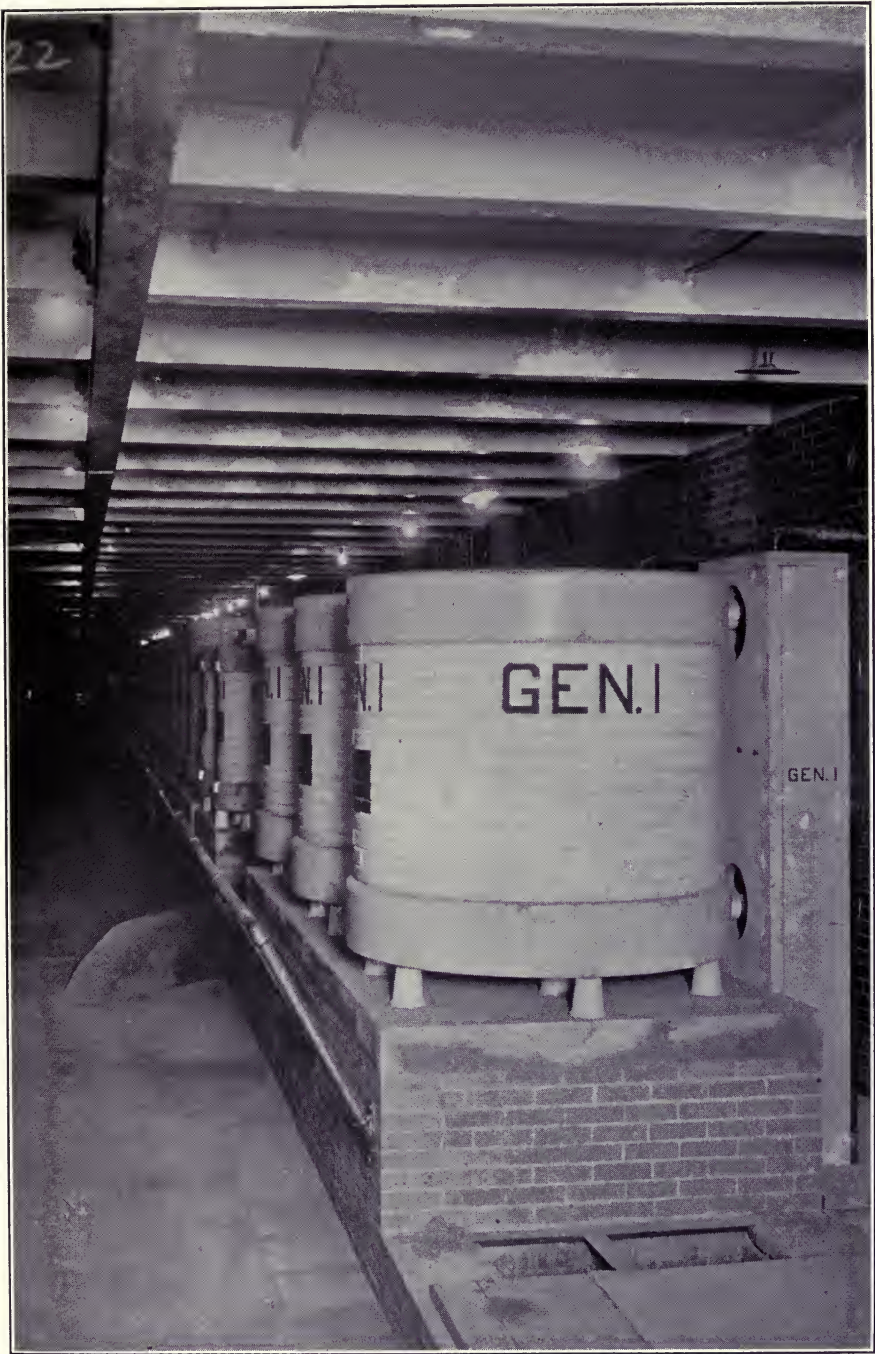
TURBINE ROOM, WATERSIDE STATION No. 2



TURBO-GENERATOR UNIT, WATERSIDE STATION NO. 2



HIGH TENSION FEEDER BOARD, WATERSIDE STATION NO. 2

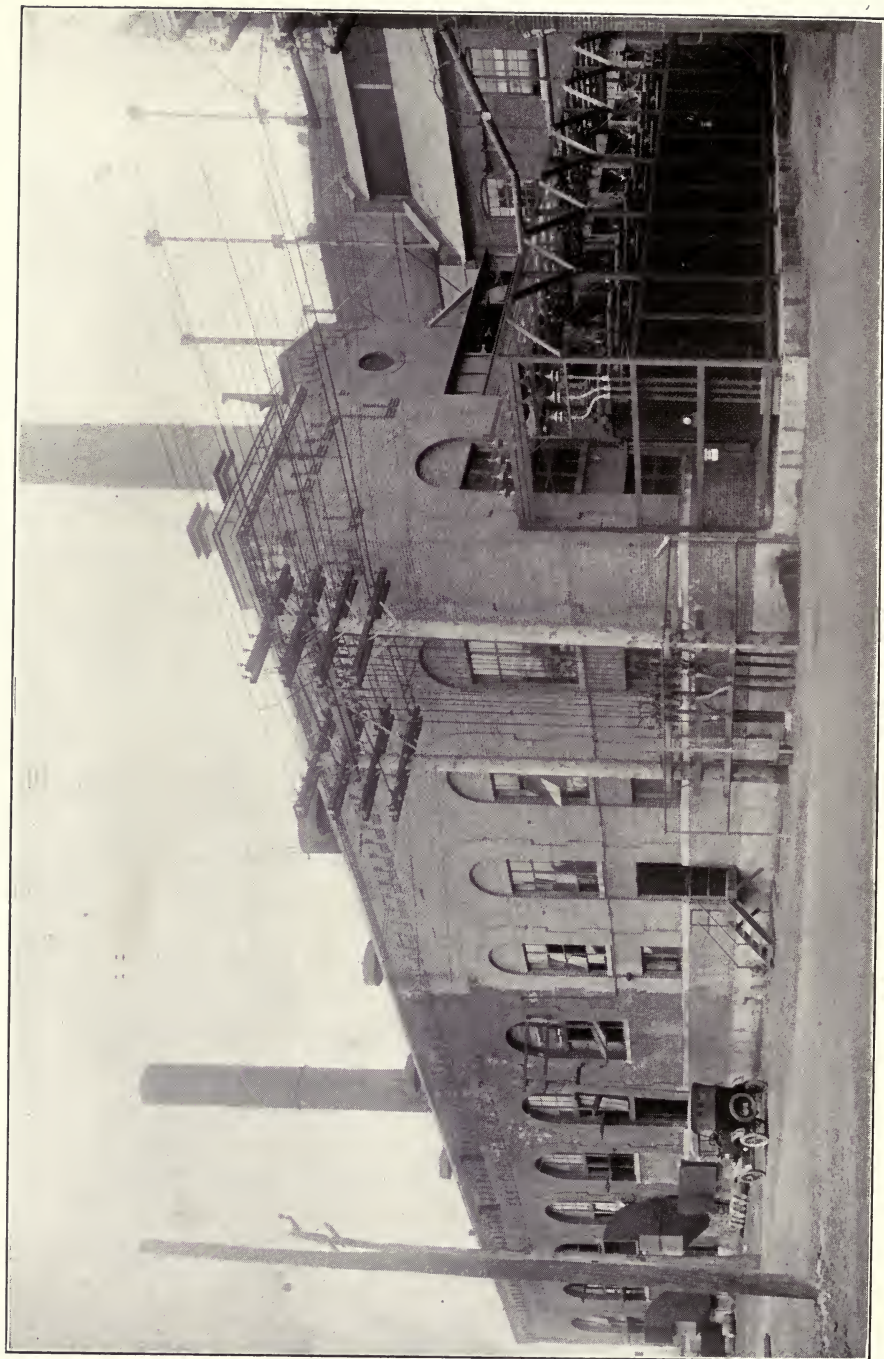


REACTANCE COILS, WATERSIDE STATION NO. 2

WASHINGTON STREET STATION

Utica Gas and Electric Company

Utica, New York



WASHINGTON STREET STATION AND SUBSTATION, UTICA, N. Y.

WASHINGTON STREET STATION

UTICA GAS AND ELECTRIC COMPANY

UTICA, N. Y.

Capacity: 20,000 kw.

Building: Brick with steel frame on piles. Main Boiler House, 121 ft. x 88 ft. Boiler House extension, 50 ft. x 67 ft. Operating Room, 118 ft. x 52 ft. Electrical Galleries, 85 ft. x 30 ft.

Boilers: Twelve 650 h.p. and four 280 h.p. water tube with superheaters.

Stokers: Seven retort underfeed for nine 650 h.p. boilers. Balance of boilers hand-fired.

Stoker Drive: Six 5 x 5 vertical engines.

Forced Draft: One 80,000 cu. ft. p.m., motor-driven blower. One 80,000 cu. ft. p.m., turbine-driven blower. One 60,000 cu. ft. p.m., motor-driven blower. One 60,000 cu. ft. p.m., turbine-driven blower.

Stacks: One 10 ft. dia., steel, 150 ft. high. One 12 ft. dia., brick, 175 ft. high.

Coal Handling: Coal is carried into the station by bucket conveyor and into storage by telpher system.

Ash Handling: Steam jet conveyor and industrial railway

Steam Conditions: 180 lbs. pressure, 100° F. superheat.

Condensing Equipment: Jet condensers with turbine or engine-driven auxiliaries.

Traveling Crane: Fifteen ton, hand operated.

Feed Pumps: Three 460 g.p.m. centrifugal, turbine-driven.

Heaters: One 7,000 h.p. open feed water.

Generating Equipment: One 7500 kw., 2300 volt, 60 cycle, 3 phase, horizontal turbo-generator. Two 5,000 kw., 4,000 volt, 60 cycle, 2 phase, horizontal turbo-generators. One 2500 kw., 4,000 volt, 60 cycle, 2 phase, turbo-generator.

Exciters: Two 75 kw. and two 30 kw., 125 volt, motor-driven. One 35 kw. steam-driven.

Transformers: Three 3,000 kv.a. banks, 2300/22000 volt, 3 phase. Two 6,000 kv.a. banks, 4000/13000 volt, 2 phase to 3 phase.

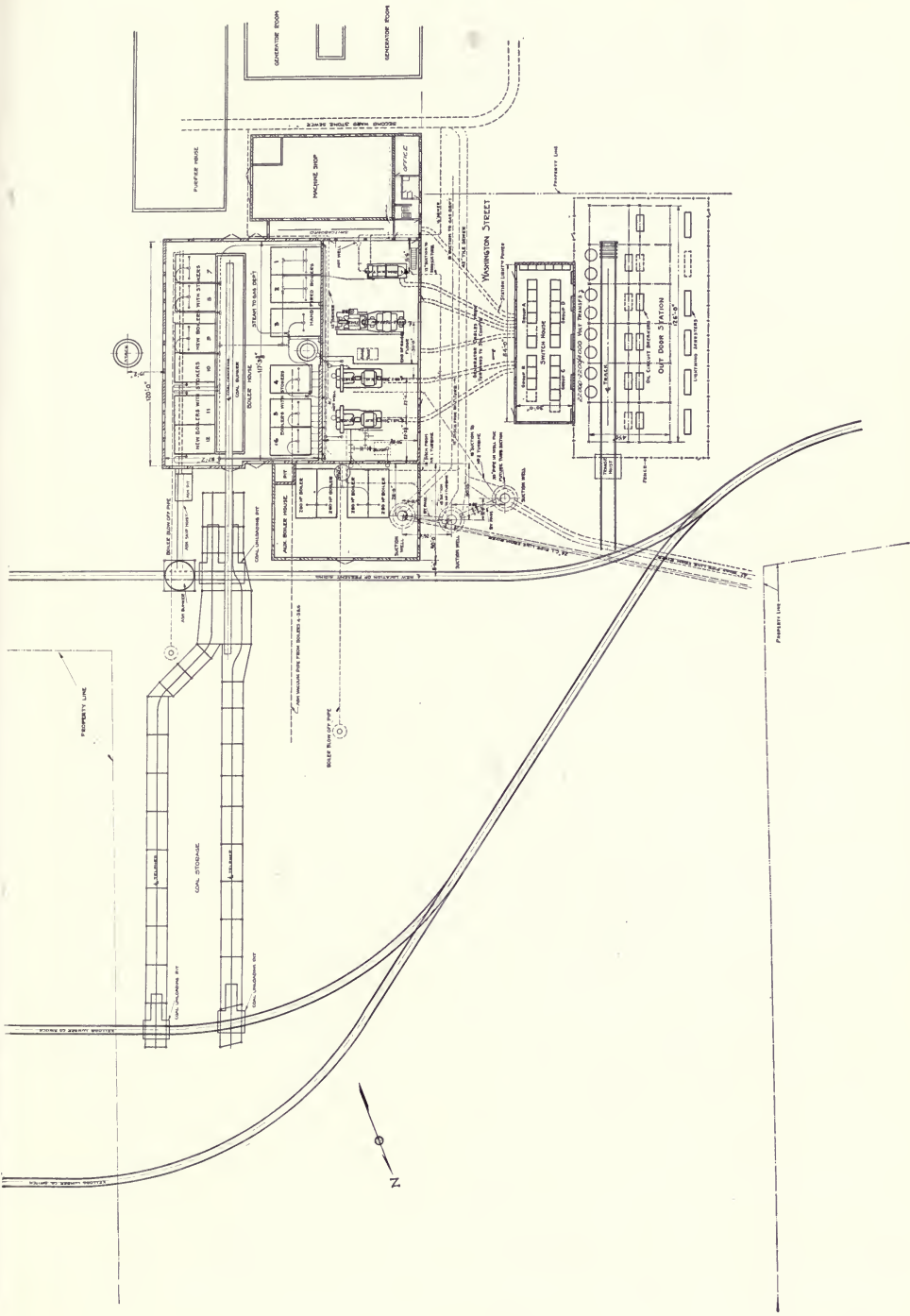
Motor Generators: One 15 kw., 125 volt, steam-driven.

Switching Equipment: Electrically operated oil circuit breakers.

Storage Battery: One 59 cell, 320 ampere, for one hour.

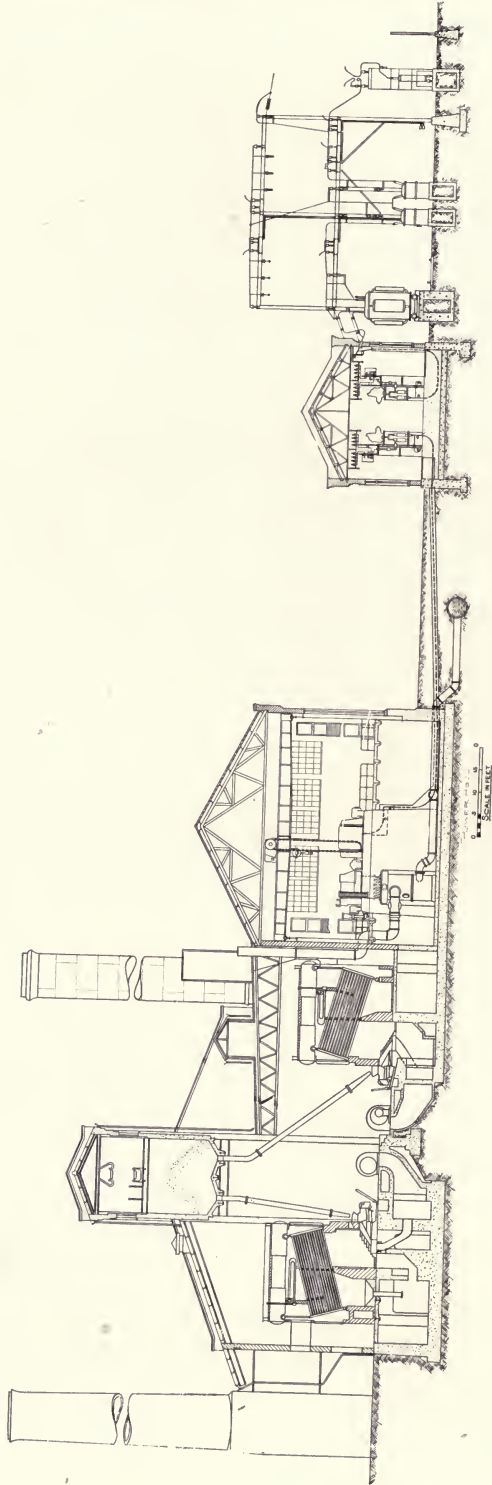
District Served: Utica, Rome, Ilion, Little Falls and surrounding territory.

Built: 1901, extension 1917.



GENERAL LAYOUT OF WASHINGTON STREET STATION

WASHINGTON STREET STATION



CROSS SECTION, WASHINGTON STREET STATION



FIRING FLOOR, WASHINGTON STREET STATION



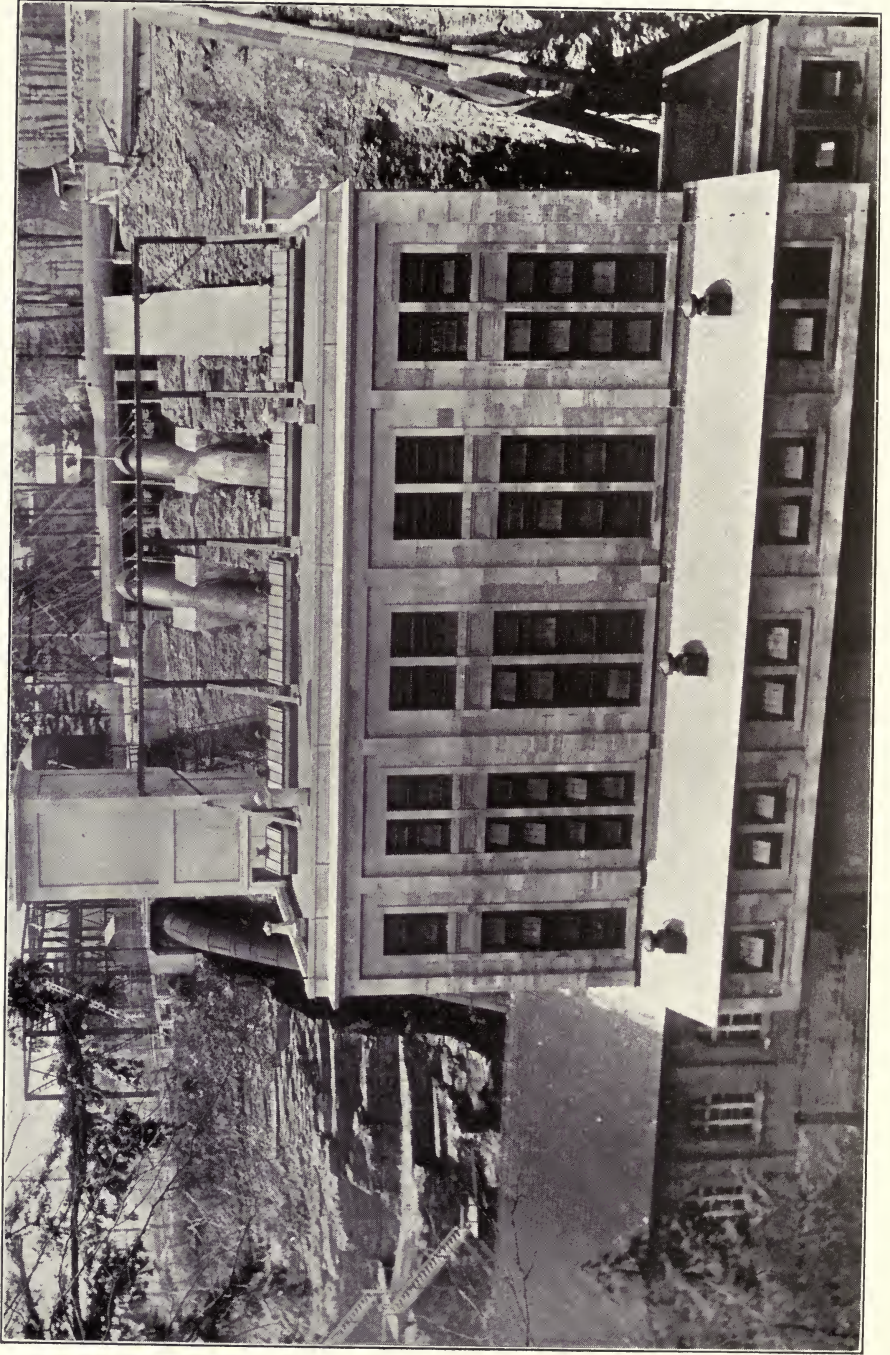
TURBINE ROOM, WASHINGTON STREET STATION



SWITCHBOARD, WASHINGTON STREET STATION

TRENTON FALLS STATION

Utica Gas and Electric Company
Trenton Falls, New York



TRENTON FALLS HYDRO-ELECTRIC STATION, TRENTON FALLS, NEW YORK

TRENTON FALLS HYDRO-ELECTRIC STATION

UTICA GAS AND ELECTRIC COMPANY
WEST CANADA CREEK, N. Y. (UTICA)

Capacity: 23,200 kw.

Building: Concrete with steel frame on concrete foundation.
Operating Room, 104 ft. x 32 ft. Electrical Galleries,
104 ft. x 32 ft.

Generating Equipment: Four 1,000 kw., 2200 volt, 3
phase, 60 cycle generators. Three 6400 kw., 13200 volt,
3 phase, 60 cycle generators. 80% power factor.

Exciters: Two 125 kw., 125 volt, direct connected. Two
75 kw., Pelton wheel. One 80 kw., Pelton wheel.

Transformers: Three 6,000 kv.a., 13200/44000 volt, 3 phase
banks. One 3,000 kv.a., 13200/2200 volt, 3 phase banks.

Switching Equipment: Electrically operated oil circuit
breakers.

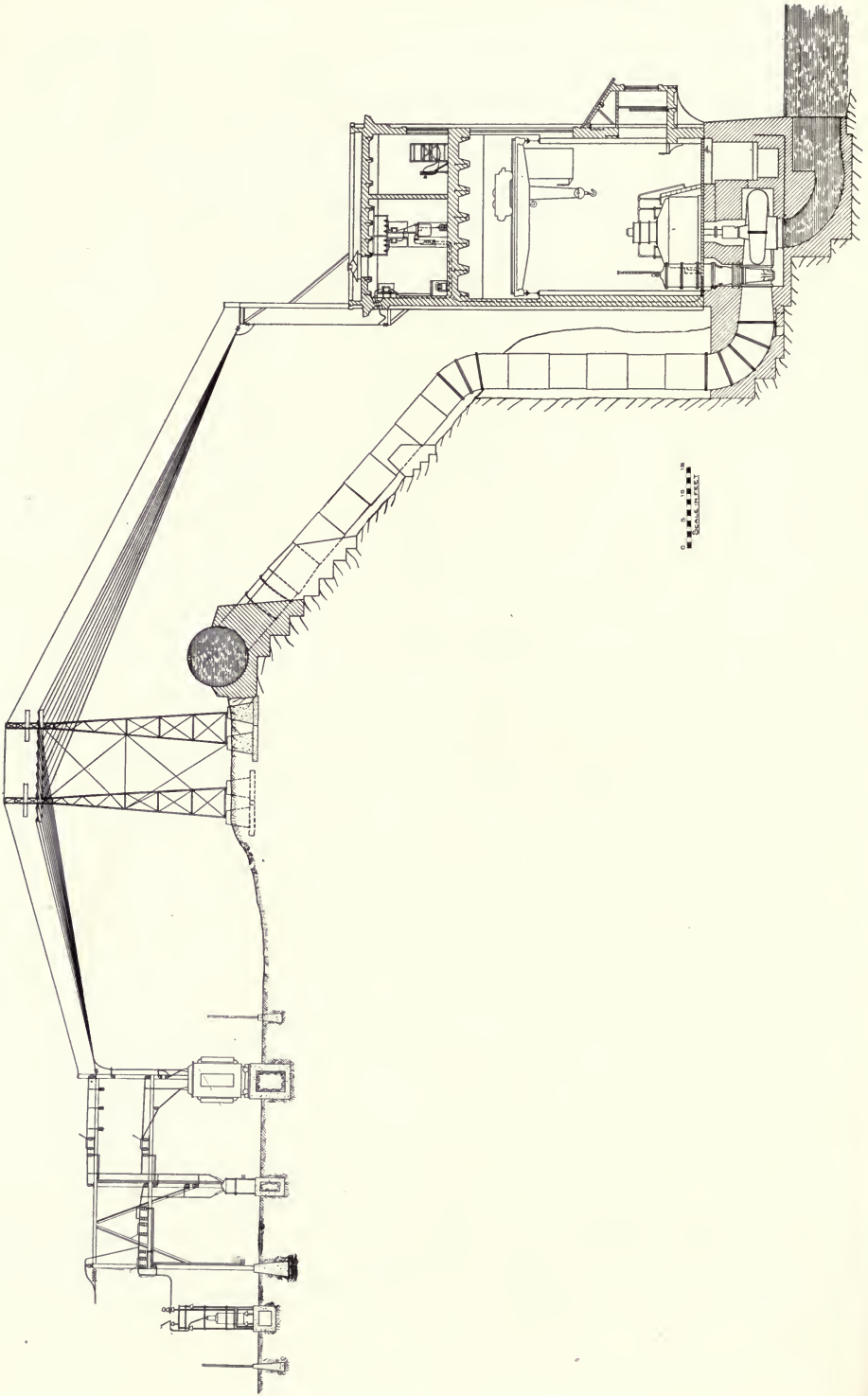
Storage Battery: One 59 cell, 120 ampere, for one hour.

Reactance Coils: Three sets on ultimate incoming feeders.

Traveling Crane: 50-ton motor-driven.

District Served: Ilion, Utica and Rome, New York.

Station Built: Extension 1917.



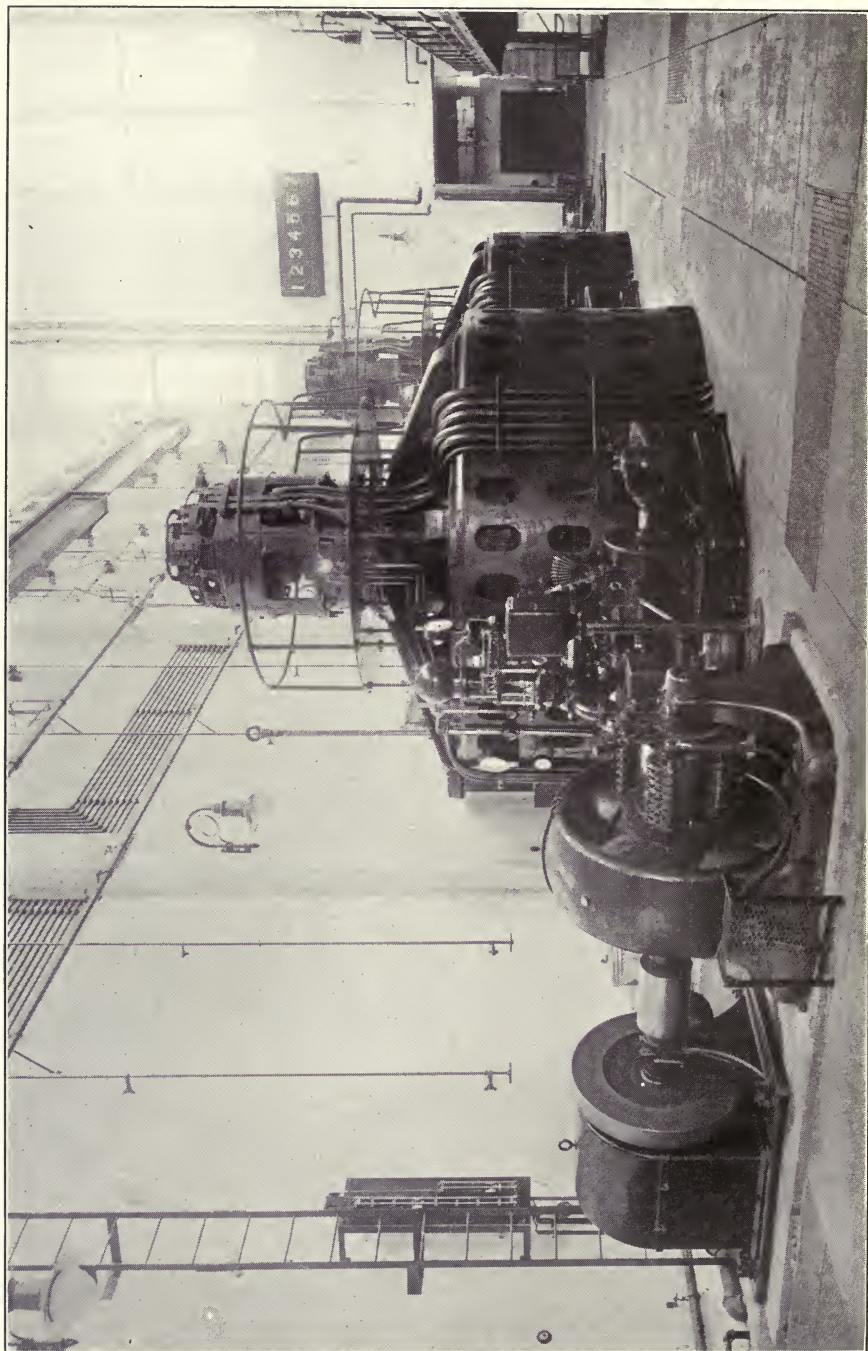
CROSS SECTION THROUGH EXTENSION, TRENTON FALLS HYDRO-ELECTRIC STATION



DAM, TRENTON FALLS STATION.



WOOD STAVE PIPE LINE, TRENTON FALLS STATION

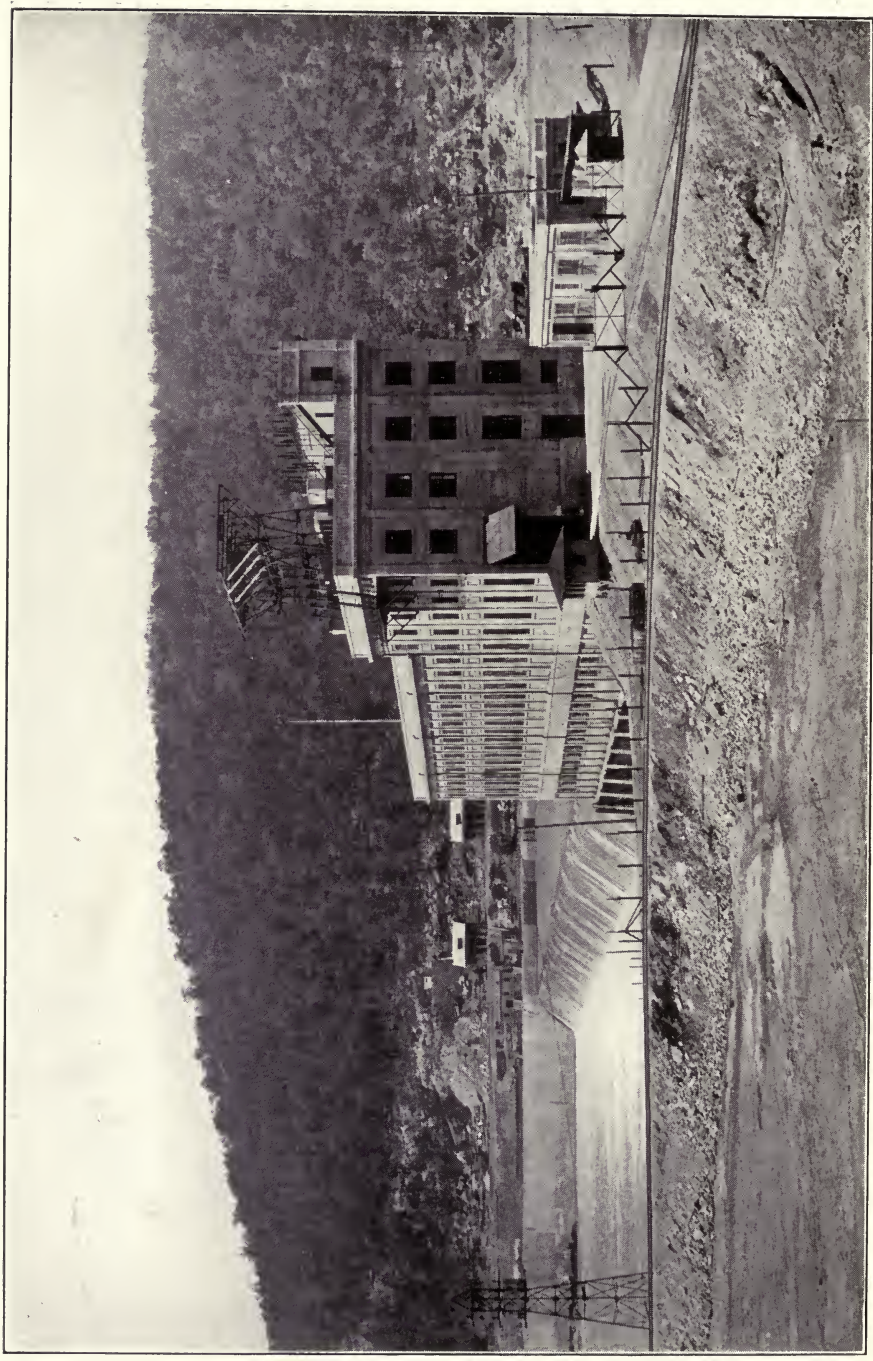


GENERATOR ROOM, TRENTON FALLS STATION



HALES BAR STATION

Chattanooga and Tennessee River Power Company
Chattanooga, Tennessee



HALES BAR STATION, CHATTANOOGA, TENNESSEE

HALES BAR HYDRO-ELECTRIC STATION

CHATTANOOGA AND TENNESSEE RIVER POWER
COMPANY

HALES BAR, TENN.

Capacity: 46,330 kw.

Building: Concrete with steel frame. Operating Building, 220 ft. x 66 ft. foundation on solid rock. Switch and Transformer Building, 133 ft. x 66 ft., foundation on concrete piers.

Generating Equipment: Ten 3133 kw., 3 phase, 60 cycle, 6600 volt, vertical turbo-generators. Four 3750 kw., 3 phase, 60 cycle, 6600 volt, vertical turbo-generators.

Exciters: Four 100 kw. direct connected.

Transformers: Two banks of three 3133 kv.a., 6600/44000 volt, oil insulated water cooled. Three 10,000 kv.a., 3 phase, 6600/120,000 volt, oil insulated water cooled.

Motor Generators: Four sets, each 250 kw., 250 volt, 720 r.p.m., driven by 375 h.p., 220 volt motor.

Switching Equipment: Remote control, electrically operated oil switches.

Storage Battery: One 120 cell, 160 amp. for one hour.

Reactance Coils: Five sets 875 ampere.

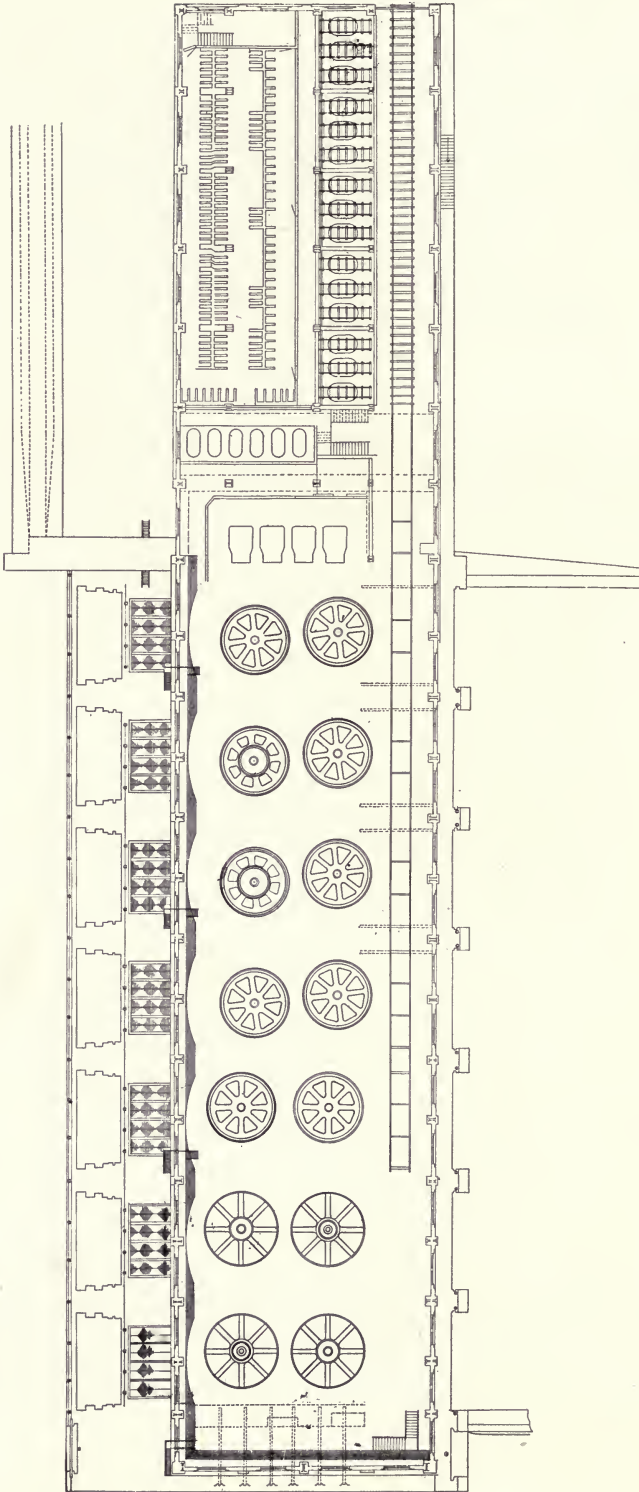
Traveling Crane: 50-ton motor-driven.

District Served: The 44,000 volt and 120,000 volt system at Chattanooga and vicinity.

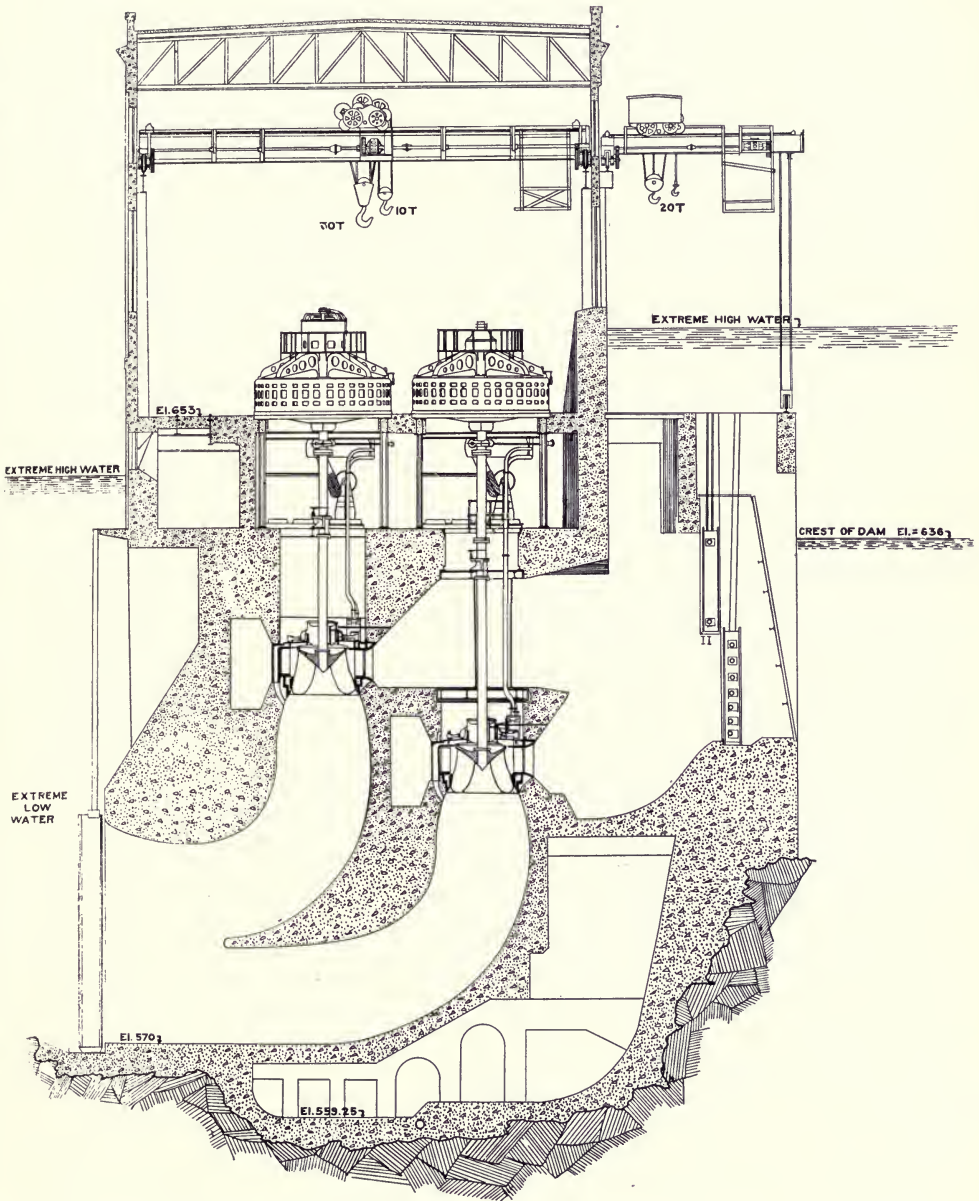
Station in Service: 1913.

(Bogert and Pohl associated with author on design of this station.)

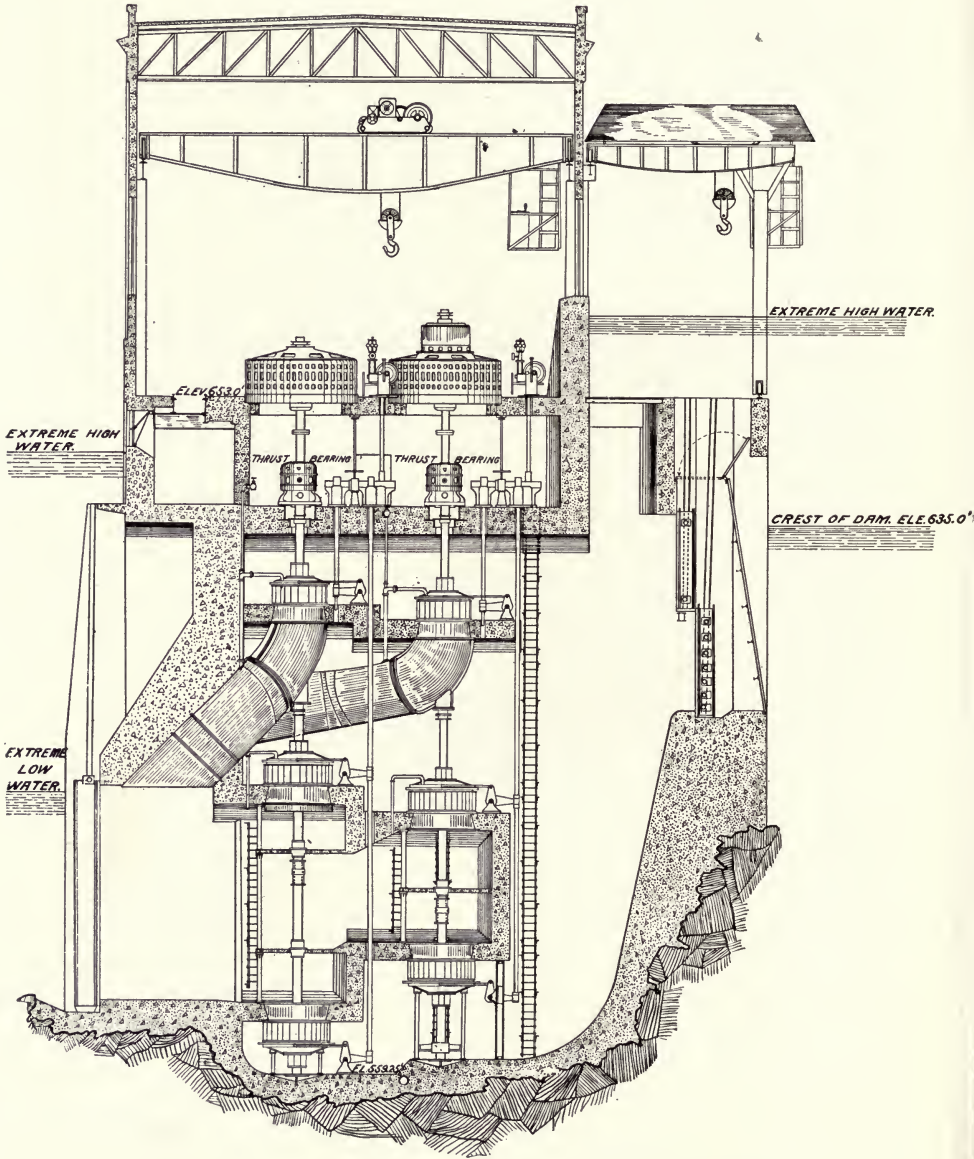
HALES BAR STATION



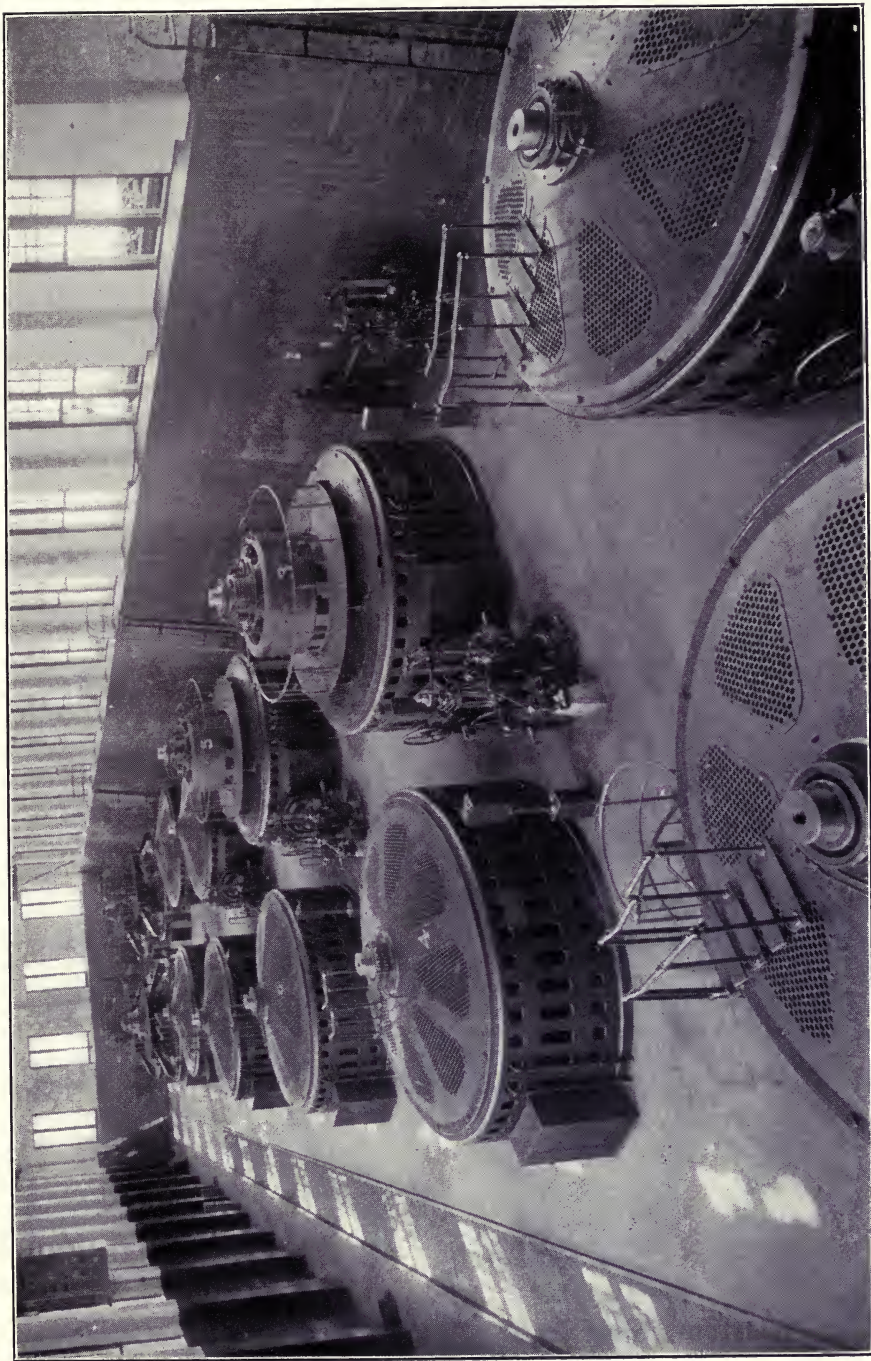
FLOOR PLAN, HALES BAR STATION



CROSS SECTION THROUGH 3750 K.W. UNITS, HALES BAR STATION



CROSS SECTION THROUGH 3133 K.W. UNITS, HALES BAR STATION

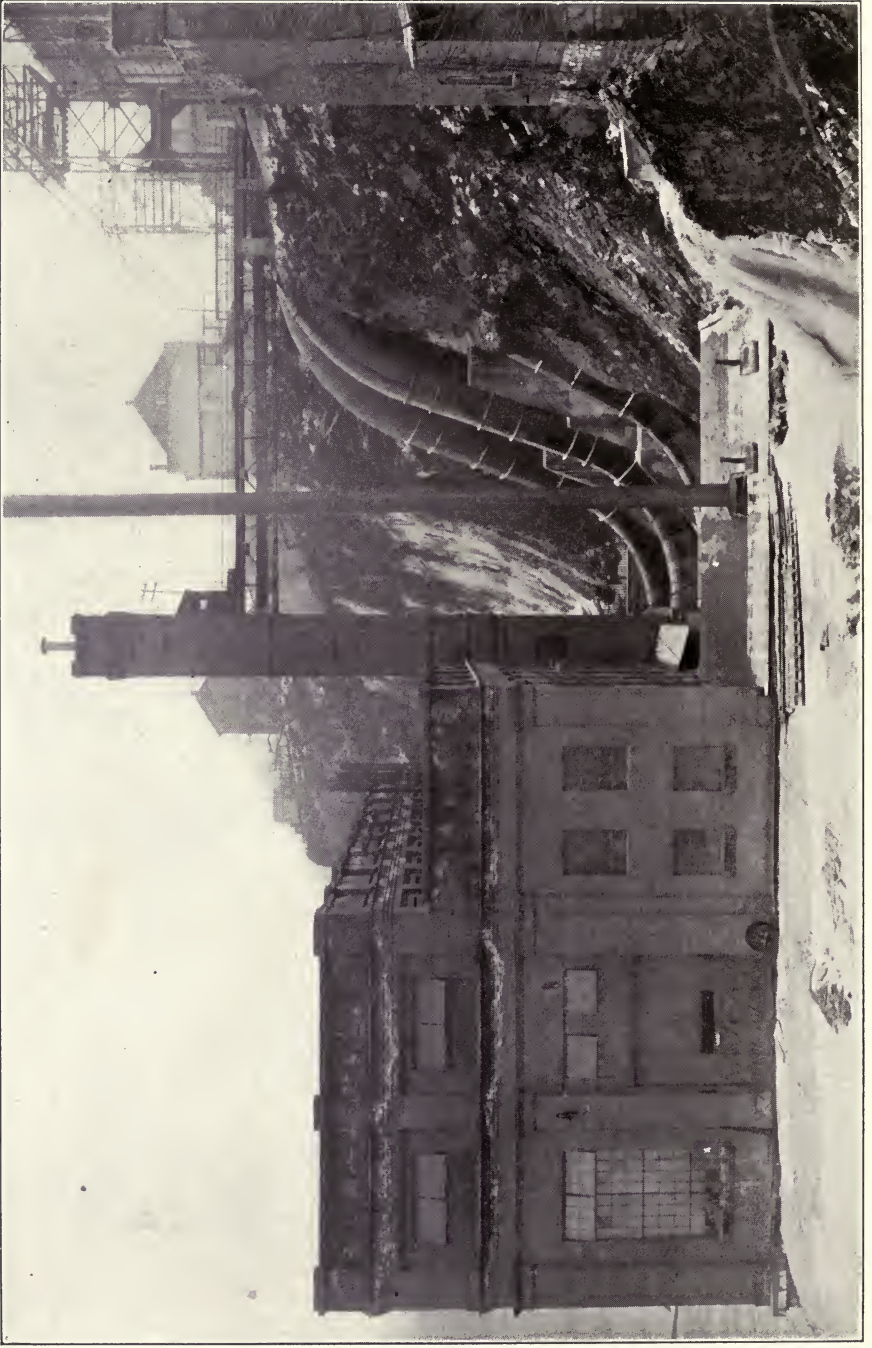


TURBINE ROOM, HALES BAR HYDRO-ELECTRIC STATION

COHOES FALLS STATION

Cohoes Power and Light Corporation

Cohoes, New York



COHOES HYDRO-ELECTRIC STATION, COHOES, NEW YORK

COHOES HYDRO-ELECTRIC STATION

COHOES POWER AND LIGHT CORPORATION

COHOES, NEW YORK

(Designed by Sanderson and Porter under supervision of the author.)

Capacity: 28,800 kw.

Building: Brick with steel frame on concrete foundation.
Operating Room, 165 ft. x 40 ft. Switch Room, 83 ft. x 25 ft. Electrical Galleries, 165 ft. x 25 ft.

Generating Equipment: Four 7200 kw., 40 cycle, 3 phase, 12,000 volt, vertical turbo-generators, 80% p.f. Fourth unit in service December 1, 1921.

Exciters: Two 165 kw., 250 volt, 800 r.p.m., motor-driven.

Transformers: Four single-phase in two banks, each rated 400 kv.a., 1200/2300 volts.

Motor Generators: One battery charging.

Switching Equipment: Remote control electrically operated oil switches.

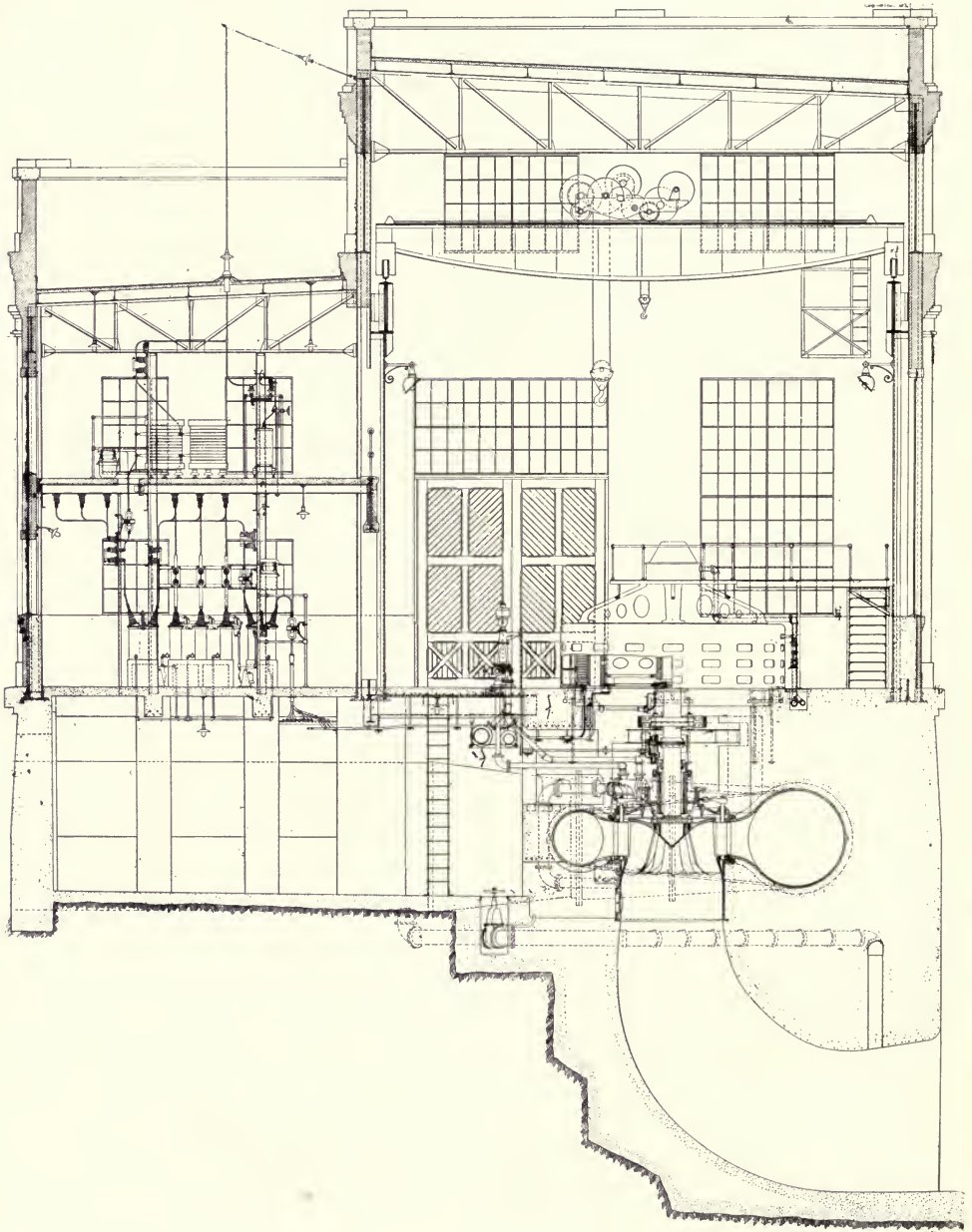
Storage Battery: One 60 cell, 120 volt, 200 amp. for one hour.

Reactance Coils: Eighteen 40 cycle, 3 phase, 12,000 volts, 66 kv.a., on feeders; six 40 cycle, 12,000 volts, 58 kv.a., on transformers.

Traveling Crane: Fifty ton motor-driven.

District Served: Cities of Albany and Cohoes and surrounding communities.

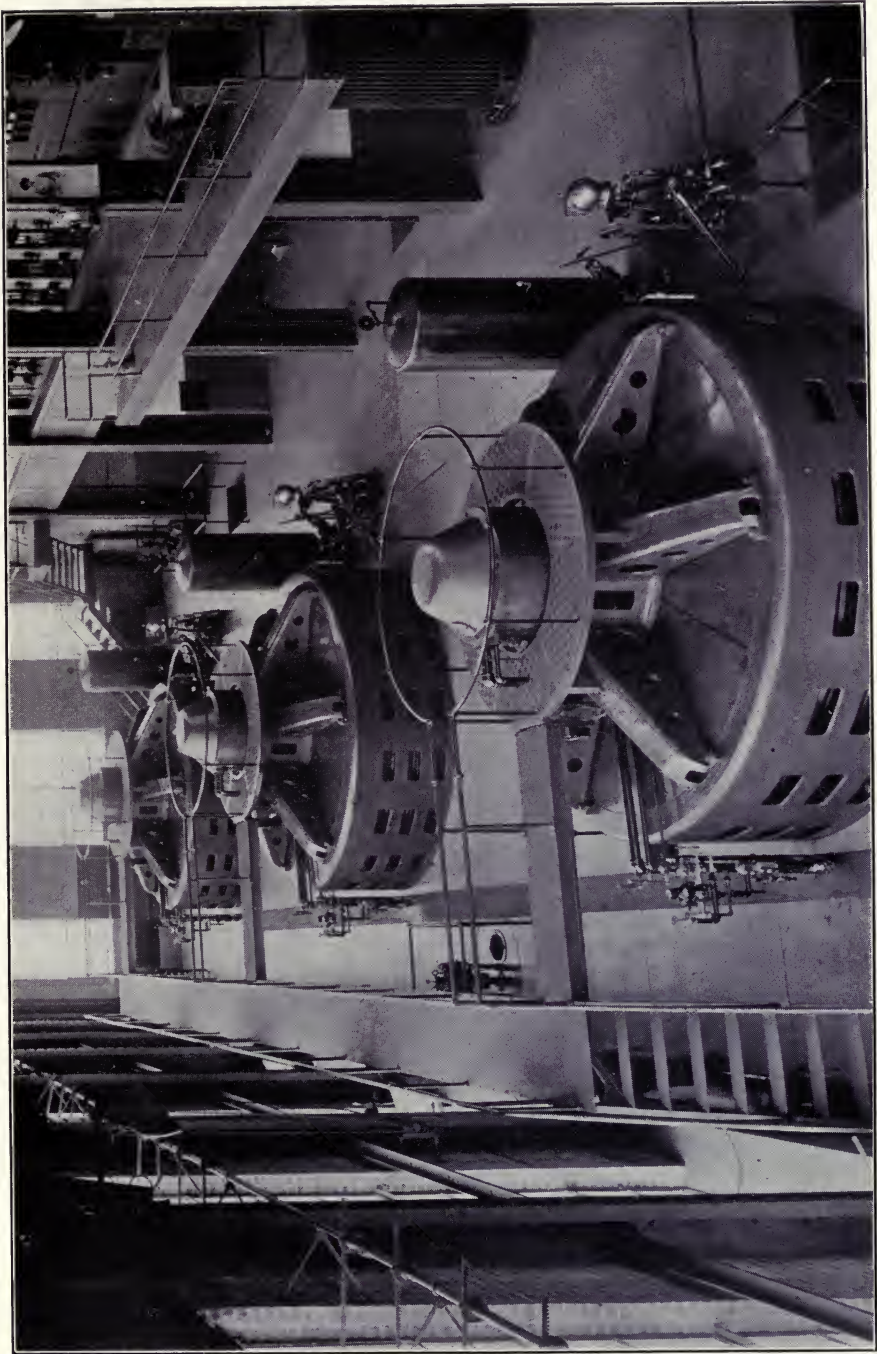
Built: 1915.



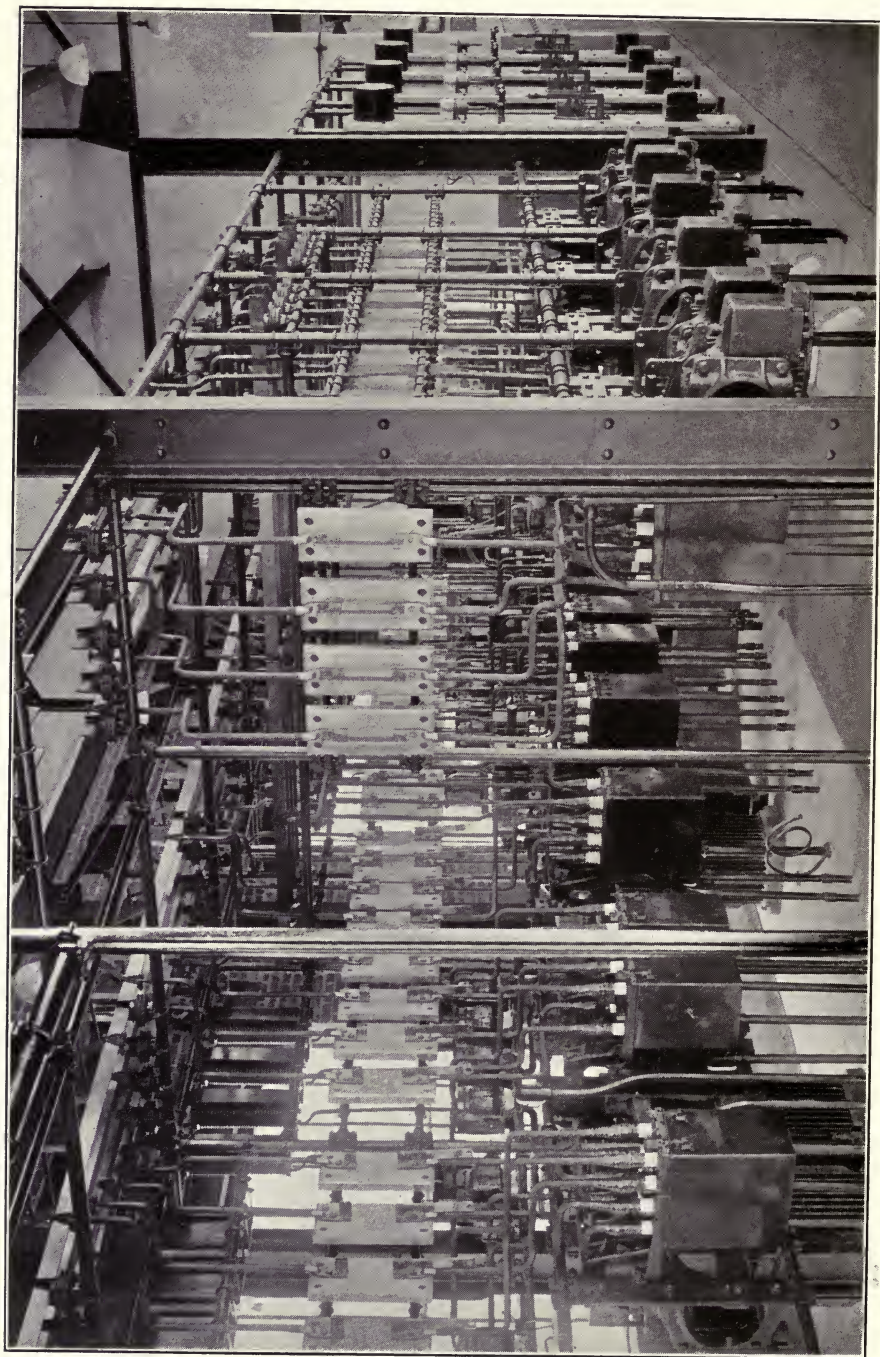
CROSS SECTION, COHOES STATION



INTERIOR OF GATE HOUSE, COHOES STATION



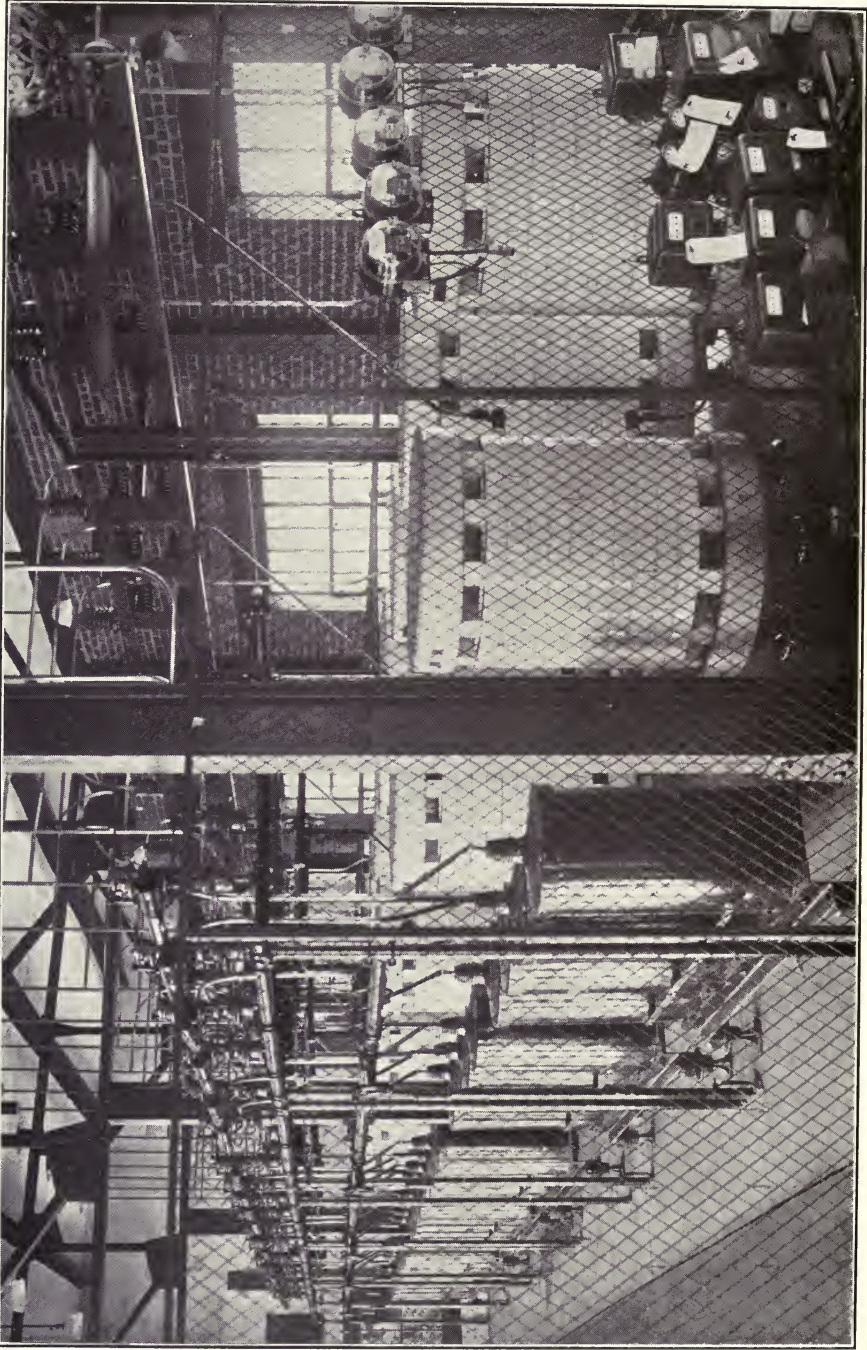
OPERATING ROOM, COHOES STATION



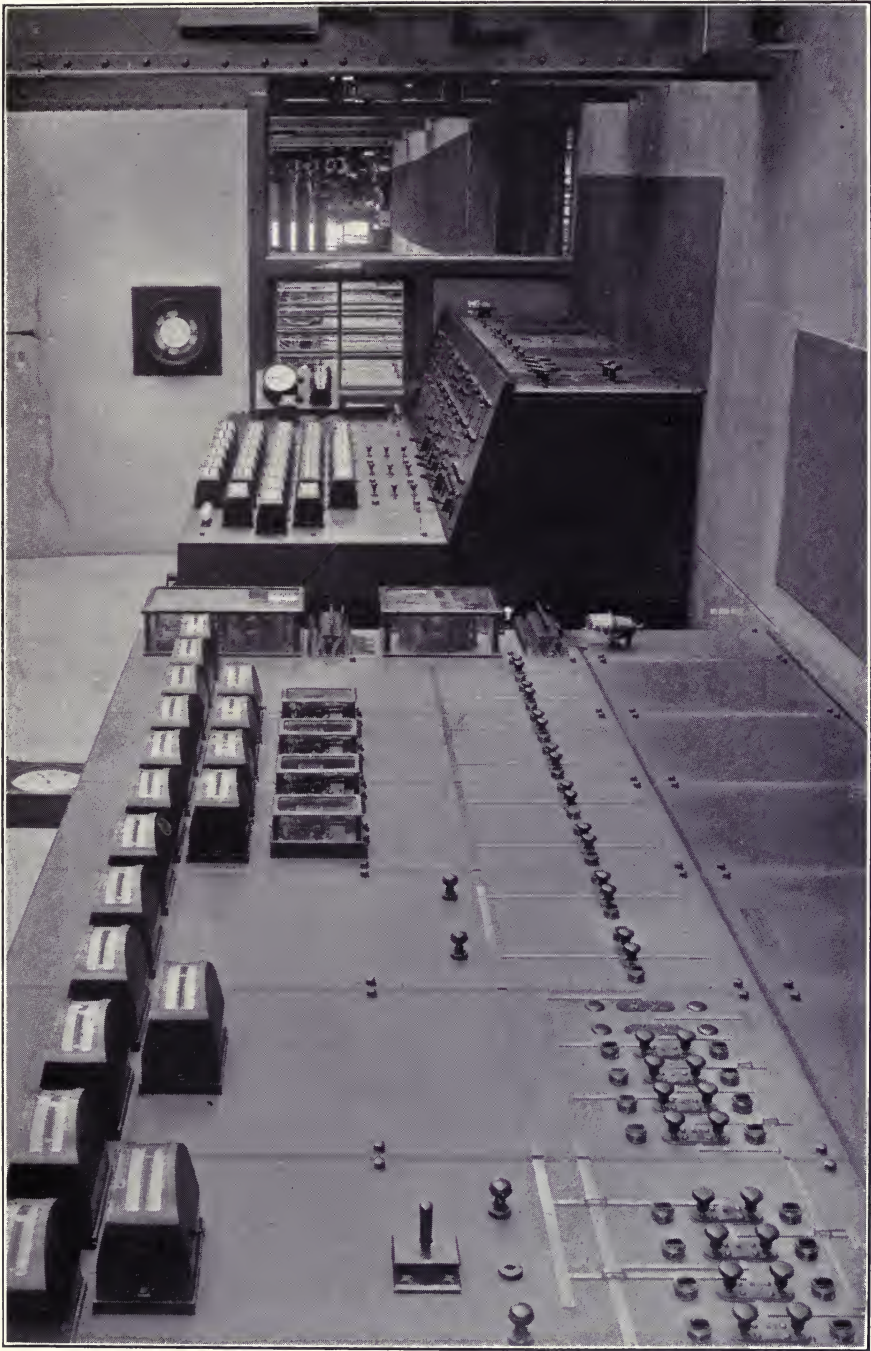
12,000-VOLT SWITCHING EQUIPMENT, COHOES STATION



12,000-VOLT SWITCHING EQUIPMENT, COHOES STATION

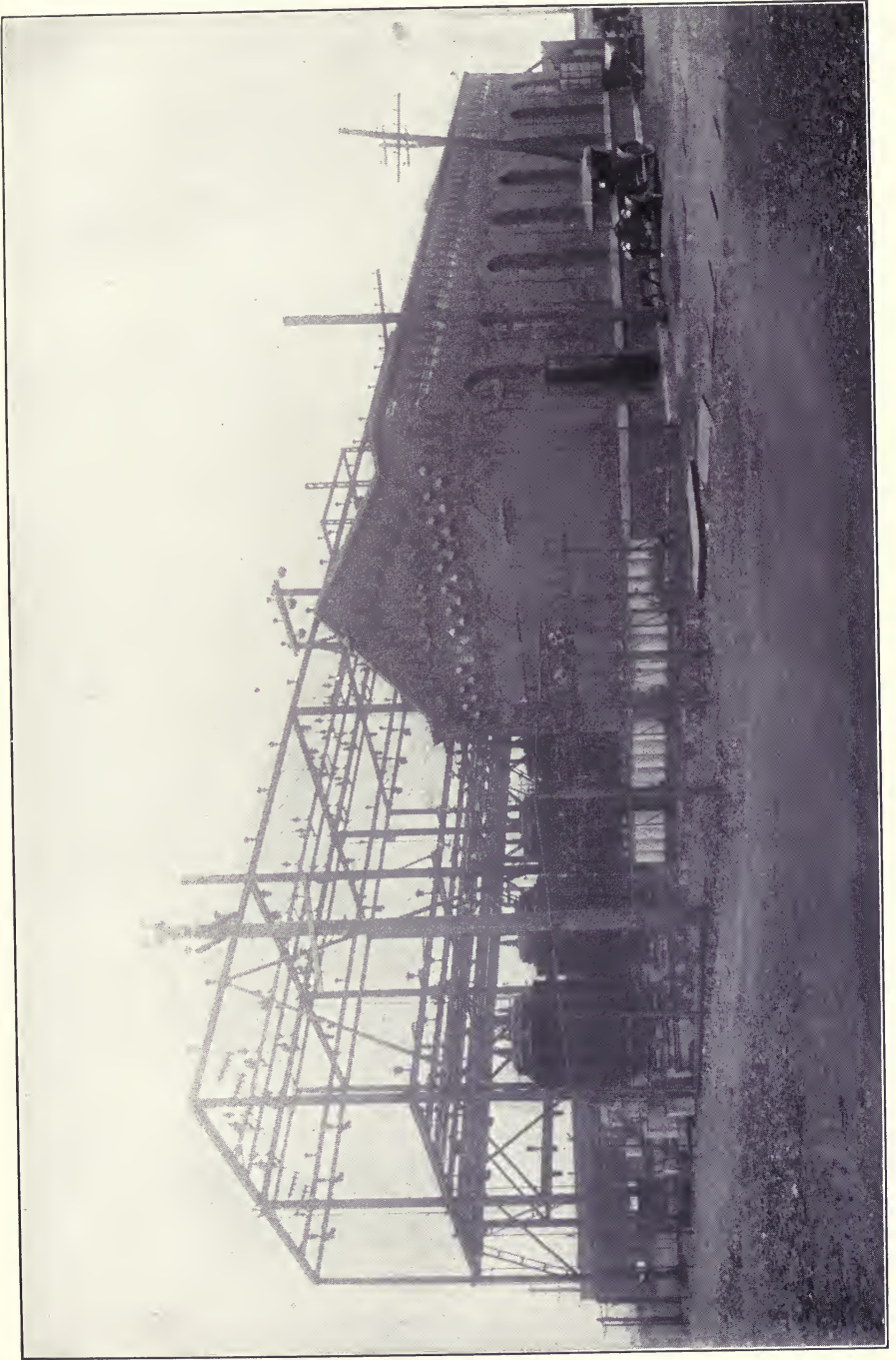


FEEDER REACTANCE COILS, COHOES STATION

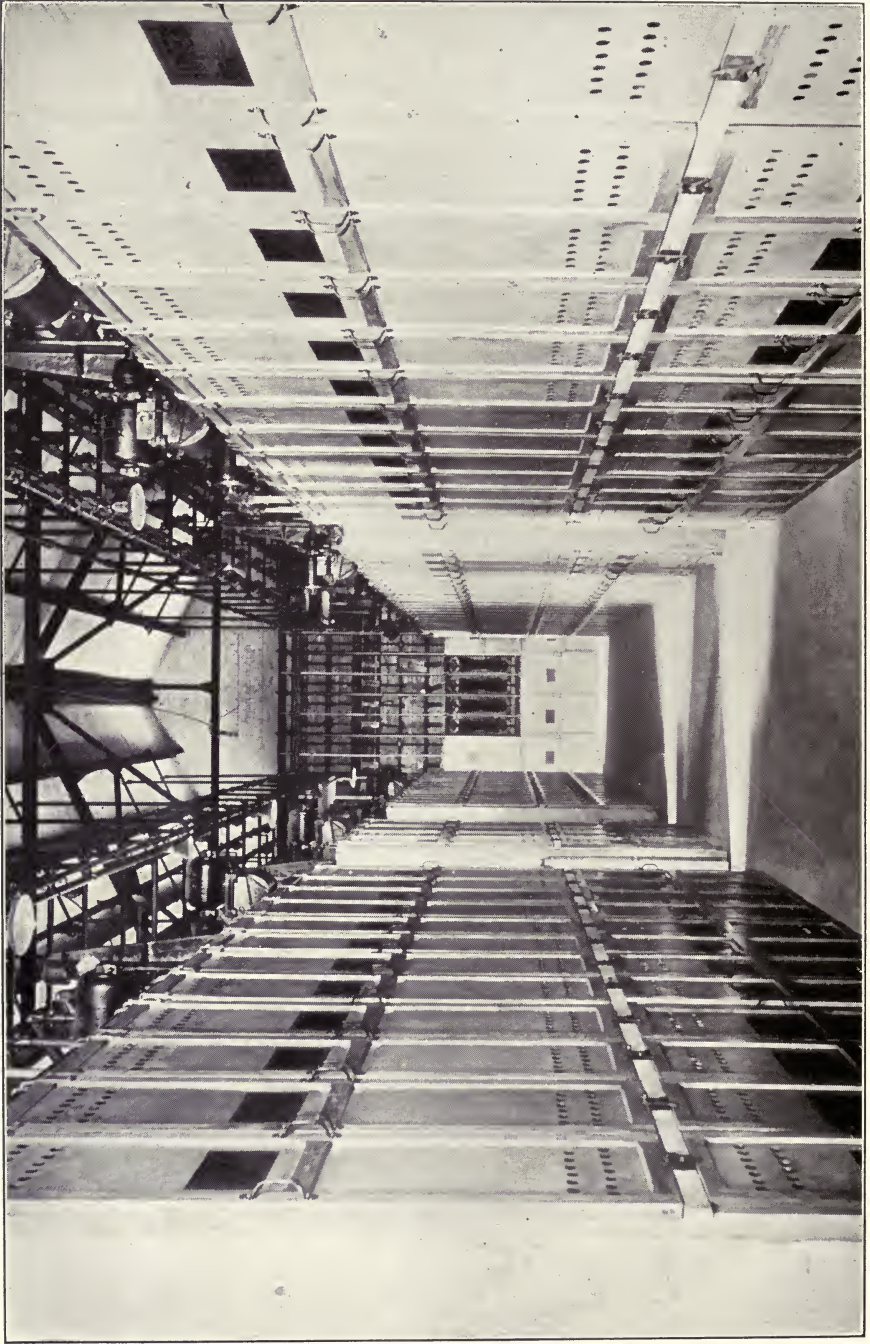


GENERATOR AND FEEDER CONTROL SWITCHBOARD, COHOES STATION

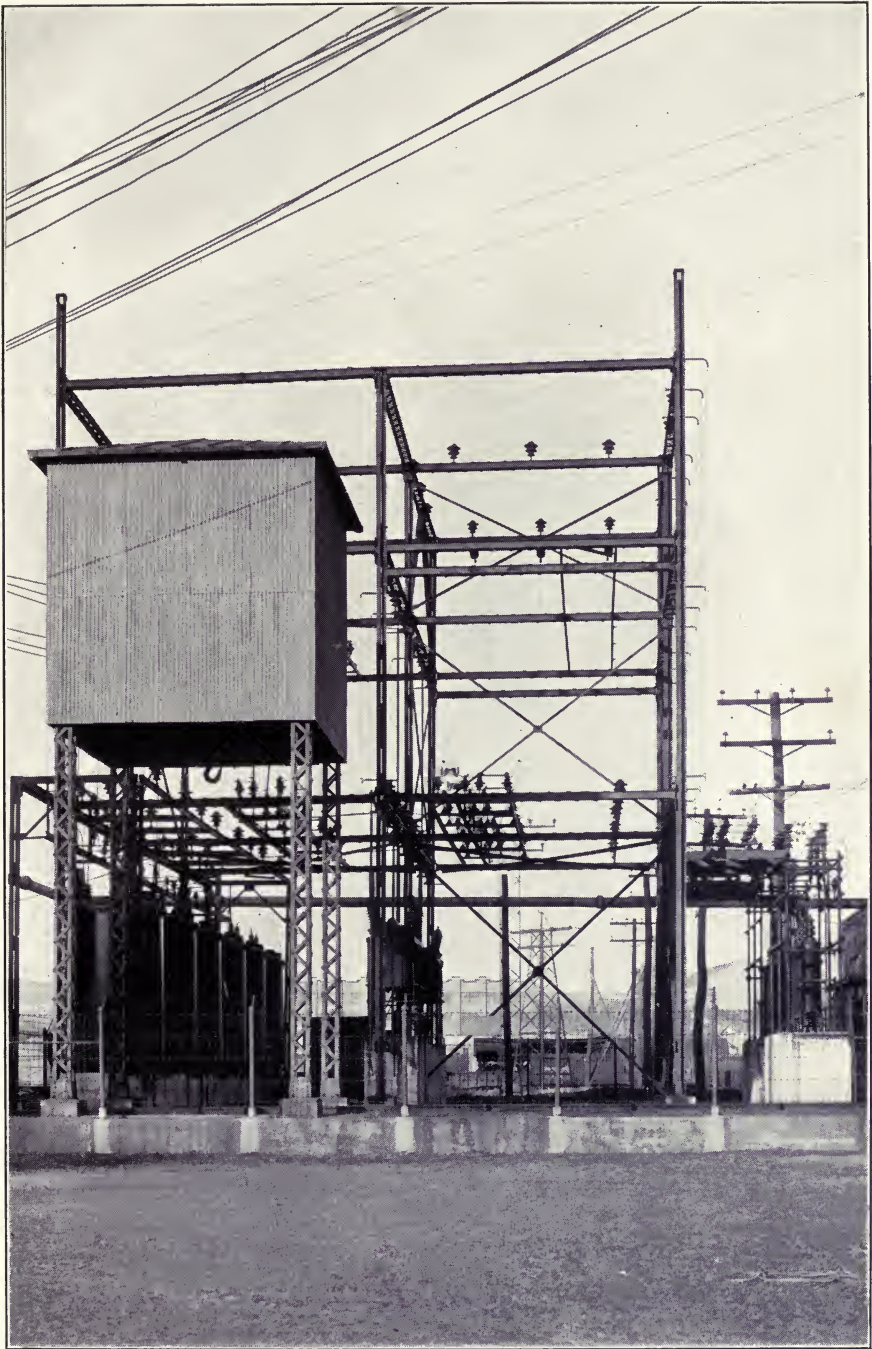
SUBSTATIONS



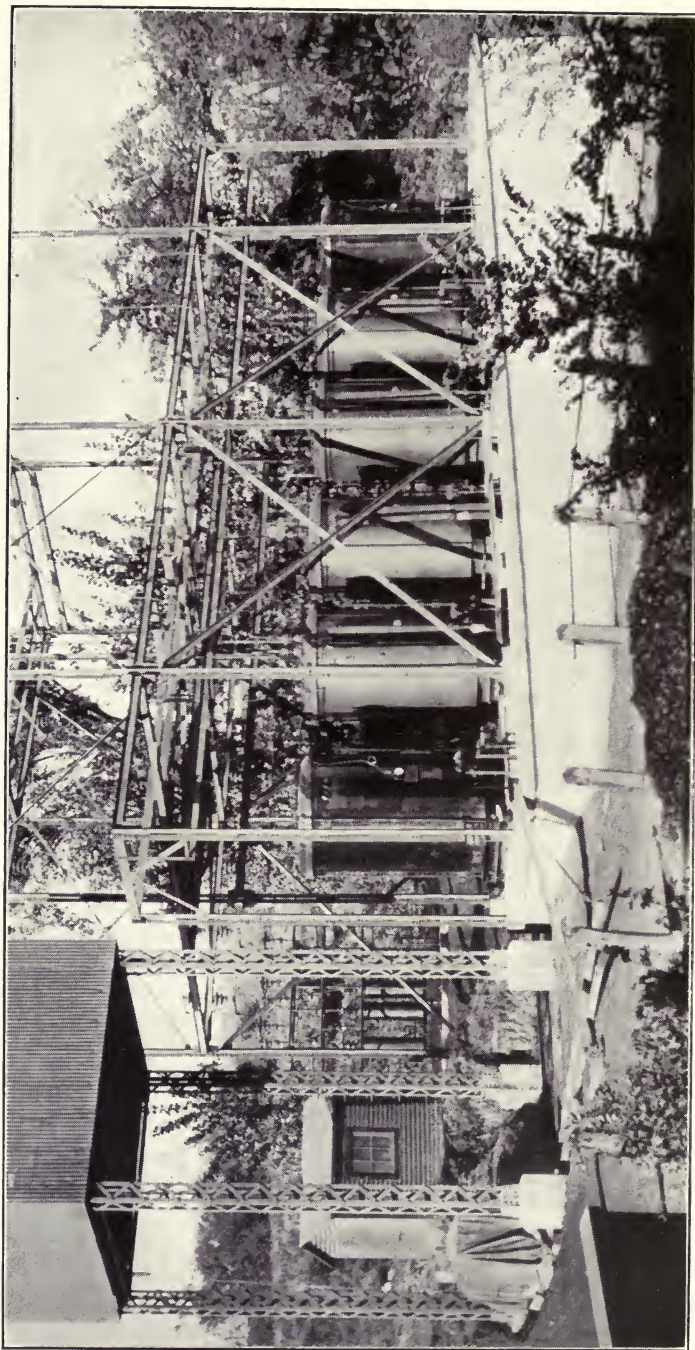
WASHINGTON STREET SUBSTATION, UTICA GAS AND ELECTRIC CO.



SWITCH HOUSE INTERIOR, WASHINGTON STREET STATION, UTICA GAS AND ELECTRIC CO.



OUTDOOR SUBSTATION, RIVERSIDE STATION, MUNICIPAL GAS CO.



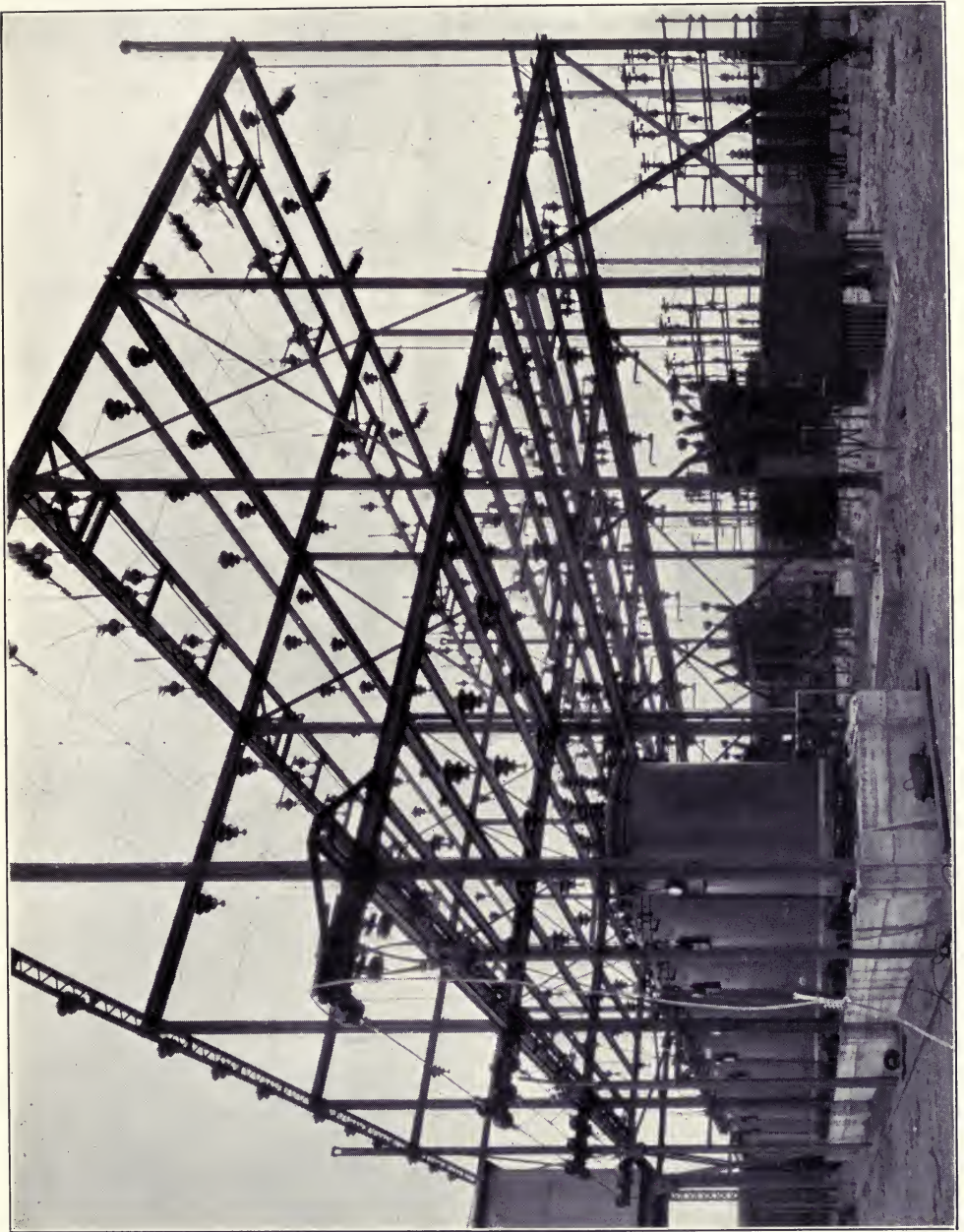
COHOES OUTDOOR SUBSTATION, COHOES POWER AND LIGHT CORPORATION



SUBSTATION, TRENTON FALLS, UTICA GAS AND ELECTRIC CO.



WEST SIDE SUBSTATION, DAYTON, OHIO, DAYTON POWER AND LIGHT CO.



MILLERS FORD OUTDOOR SUBSTATION, DAYTON POWER AND LIGHT CO.

GENERATING STATIONS DESIGNED
UNDER SUPERVISION OF
THOMAS E. MURRAY

<i>Station</i>	<i>Location</i>	<i>Company</i>	<i>KW. Capacity</i>
Millers Ford	Dayton, Ohio	Dayton Power and Light Company	45,000
Riverside	Albany, New York	Municipal Gas Company	15,000
Sherman Creek	201st Street, N. Y. City	The United Electric Light & Power Company	151,600
Williamsburg Annex	Brooklyn, New York	Brooklyn Rapid Transit Company	70,000
Williamsburg (Original Station)	Brooklyn, New York	Brooklyn Rapid Transit Company	112,500
Hell Gate	134th St. & Locust Ave., New York City	The United Electric Light and Power Company	300,000
Cohoes Falls (Hydro-electric)	Cohoes, New York	Cohoes Power & Light Corporation	28,800
Trenton Falls (Hydro-electric)	Trenton Falls, New York	Utica Gas & Electric Company	23,200
Waterside No. 1	38th St. & 1st Ave., N. Y. C.	The New York Edison Company	174,000
Waterside No. 2	39th St. & 1st Ave., N. Y. C.	The New York Edison Company	151,000
Hales Bar (Hydro-electric)	Chattanooga, Tennessee	Chattanooga & Tennessee River Pr. Co.	46,330
Washington Street	Utica, New York	Utica Gas & Electric Company	20,000
Central Power Station	Brooklyn, New York	Brooklyn Rapid Transit Company	21,600
Central Station	Rochester, New York	Citizens Light & Power Company	5,000
Helderberg Plant	Howes Cave, New York	Helderberg Cement Company	2,250
Gold Street	Brooklyn, New York	Brooklyn Edison Company	112,500
Explosives Plant "C"	Nitro, West Virginia	United States Government	9,000
Miscellaneous Stations	10,000
		Total Kilowatt Capacity	1,291,780
<i>Boiler Plants</i>			
Prudential Oil	Baltimore, Maryland	Prudential Oil Corporation	3,900 BHP
Explosives Plant "C"	Nitro, West Virginia	United States Government	35,462 BHP
55th Street	Brooklyn, New York	Kings County Lighting Company	500 BHP
		Total Boiler HorsePower Installed	39,862 BHP



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