

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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HISTORIC PRESERVATION OFFICE MAY - 8 2000

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NATIONAL REGISTER, HISTORY EDUCATION
653

OMB No. 10022-0018

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register/Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for **NATIONAL PARK SERVICE** architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Enter additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Illumination Gas Plant of The New Jersey State Asylum for the Insane at Morris Plains

other names/site number Greystone Park State Psychiatric Hospital Gas Works

2. Location

street & number Old Dover Road not for publication

city or town Parsippany-Troy Hills Township vicinity

state New Jersey code NJ county Morris code 027 zip code 07950

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. I recommend that this property be considered significant nationally statewide locally. (See continuation sheet for additional comments.)

[Signature] Date 11/18/99
Signature of Certifying official/Title
Assistant Commissioner for Natural & Historic Resources/DSHPO
State of Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. (See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State of Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

- entered in the National Register. See continuation sheet.
- determined eligible for the National Register See continuation sheet.
- determined not eligible for the National Register.
- removed from the National Register.
- other, (explain): _____

[Signature] Signature of the Keeper Date of Action 6/9/00
Edson H. Beall

Name of Property

County and State

5. Classification

Ownership of Property

(Check as many boxes as apply)

- private
- public-local
- public-State
- public-Federal

Category of Property

(Check only one box)

- building(s)
- district
- site
- structure
- object

Number of Resources within Property

(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
1	1	buildings
1		sites
2		structures
		objects
4	1	Total

Name of related multiple property listing

(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions

(Enter categories from instructions)

Industry/Processing/Extraction

Historic Subfunctions

(Enter subcategories from instructions)

Energy Facility

Current Functions

(Enter categories from instructions)

Vacant/Not In Use

Current Subfunctions

(Enter subcategories from instructions)

Unoccupied Land

7. Description

Architectural Classification

(Enter categories from instructions)

Other

Materials

(Enter categories from instructions)

- | | |
|------------|-----------|
| Foundation | Stone |
| Walls | Granite |
| | Sandstone |
| Roof | Slate |

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B** Property is associated with the lives of persons significant in our past.
- C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is

- A** owned by religious institution or used for religious purposes.
- B** removed from its original location.
- C** a birthplace or grave.
- D** a cemetery.
- E** a reconstructed building, object, or structure.
- F** a commemorative property.
- G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Engineering
Industry

Period of Significance

1876-1935

Significant Dates

1899
1910
Circa 1935

Significant Person

(Complete if criterion B is marked above)

N/A

Cultural Affiliation

Undefined

Architect/Builder

Sloan, Samuel, architect
William Farmer, architect

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS:)

- preliminary determination of individual listing (36 CFR 67) has been requested.
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey
- recorded by Historic American Engineering Record
- See continuation sheet for additional HABS/HAER documentation.

Primary location of additional data:

- State Historic Preservation Office
-
-
-
-
- Other (Repository Name: Bierce Riley President Society for Industrial Archaeology)

10. Geographical Data

Acreage of Property: 20.00

UTM References

(Place additional UTM references on a continuation sheet.)

1	18	541950	4520595	3	18	542160	4520460
	Zone	Easting	Northing		Zone	Easting	Northing
2	18	542040	4520550	4	18	542140	4520375

See continuation sheet

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title: Kurt Hirschberg and Randy Tortorello

organization: Drew University, Certificate in Historic Preservation

date: 1/31/1999

street & number: 15 Dogwood Road

telephone: (973) 386-0833

city or town: Whippany

state: New Jersey

zip code: 07981-1904

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets**Maps**

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property

Additional items

(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name: The State of New Jersey: Division of Mental Health

street & number: P.O. Box 850

telephone: (609) 292-1780

city or town: Trenton

state: New Jersey

zip code: 08625-

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

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ILLUMINATION GAS PLANT FOR THE STATE ASYLUM FOR THE INSANE AT MORRIS PLAINS

COAL GAS PRODUCTION PROCESS DESCRIPTION:

The State Asylum at Morris Plains at the time of its completion in 1876 had a state of the art coal gas producing facility co-designed by architects Samuel Sloan and William Farmer. From 1876 until the time of the asylum's complete transfer to electric power in the 1930's, the facility converted soft coal brought by the Delaware, Lackawanna and Western Railroad into coal gas used in illuminating the asylum. Coal gas is a natural by product of heating coal. The experimentation with the production of coal gas was started as early as 1659 in England by Thomas Shirley¹. By 1803, coal gas was being produced by the first commercial Boulton and Watt Plant in England, designed by engineer William Murdoch². The process that converts the smoke of super heated soft coal into coal gas is known as destructive distillation. This process produces a thick brown smoke that contains coal gas, ammonia, carbonic acid, tar, hydrogen sulfide, and naphthalene³.

The destructive distillation process requires not just the heating of the soft coal but also purification and storing of the produced coal gas for later use (*see coal gas production diagram*). This process required production equipment that would have been purchased by any one of several companies that produced standardized systems⁴. Equipment could be purchased from manufactures like Morris and Tasker Co. (*see Coal Gas Works diagram*), as well as publications like Gas Light Journal which listed new designs and advertisements for a variety of systems⁵ (*see bench of retorts diagram*). The exact manufacturer of the retort and purifier equipment at the Illumination Gas Plant of The New Jersey State Asylum for the Insane at Morris Plains is not known. The manufacturer of the gasholder contained within the 12-sided stone building was Phoenix Iron Works of Philadelphia, identified by a company stamp on the remaining rails of the gasholder. It is quite possible that this company would have been the manufacturer of all the equipment used at this facility but we cannot be certain.

The destructive distillation equipment would be arranged in a linear four stage format allowing easy access of the raw soft coal and the equipment. The first stage of the layout would be the Delaware, Lackawanna, and Western sidings that would most likely have brought the raw soft coal from southern Pennsylvania or West Virginia⁶ (*see photo #3*). The soft coal would be dropped through a large brick lined opening in the ground and stored within underground coal vaults beneath the railroad sidings. In the Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains these vaults were arranged in a series of 4 adjacent vaults located perpendicular to Old Dover Road on axis with the gasholder tank. These vaults are constructed of brick with slate flooring and are approx. 10 foot wide, 40 foot long, and 10 foot high. The soft coal storage area had to be near the location of the

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retort equipment where the coal would be heated to produce coal gas.

The second stage of the layout was the retort stage, housing the actual production of coal gas. The retorts at this plant were located in the large retort room and vented through a clay pipe chimney out the window on the west wall. Retorts are arranged as a "bench" of retorts housing anywhere from 3-8 retorts in one bench⁷. The original setup of this plant featured one bench of three retorts. The retorts are large pipe-like clay containers 11 feet long and 15 inches in diameter set in a brick producer box⁸. The producer box is actually a small coke fired furnace. The producer is filled with coal, ignited, and the temperature is raised to 1400° F⁹. The clay retorts are then filled using a long funnel like tool with 400 pounds of soft coal *(see historic coal works drawing)*¹⁰. The air tight iron doors of the clay retorts are sealed and the super heated soft coal gives off a gas which passes up out of the clay retort into an ascension pipe¹¹. When the retorts are sealed air tight the soft coal doesn't actually burn but softens and carbonizes in the absence of oxygen¹². After a short period of heating the soft coal no longer gives off gas, at this time the retort door is opened and the super heated coal instantly ignites and flashes over. This burning coal is quickly pulled out using a retort scraper *(see coal gas plant tools diagram)*, and then shoveled into the producer to be used in heating a new batch of raw soft coal in the retorts¹³. The more retorts you have in the bench the more gas can be produced since there is always at least one retort open at any time being scraped and refilled. The ascension pipes are simple clay piping system that carries the coal gas to the hydraulic main. The hydraulic main is a "U" shaped pipe partially filled with water acting as the first filter to remove impurities as well as preventing a backflow of air into the retorts, which would result in an explosion¹⁴. The chemical reaction of the ammonia in the coal gas and the water in the hydraulic main produces ammonium hydroxide which is common household ammonia, which could and probably was used by the asylum in cleaning¹⁵. As the coal gas leaves the hydraulic main it rises into the foul main, another clay pipe set horizontally passing through the wall of the retort room at a height of 10 feet¹⁶. The remnants of this foul main are still in the north wall of retort room of this gas plant, and can be seen as a broken fragment of clay pipe that was set within the wall.

The foul main was the connection between the second and third stages of the layout of the gas plant. The third stage was the purification stage, housed in four small rooms. In the first purification room there is a long vertical pipe connected to the foul main. This water cooled vertical pipe known as a condenser was where most of the accumulated tar in the coal gas would drop through a gravity fed system where it could be collected into barrels and sold by the asylum for a profit¹⁷. At this stage the coal gas in the system is no longer able to flow freely through the system on its own without pumping. An exhauster is a large pump, belt driven by an overhead line-shaft similar to an axle¹⁸. This line-shaft was most likely powered by a coal fed engine. The exhauster pulls the coal gas through the foul main as well as pumping it into the condenser. Most plants would always have at least one spare exhauster on hand since any failure in this system would result in the ceasing of gas production¹⁹.

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The line-shaft of the original system of this plant still remains on the floor of the first purification room.

In the second room of the purification stage the coal gas would have more impurities removed. In the first purification stage the coal gas is passed through a scrubber. The scrubber is a large water tank where the coal gas is allowed to bubble through the water in another chemical reaction removing more ammonia as well as carbonic acid²⁰. After the coal gas is passed through the scrubber it passes through a series of large iron caskets known as purifiers²¹. This room would have had a gantry fixed to the roof structure in order to lift the large cast iron lids of the purifiers as well as the mesh screens which held the filter media²². The coal gas would pass over a media of iron oxide or lime and in a chemical reaction the sulfur content of the coal gas would bond to the media. The media required renewing at regular intervals requiring more than one purifier, so there is always one purifier in operation at any given time²³. The exact media used in this plant is not known, but the Morristown New Jersey Illumination Gas Plant located in a neighboring town used lime²⁴. Knowing that the Morristown Plant, similar in size and layout was supplied by the same rail line it is possible that the Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains also used the same type of media. The final process in the purification stage is the metering of the amount of gas that is produced and pumped to the gasholder. This metering is similar to modern day gas meter devices²⁵.

The fourth and final stage of the layout of the gas producing facility is the gasholder building. The gasholder building at this plant is a large 12 sided stone building 50 feet in diameter *(see photo #1, #2, #8, and #9)*. This building would have housed the gasholder within its walls. The gasholder is a large inverted cast iron bell like vessel which sits in a round trough or pit filled with water to create a vapor seal²⁶. The gasholder rises and lowers on a series of guide rails. The gasholder is equipped with wheels and counterbalance weights that maintain the even level of the holder as well as keeping the holder from going askew in the building²⁷. As the coal gas would be pumped into the gasholder the tank would rise, and as the gas was removed for use it would lower again. The pit beneath the gasholder in the ground was of a varying depth depending on the number of lifts of the tank. A telescoping tank would have a multiple number of lifts allowing the tank to collapse to a smaller size, thus needing a shallower pit. The number of lifts of the tank at this facility is not known. The gasholder tank and rails were manufactured by Phoenix Iron Works of Philadelphia and held 23, 000 cubic feet of coal gas²⁸. The guide rails are the only remaining parts of the gasholder *(see photo #2)*. The stone building is intact but the roof has collapsed into the interior of the holder *(see photo #2)*. The original roof featured a cupola with decorative iron work *(see photo #7, #8, and #9)*. The cupola was a functional element of the gasholder allowing any coal gas that may have escaped from the gasholder tank to quickly be vented, preventing gas buildup or explosion²⁷. The gas is then drawn out of the tank as needed by coal gas appliances such as gas lights, gas jet fireplaces in the

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administration wing of the main building, and gas fired irons in the asylum's laundry room.

The original layout of the Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains has been enlarged over several periods in connection with the enlargement of the facilities at the asylum. In periods of heavy construction, when new buildings were hooked up to the system, the commissioner lobbied for installation of another bench of retorts. These were added in 1899 and installed in a new addition to the original structure²⁹. Then in 1910 after a failed attempt at constructing a new gasholder in order to keep up with the 60,000 cubic foot daily load of the asylum, electricity was installed³⁰. A dynamo and transformers were placed in yet another addition to the gas plant. Both the coal gas and electric systems were in use simultaneously until the 1930's when the electric system was upgraded and became the sole power for the asylum. At this time the gas plant facility was shut down and the buildings converted into a storage/dumping facility for the asylum which it remains as today. The soil content contains such toxins as P.C.B.s, tar, coke ash, and numerous other chemical components from its years as an industrial production site.

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DESCRIPTION:

The location of the Illumination Gas Plant of the New Jersey State Asylum for the Insane is north-east from the asylum on the opposite side of Old Dover Road an early street running through the facility grounds. The surrounding landscape is open wooded space with the asylum's reservoir, a small brook, and 255 acres of undisturbed natural environment. The siting of the facility in this location is primarily based on the volatility of the production of coal gas. The need for railroad access, coal storage, and foul smoke involved with the destructive distillation of soft coal would make the production facility highly undesirable in close proximity to the main building of the asylum. The landscape features several discarded elements from the original asylum, gas lamps, radiators, and architectural iron work. The landscape contains two buildings; the retort/ purification house, and a later pump house. Also intact structures are the remaining support for the original Delaware, Lackawanna, and Western railroad sidings as well as the gas holder house .

The layout of the gas plant is a typical design used in most gas producing plants of this size and use. Beneath the railroad sidings are brick coal vaults adjoining the retort/purification house which is next to the gas holder house. All the elements were aligned in an axial relationship. This layout allowed for simple and inexpensive arrangement of equipment and piping. This design by Samuel Sloan and William Farmer the architects for the Illumination Gas Plant shows their knowledge and understanding of the ideal system of efficiently producing coal gas³¹. The two latter additions to the retort/ purification house have detracted from this straight forward layout by Samuel Sloan and William Farmer. The original retort/ purification house was constructed with the same granite walling and brown sandstone trimming as the main building of the asylum. The concern for a unified appearance and texture of materials in the construction of not only the asylum building but also the gas plant show how important it was to Samuel Sloan to have the New Jersey State Asylum for the Insane at Morris Plains appear as a single functional entity. This further reinforces the ideal of Doctor Thomas S. Kirkbride that the asylum should be designed as a whole not just as a collection of parts³². Even as far as to include industrial out buildings.

The first structure located on the grounds of the gas plant facility is the structural remains of the concrete support for the railroad sidings that supplied the facility with soft coal (see photo #11). This structure is located parallel to Old Dover Road and approx. 15-20 feet away. Today this structure is intact but deteriorated on the Old Dover Road side due to the reaction of concrete with road salt spray. The underside of the concrete structure is divided into four open spaces each with a covered opening on the ground. The covered openings are brick lined shafts leading to the coal vaults

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located beneath the railroad sidings[see photo #12, #13]. These compartments are long single vaulted rooms constructed of brick with slate floors[see photo #14]. Along the front of these vaults is a cross vaulted corridor that provides access from the retort room to each vault. At the western end of this corridor a doorway has been added most likely during the 1899 enlargement of the facility. This door provides access to the three exposed outdoor coal bunkers, added in that year, located next to the underground coal vaults.

The first building on the grounds is immediately next to the railroad sidings and is the retort/ purification house. The original house was a two part rectangular building with a gable roof and monitor top [see historic photo #7]. The first part of the building was the retort room located closest to Old Dover Road. This large room [approx. 30 feet by 50 feet] would have held the bench of retorts along the western wall vented through a chimney out an opening in this wall[see photo #35]. This room also had a raised wood platform along the northern wall to provide access to the hydraulic main and the foul pipe for repairs[see photo #36]. The southern wall was an unbroken wall with the exception of a round window in the top of the gable end primarily for ventilating the extreme heat involved with the destructive distillation process. The eastern wall featured a large double door which would have been needed for equipment moving as well as bringing soft coal in and used coke ash out. The northern wall had single door that led into the adjoining purification room. All that remains today is the raised wooden catwalk, the foul pipe remnants in the wall, and a large square opening in the west wall where the original chimney for the bench of retorts was located.

This first purification room was the condenser room, this room too had a loft space above the southern half of the room to provide easy access for pipe repairs. The second half of the room had a line-shaft mounted from the roof structure which belt drove the exhauster pump from a coal burning engine located in the northeastern corner of the room. The southern end of the room was the location of the condenser. The only remaining evidence of this equipment are the brick piers located in the basement level under this room[see photo #38] and the cast iron upper support brackets for the condenser[see photo #37]. These elements would have provided support for the condenser pipes. The room has a single door on the eastern wall, a single window on the western wall in line with the door and a door into the next purification room on the northern wall. The basement level beneath this room would have been the location of the gravity feed piping system that moved tar outside to a collection area. The only remnants in this area today are the line shaft of the exhauster, the condenser support structures, and the wooden catwalk.

The second purification room on the main level housed the scrubber and purifiers. The roof supports hold a gantry used for lifting the cast iron purifier lids[see photo #40]. Below the floor are again a set of brick piers that were used to support the weight of the cast iron purifier chests[see photo #41]. This room had a single door on the eastern wall, a single window on the western wall again in line with the door, and

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two doors on each end of the northern wall one led to a storage space the other to the meter room(see photo #42). The rooms below this area in the basement level would probably have been used as offices for the operations of the gas plant. Today the only remnants in this area are the brick pier supports, the gantry, and another overhead catwalk. These rooms today hold a large collection of original doors and windows from the main building of the asylum(see photo #53), including an original door from the criminally insane wing with cast iron bars over a small window and a tray slot at the base of the door(see photo #52).

The south elevation of the original building was a gabled end articulated with the end of the monitor top of the roof (see photo #7, #3). At the center in the top of the gabled end was the round window vent. The west elevation was articulated into two sections one containing the retort room the other containing the purification rooms. The retort room section had one centrally located opening(see photo #34). This opening was the location of the original clay pipe chimney of the retort. The purification room section is divided into two bays each bay containing one window for the main floor and one small basement window. The east elevation was articulated in the same manner as the west elevation. The retort room section had two centrally located double doors. The purification room section was divided into three bays, each bay containing one single door. The north elevation was two bays, each bay containing one window in the main level and one small basement window(see photo #29). The window and door arches were trimmed with brown sandstone matching the main building of the asylum. The corners of each elevation had brown sandstone quoins(see photo #31). The roof was slate with a monitor top to allow for ventilation of heat and any escaping coal gas.

The structural system of the building was stone bearing walls with a cast iron roof structure and heavy wooden timber framing for floors in the purification rooms. In the retort room the floor is stone. The difference in materials is due to the mixed use of the building. The retort room generated a great deal of heat and the building material must have been able to withstand temperatures of at least 1400°F. The purification rooms worked with cooled coal gas and the added expense of heat resistant construction materials was not necessary³². Today this building is structurally intact with only minor visual damage. The roof and walls are intact with some minor damage and deterioration. The rooms house remnants of the asylums past, containing items discarded from the mid 1930's up to the early 1970's.

The first addition to the facility came in 1899³³. The addition was "L" shaped in plan attaching to the eastern side of the original building creating a "U" shaped plan for the new building complex. The new addition contained two rooms the first large ("L" shape in plan) room was the new retort room which held a bench of two retorts on the eastern side of the room with the chimney located on the eastern wall(see photo #43). The east wall had no openings. The south wall had a large double door that provided access for equipment and supply of materials. The west wall on the short end of the "L" had one door that led into the original retort room(see photo #4). The west wall of the long end of the "L" had two louvered windows to provide ventilation of heat. The

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north wall on the short end of the "L" had a single door centrally located (see photo #30). The north wall on the long end of the "L" had a single door into the new purification room. This north wall also has the remaining evidence of three clay foul pipes that were set in the top of the wall (see photo #44). Today the only remaining evidence of the production process in this area are the remnants of the foul pipes in the wall, and the remains of the chimney for the bench of retorts.

The rear room was the new purification room. The east wall had a single door centrally located. The south wall had a single door from the new retort room. The west wall had one window centrally located. The north wall has one single door leading outside (see photo #30). Today all that remains in this area is the original concrete flooring which contained a concrete support pedestal for the cast iron purifier chest, as well as having the original piping still set within.

The exterior of the new addition was constructed of a similar granite to match the original building. The trimming around the windows and doors was again brown sandstone. The south elevation was two bays with two large double doors in each bay. The west elevation was three bays to correspond to the east elevation of the original building it faced. The east elevation contained only one single door located at the very northern end of the wall. The north elevation also had only one single door located at the very western end of the wall. The new building had a gable roof of slate to match the original building.

The structural system of the new addition is stone bearing wall. Concrete flooring in both rooms with an equipment platform and system piping set in the floor of the purification room. The roof structure is a cast iron truss system (see photo #4). This addition is in good condition. The walls have little to no deterioration, and the roof is also in good condition with little to no damage or deterioration.

The final addition to the retort/ purification house came in c. 1910 with the addition of electric generating equipment to this building. This addition was a single room (15 foot by 30 foot) made of brick and attached to the retort room of the 1899 addition. This room would have held the dynamo and transformers for generating electricity. The walls of the interior are covered with an asbestos board used to shield the electrical equipment from the high temperatures of the retorts (see photo #45). The west wall of the room had a door at each end that allowed access into the 1899 retort room. The south wall was a large wooden wall with one large single door and one large double door (see photo #33). The north wall had no openings. The east wall had one door at the northern corner of the room (see photo #33). Also added was a wall from the original retaining wall on the south end of the property to the east wall of the new addition.

The red brick walling material in this addition was chosen for cost issues only and no concern was made to match the appearance. The south wall was articulated with a large opening. The opening contained a wooden wall housing one large single door and one large double door (see photo #5). The northern wall had no articulation. The eastern wall had a single door located to the northern end of the wall.

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The structure of the new addition was brick bearing wall. The floor was concrete. The roof is pre-cast concrete with a downward slope in the eastern direction. This addition is also in good condition, the asbestos sheeting is beginning to sag severely, and the large wooden doors on the south elevation are in poor condition but still intact. The pre-cast concrete roof is in excellent condition with no signs of deterioration.

The gas holder house was the second structure involved with the production of coal gas for illuminating the New Jersey State Asylum for the Insane at Morris Plains. The gas holder house was part of the original complex completed in 1876. It was a large 12 sided polygonal building of the matching granite walling. The building was 50 feet in diameter and 14 feet high. Each side of the polygonal building is 13 feet by 14 feet. Every other side was a single bay elevation with one centrally located window. In the eastern most side the bay contained a large double door *(see photo #18)*. The windows and doors were trimmed with brown sandstone *(see photo #20)*. There was a denticulated brick molding along the top of the building capped with a wooden cornice which is now mostly gone *(see photo #1, #19, #21)*. Above the wood cornice was the cast iron tension ring that held the top of the building together structurally *(see photo #28)*. The roof was slate with iron ribs on line with each of the twelve divisions. The roof was capped by a ventilation cupola with wooden louvers. The cupola roof was a small scale version of the main roof including identical iron ribs *(see photo #9)*. The cupola roof was trimmed at the top with a cast iron decorative spire.

The interior of the gas holder house held the gas holder tank. This cast iron tank moved up and down on steel rails. The tank is now gone but the rails are still intact *(see photo #2, #22, #23)*. In the bottom of the gas holder house there was a water filled pit for the tank to lower into, which has since been filled with debris, and numerous discarded items from the asylum's past. The windows on the exterior of the gas holder house were real windows that revealed the position of the tank inside, and due to the poor stability of the polygonal masonry structure these openings were reinforced with steel compression rods *(see photo #20)*. The doors on the exterior provided access to the small access space that encircled the gas holder tank. Near to this area was the original underground valve that controlled the flow of gas into the gas holder tank. Today the original brick lined pit that housed this valve is still intact, but filled with debris, most likely the valve is still located within this pit beneath the debris of soil and leaves *(see photo #17)*.

The structural system of the gas holder tank was stone bearing wall held together at the base of the roof with a cast iron tension ring. The roof structure was heavy wood timber framing *(see photo #25, #26, #27)*. The support structure for the gas holder tank rails were steel brackets bolted to the exterior stone wall. Today this structure is in poor condition. The structural walls and rails are intact and in good condition. The roof collapsed in January of 1991 during a severe snow storm after the wooden structure was heavily deteriorated with termite damage. The structural components and roofing material are still located on the inside of the gas holder

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house(see photo #24, #25, #26, #27). The gas holder tank has been removed and the pit filled with debris and discarded items from the asylum such as furniture, doors and some mechanical equipment. The wooden cornice has since fallen off of the building and is located on the site surrounding the building this deterioration has provided visual access to the structural tension ring. Revealing the interesting structural system that was used in the construction of this gas holder house. The tension ring, and brick denticulated molding are still in good condition(see photo #19, #28).

There is one non-contributing building on site which is a 1928 water pump house which supplied the gas plant with water during the plant's last years of operation. This pump house replaced an earlier pump house which was in use from 1876 until 1928. Today this building still houses all of its electrical equipment and controls that powered the pumps, as well as having all the pumps and piping(see photo #46, #47).

Today the surroundings of the Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains hold the scattered remains of the asylum's past. There are large piles of clay pipe on the site which most likely were a part of the gas production system. These pipes would be the same size and type that would have been used in the process of moving the coal gas from one purifier to the next. The site also holds a large collection of discarded gas street lamps that are original to the facility(see photo #6). They are identical to the last remaining gas light at the rear of the main building. The site also contains items such as the original doors and windows of the asylum where they were dumped after being replaced, original marble counters discarded in the coal vaults, tools and equipment that were used in the farm which was also a part of the asylum's operations such as a milk bucket(see photo #54). The area also contains discarded surplus silverware from W.W.II marked with US Navy and US Army which were used in the asylum's dining rooms(see photo #51). Radiators(see photo #50), light fixtures, and even furniture have been discarded on the grounds of the gas plant. There are even several pieces of the original brown sandstone trimming of the main building. These stones were window trimmings which were removed in 1919 when fire exit doors replaced windows on the first floor of each block of wards(see photo #49). And probably the most interesting remaining artifacts are the soft coal stockpiles that were buried in earthen mounds throughout the site. Today these earthen mounds are beginning to be deteriorated by the elements and are beginning to expose the vast amounts of soft coal that were buried within them(see photo #48). A surviving example of the self-sustainability ideals that drove the New Jersey State Asylum for the insane at Morris Plains. Showing that whatever happened there would always be a substantial supply of coal for illumination even if no deliveries were made for many months.

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DESCRIPTION FOOTNOTES:

- 1-The Gasworks at Greystone Park 1999 Pg. 4
- 2-The Gasworks at Greystone Park 1999 Pg. 4
- 3-The Gasworks at Greystone Park 1999 Pg. 5
- 4-Russel Casholder Personal Interview 1999
- 5-Gas Light Journal 1870
Morris And Tasker 1861
- 6-Bierce Riley Personal Interview 1999
- 7-The Gasworks at Greystone Park 1999 Pg. 5
- 8-The Gasworks at Greystone Park 1999 Pg. 5
- 9-The Gasworks at Greystone Park 1999 Pg. 5
- 10-The Gasworks at Greystone Park 1999 Pg. 5
- 11-The Gasworks at Greystone Park 1999 Pg. 5
- 12-The Gasworks at Greystone Park 1999 Pg. 5
- 13-Bierce Riley Personal Interview 1999
- 14-Bierce Riley Personal Interview 1999
- 15-Bierce Riley Personal Interview 1999
- 16-The Gasworks at Greystone Park 1999 Pg. 5
- 17-The Gasworks at Greystone Park 1999 Pg. 9
- 18-The Gasworks at Greystone Park 1999 Pg. 6
- 19-Bierce Riley Personal Interview 1999
- 20-The Gasworks at Greystone Park 1999 Pg. 6
- 21-The Gasworks at Greystone Park 1999 Pg. 6
- 22-The Gasworks at Greystone Park 1999 Pg. 6
- 23-The Gasworks at Greystone Park 1999 Pg. 6
- 24-Morristown Gas Works Pg. 2-3
- 25-Bierce Riley Personal Interview 1999
- 26-The Gasworks at Greystone Park 1999 Pg. 7
- 27-Bierce Riley Personal Interview 1999
- 28-The Gasworks at Greystone Park 1999 Pg. 8
- 29-Commissionier's report 1899
- 30-Commissionier's report 1910
- 31-Bierce Riley Personal Interview 1999
- 32-Select and a Site and Build a New Asylum 1876
- 33-Russel Casholder Personal Interview 1999

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SIGNIFICANCE:

From 1876 until the mid 1930's¹ The Illumination Gas Plant at the State Asylum for the Insane at Morris Plains converted soft coal into enough coal gas to illuminate the streets in the complex, the rooms, the corridors, power some fireplaces in the administration wing of the main building, as well as fire the gas irons of the laundry room. Today this marvel is a one of a kind gem in all of the United States. The Illumination Gas Plant at the State Asylum for the Insane at Morris Plains qualifies for the National Register for Historic Places based on the following criterion: Criterion A: association with important events, Criterion D: for the potential to yield information about the asylum's past. Criterion A as an extremely rare example of the design and period technology of a nineteenth century destructive distillation plant. And Criterion D as being a self contained time capsule of the asylum containing the discarded remains of the asylum from the mid 1930's to the early 1970's. Many of these items being from as early as 1876 and the start of the asylum. As well as holding information about the process of the production of coal gas in the late nineteenth and early twentieth centuries.

At the time of the completion of the New Jersey State Asylum for the Insane at Morris Plains in 1876, the illumination gas plant co-designed by Samuel Sloan and William Farmer was an engineering marvel. The destructive distillation system was in itself a revolutionary process. It was a continuous operation that had to be kept running day and night. The beliefs of Doctor Thomas S. Kirkbride of Philadelphia in the design of an asylum were even applied here to the illumination gas plant. The process was a self contained efficient system. The soft coal was delivered by the Delaware, Lackawanna, and Western railroad sidings. The coal was then stored in underground vaults where large stockpiles of coal could be kept if ever the asylum was unable to obtain more. The retort/purification house turned this soft coal into a thick dark brown smoke that would then be processed and refined into a colorless, low odor gas that was used all over the asylum. After the super heated soft coal was through emitting gas it was scraped out, shoveled into the producer to be used to heat the next batch of coal³. An extremely efficient process that left little to be discarded as a waste product. As the coal gas was purified in the hydraulic main, the end product of the chemical reaction of the ammonia in the coal gas and the water in the main was ammonium hydroxide, which we know as common household ammonia which could be used for any variety of needs at the asylum⁴. When the coal gas was passed through the condenser the tar that was removed and captured in a gravity feed piping system, drawn out of the building, and emptied into barrels. These barrels of coal tar were then sold by the asylum at a profit⁵. The final end result of the process, the refined

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coal gas was like free energy thanks to all the by products that were removed and reused.

The general layout and design of the Illumination Gas Plant at the New Jersey State Asylum for the Insane at Morris Plains was not uncommon. The generic axial layout was the standard layout perfected in the United States and Europe during the first half of the nineteenth century⁶. What makes the design of this plant so unique is the integration with the design of the main building of the asylum. Simple, straight forward organization and planning were what made the asylum as well as the gas plant so efficient. The articulation of materials by Samuel Sloan in an attempt to integrate texture and appearance of the asylum and the gas plant show how concerned he was with the asylum reading as one entity, rather than a collection of buildings.

The design details and materials chosen by Samuel Sloan are what make the Illumination Gas Plant the rarity that it is today. The last survey completed in 1988 revealed that there were only 14 coal gas plants still remaining in the United States⁷. Of these 14 coal gas plants the Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains is the only one remaining the was constructed of stone. All the other remaining example are constructed of either brick or wood⁸. The last example of another coal gas plant constructed of stone was in Valley Falls Vermont and was lost between the survey in 1981 and the survey in 1988. The articulation of the gasholder house in plan, as a 12-sided polygon, is also quite unique and there is only one other known surviving example of such a polygonal plan and that is a brick coal gas plant in Woonsocket Rhode Island. The association of this gas plant with the New Jersey State Asylum for the Insane at Morris Plains is also a rarity, only one other gas plant that supplied a state asylum survives, that plant is located in Concord, New Hampshire. This is also the last surviving example of a coal gas illumination plant in the state of New Jersey⁹. The Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains is also the southern most example of a coal gas illumination plant. The next nearest plant is in Troy, New York, the rest of the remaining coal gas illumination plants are in Maine, New Hampshire, Rhode Island, and Massachusetts¹¹. In addition what also makes this illumination gas plant so important is the statistics of illumination coal gas plants. Seven of the twenty-one coal gas plants that were known to exist in the United States in 1970 were lost by 1988¹². This illumination gas plant is such a rarity that it must be recognized, stabilized, and preserved. The sad fact is that the current numbers are not known since the latest available data was from over ten years ago. The Illumination Gas Plant of the New Jersey State Asylum for the Insane could even be more of a rarity that we currently believe.

Ten years ago the Illumination Gas Plant of the New Jersey State Asylum for the Insane was only in a minor state of disrepair¹³. In the last 11 years the condition has been allowed to spiral downward at an alarming rate. If this plant is not stabilized soon, it too will be added to the list of the coal gas illumination plants that have been lost forever.

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SIGNIFICANCE FOOTNOTES:

1-Commissioniers's reports 1876-1924

The Gasworks at Greystone Park 1999 Pg. 7

2-Select a Site and Build an Asylum for the Insane at Morris Plains 1876

3-The Gasworks at Greystone Park 1999 Pg. 5

4-Commissionier's Reports 1876-1924

5-The Gasworks at Greystone Park 1999 Pg. 8

6-The Gasworks at Greystone Park 1999 Pg. 4

7-H.A.E.R. Gasholder Inventory Survey 1988

8-H.A.E.R. Gasholder Inventory Survey 1988

9-The Gasworks at Greystone Park 1999 Pg. 9

10-H.A.E.R. Gasholder Inventory Survey 1988

11-H.A.E.R. Gasholder Inventory Survey 1988

12-H.A.E.R. Gasholder Inventory Survey 1988

13-Bierce Riley Personal Interview 1999

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- Department of Charities and Corrections: N.J. Commission to Select a Site and Build an Asylum for the Insane October 31, 1876
- Department of Charities and Corrections: Acts for the Organization of N.J. State Hospitals at Morris Plains and Trenton 1894
- Department of Charities and Corrections: The State Asylum for the Insane at Morris Plains Commissioner's Reports 1875-1924
- The Gasworks at Greystone Park: Unpublished Manuscript by Bierce Riley 1999
- Personal Interview Bierce Riley: President of Society of Industrial Archaeology
- Personal Interview Russel Casholder: Historical Engineer of Gas Lighting Smithsonian Institute
- Personal Interview William Worthington: Historical Engineer Curator Mechanical Arts Smithsonian Institute
- H.A.E.R. Gas Holder Surveys 1981 and 1988 Courtesy Bierce Riley
- H.A.E.R. Documentation Concord Gaslight Co. Gasholder House 1982 Courtesy Bierce Riley
- The Manufacture and Purification of Gas: Biggar Gasworks Museum the National Museums of Scotland Courtesy Bierce Riley
- Gas Light Journal Friday December 2, 1870 Courtesy Bierce Riley
- Morristown Gas Works Morristown, New Jersey Catalog by Public Service Courtesy Bierce Riley
- Morris And Tasker Illustrated Catalogue 1861 Courtesy Bierce Riley

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Biggar Gas Works Museum Biggar Scotland By T. M. Mitchell Northwest Gas
Historical Society Courtesy Bierce Riley

Early Gas Making The Royal Scottish Museum Leaf Let #5 Courtesy Bierce Riley

Sanborn Map 1918 Sanborn Map Co. Courtesy Bierce Riley

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Historic Name

Illumination Gas Plant of the New Jersey State Asylum for the Insane at Morris Plains

Date Created/Modified

May/3/2000

Content

PRIMARY LOCATION OF ADDITIONAL DATA

The Joint Free Public Library of Morristown and Morris Township

The Parsippany Historical & Preservation Society

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VERBAL BOUNDARY DESCRIPTION

The property being nominated is the southernmost portion of Block 13, Lot 1, as shown on Parsippany-Troy Hills Township tax map parcel serial #526; issued 1971, revised 1973.

BOUNDARY JUSTIFICATION STATEMENT

The approximately 20 acres included within the boundary encompasses the entire site of the gas illumination plant together with a modest amount of additional acreage to convey its historic setting.

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UTM References (Continued)

<u>#</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>
5	18	541950	4520595

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- 1-USGS Topographic Map
- 2-The Township of Parsippany-Troy Hills Tax Maps of this area
- 3-Site Plan of Greystone Park State Psychiatric Hospital Today
(Area Around Main Building Or Original Asylum Building)
- 4-Sanborn map of the complex 1918
- 5-Coal gas Production Diagram
- 6-Diagram of Gas Plant Layout from Morris and Tasker 1871
- 7-Diagram of Retort from Gas Light Journal 1870
- 8-Diagram of Condenser Biggar Gas Works
- 9-Diagram of Retort Room Biggar Gas Works
- 10-Diagram of Coal Gas Production Tools Morris and Tasker 1871
- 11-Site Plan of Gas Plant Complex

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PHOTOGRAPHS: THE FOLLOWING IS THE SAME FOR ALL THE PHOTOGRAPHS

1-The Illumination Gas Plant of the New Jersey State Asylum for the Insane
at Morris Plains

2-Morris County, New Jersey

3-Kurt Hirschberg Photographer

4- January - March 1999

5-Negatives Held By: Kurt Hirschberg
15 Dogwood Road
Whippany, NJ 07981-1904
(973) 386-0833

6-View Of Gasholder Looking North
7-Photo # 1 of 55

6-Interior Of Gasholder
7-Photo # 2 of 55

6-South elevation of Retort/Purification House and Rail Support
7-Photo # 3 of 55

6-Interior of 1899 Retort Room
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6-South wall of Dynamo Room 1910 Addition
7-Photo # 5 of 55

6-Pile of Original Gas Street Lamps
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6-Historic View of Original Gasholder and 1876 Retort/Purification House
c. 1890 Greystone Scrapbook
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6-Interior Roof Structure of Gasholder in 1988 By Bierce Riley
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6-Gasholder roof and cupola in 1988 By Bierce Riley
7-Photo # 9 of 55

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6-Entrance to Tunnel Providing Access to The Main Building of the Asylum
7-Photo # 10 of 55

6-Delaware, Lackawanna, and Western Rail Road Sidings
7-Photo # 11 of 55

6-Rail Road Siding Coal Chutes
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6-View Of Coal Chute from Coal Vault Interior
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6-View Of Coal Vault #1 Interior
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6-Cross Access Corridor to Coal Vaults
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6-Access Door from Coal Vault to Original 1876 Retort Room
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6-Underground Pit for Gas Shut-off Valve (Control Valve for Gas Holder Tank)
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6-Gas Holder House Exterior Looking North West (Showing Access Doors)
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6-Denticulated Brick Molding of Gas Holder House Cornice
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6-Original Window with Structural Steel Compression Rod in Gas Holder House
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6-Collapeded Cupola Roof of Gas Holder House (Interior of Gas Holder House)
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6-Collased Cupola Roof Structure (Interior of Gas Holder House)
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6-Original Timber Frame Roof Structure of Gas Holder House (Interior of Gas Holder House)
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6-Structural Tension Ring Detail of Gas Holder House
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6-Original Retort & Purification House 1876 Original Building North Elevation
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6-Retort & Purification House 1899 Addition North Elevation
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6-Detail of Joining of 1876 and 1899 Retort & Purification Houses
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6-Original Window of North Elevation of 1876 Retort & Purification House
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6-East Elevation of Retort & Purification House Complex (Showing 1910 Electrical Room
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6-West Elevation of Original 1876 Retort & Purification House
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6-Original Chimney Opening for the Bench of Three Retorts
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6-Cast Iron Support Brackets for Condenser Pipes (First Purification Room 1876)
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- 6-Overhead Gantry for Lifting and Moving Cast Iron Purifier Chest Lids (Second Purification Room 1876)
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- 6-Brick Support Piers For Cast Iron Purifier Chest (Located in Basement of Second Purification Room 1876)
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- 6-Meter Room With Original Doors From Main Building of the Asylum (1876 Meter Room)
7-Photo # 42 of 55

- 6-Chimney for Bench of Two Retorts added in 1899 in East Wall of 1899 Retort Room
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- 6-Foul Pipe Remnants in North Wall of 1899 Retort Room
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- 6-1910 Electrician Generating Room Interior
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- 6-1928 Water Pumphouse South and East Elevations (North and West Similar)
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- 6-1928 Pumphouse Interior
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- 6-Earthen Mound of Underground Coal Stockpiling Looking North
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- 6-Original Brown Sandstone Keystone from Main Building of the Asylum
(Removed During addition of Fire Escapes in 1919)
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- 6-Original Radiators from Main Building of the Asylum (In Courtyard In Front of 1876 and 1899 Retort Rooms)
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- 6-Surplus Silverware from WWII (US Navy and US Army) (In 1899 Retort Room)
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- 6-Original 1876 Door From Criminally Insane Prisoner Ward of Asylum
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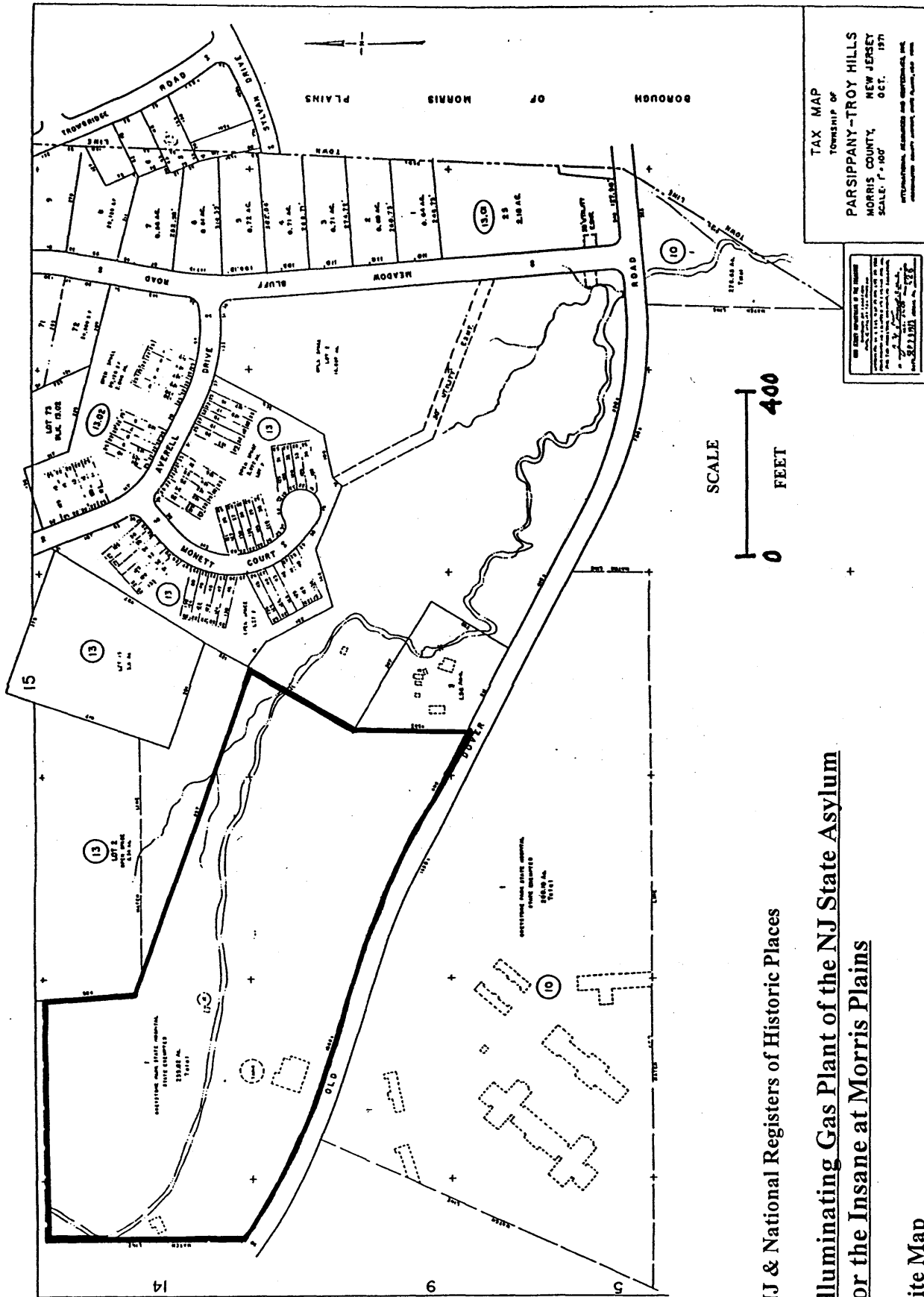
MORRIS COUNTY, NJ

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6-Original Doors and Windows From The Main Building of the Asylum
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6-Original Milk Bucket From the Farm Located on the Grounds of and Operated by the Asylum
7-Photo # 54 of 55

6-Historic Photo of the Main Building of the Asylum showing Design Intergration with
the Illumination Gas Plant
7-Photo # 55 of 55



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Illuminating Gas Plant of the NJ State Asylum for the Insane at Morris Plains

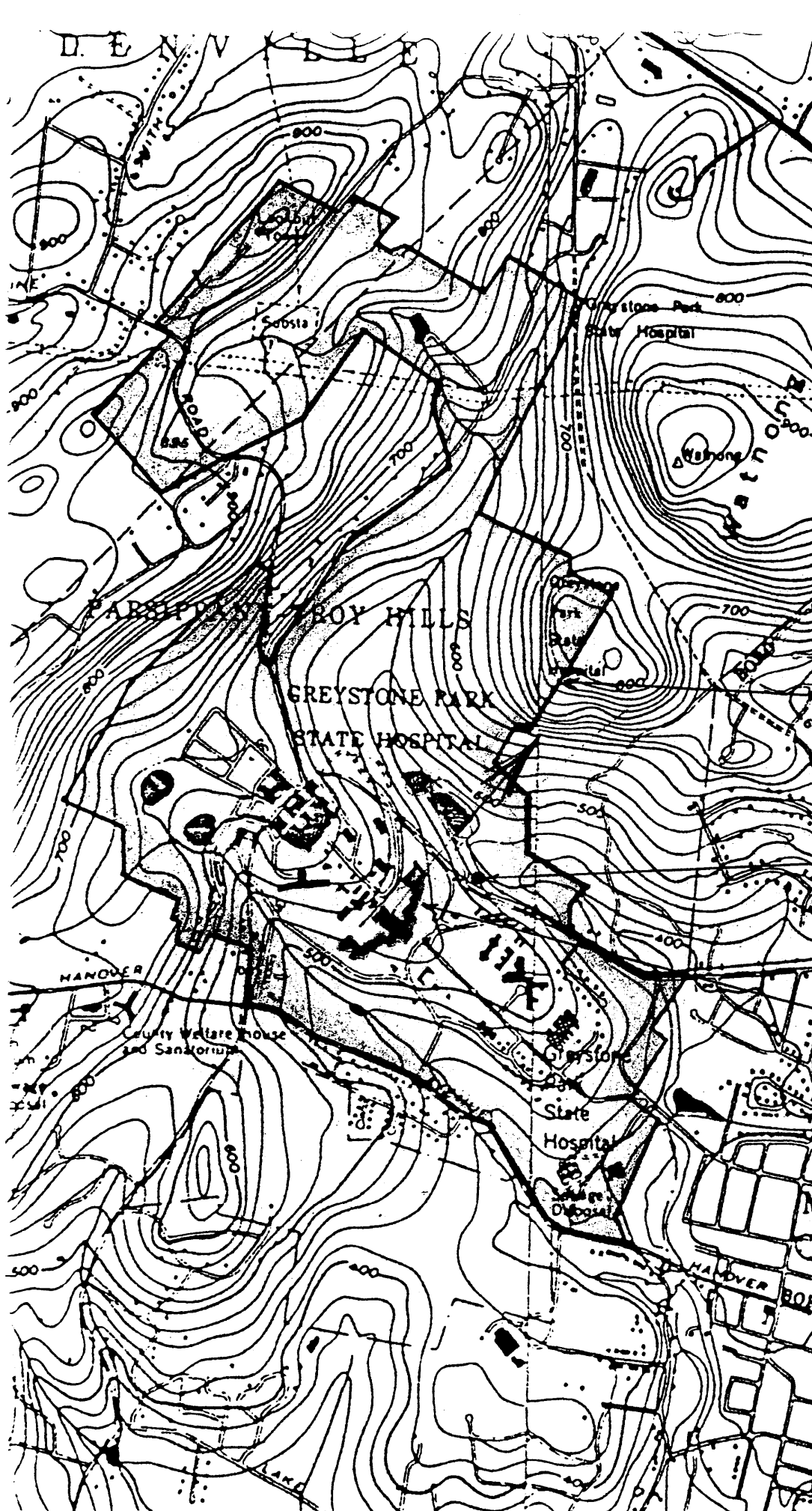
Site Map

NJ Morris County

June 1999

Parsippany-Troy Hills Township

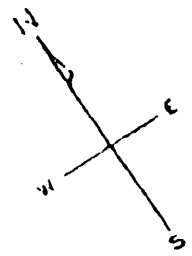
K.Hirschberg



HOSPITAL GROUNDS

GAS PLANT

MAIN BUILDING
(ORIGINAL BUILDING)



RESERVOIR

GAS PLANTS

TO MOBILE PLANTS

AVENUE

BARCELONA

PARKING

PARKING

PARKING

GAZON

MAN BLDG. NORTH

MAN BLDG. SOUTH

EMPLOYEE RESTROOMS

MAN BLDG. SOUTH

MAN BLDG. NORTH
MAN BLDG. SOUTH
EMPLOYEE RESTROOMS
GAZON
PARKING

CENTRAL AVENUE - TO MOBILE PLANTS & DRIVE 302

PARKING

BASEBALL

TENNIS

EMPLOYEE RESTROOMS

RES. 4

RES. 5

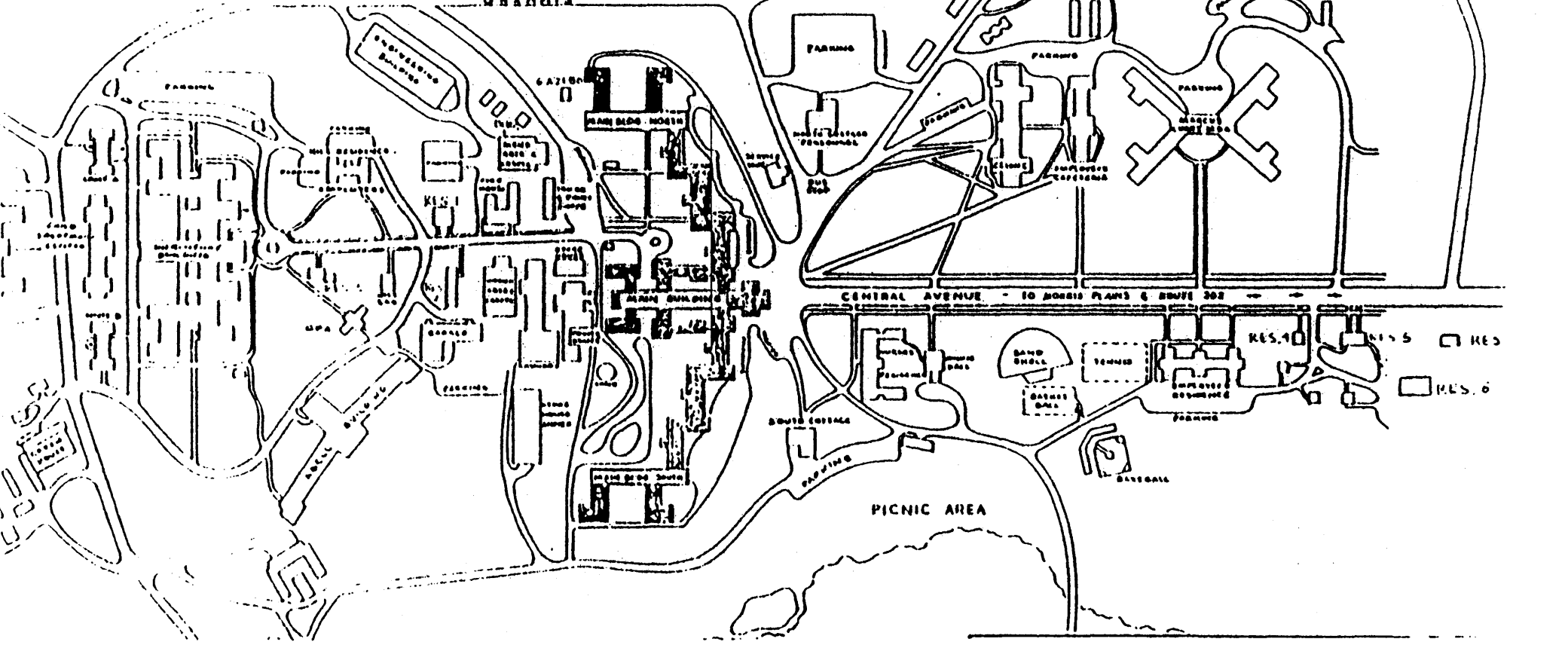
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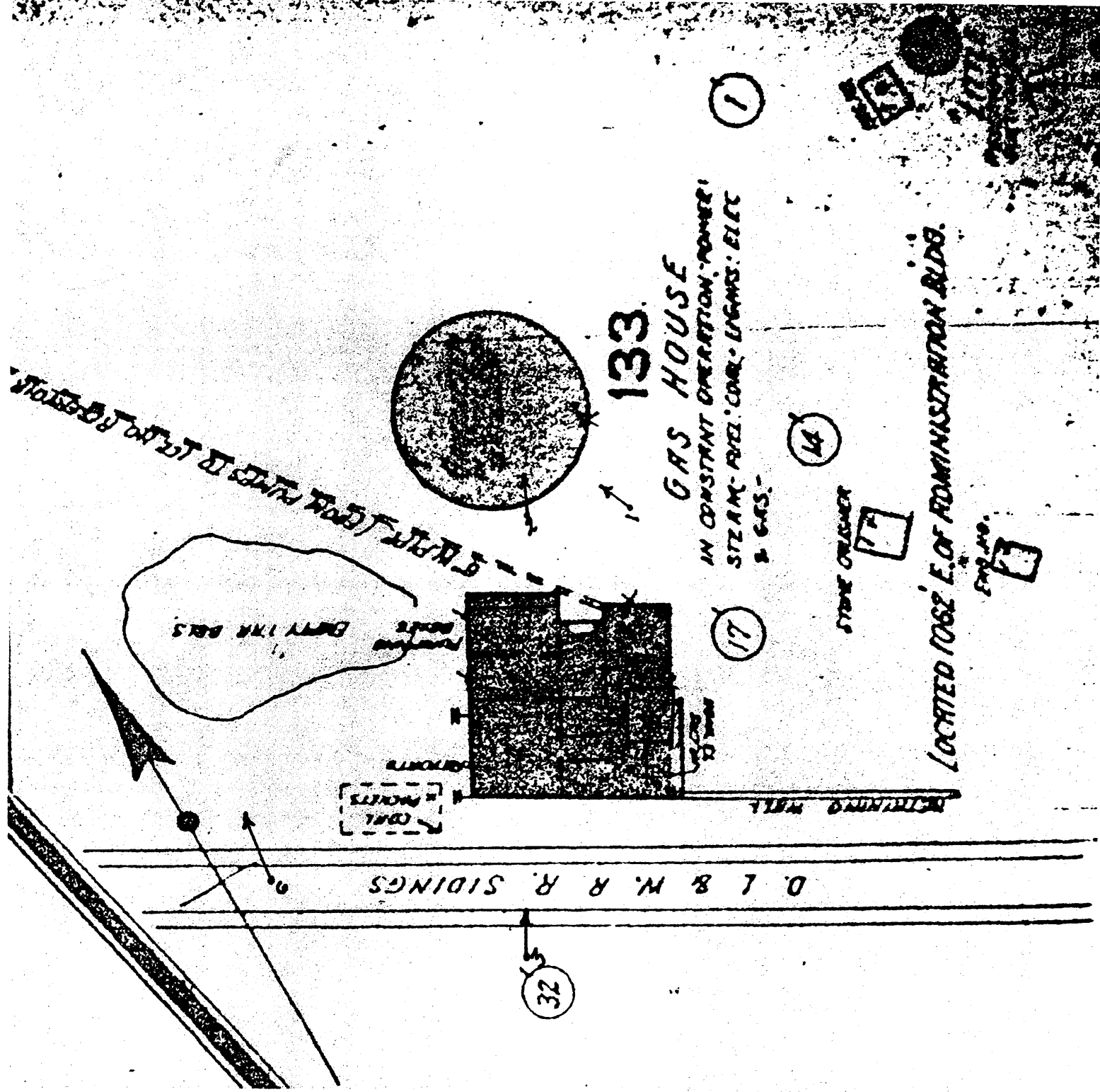
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PARKING

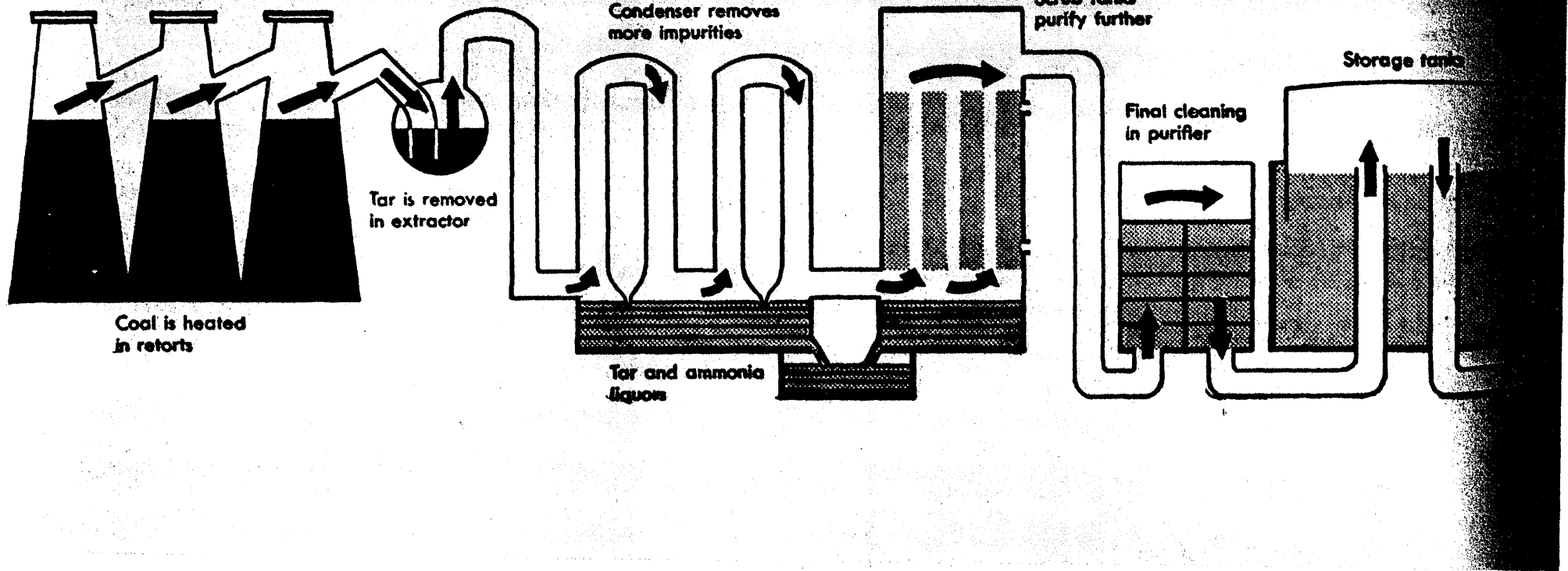
PICNIC AREA

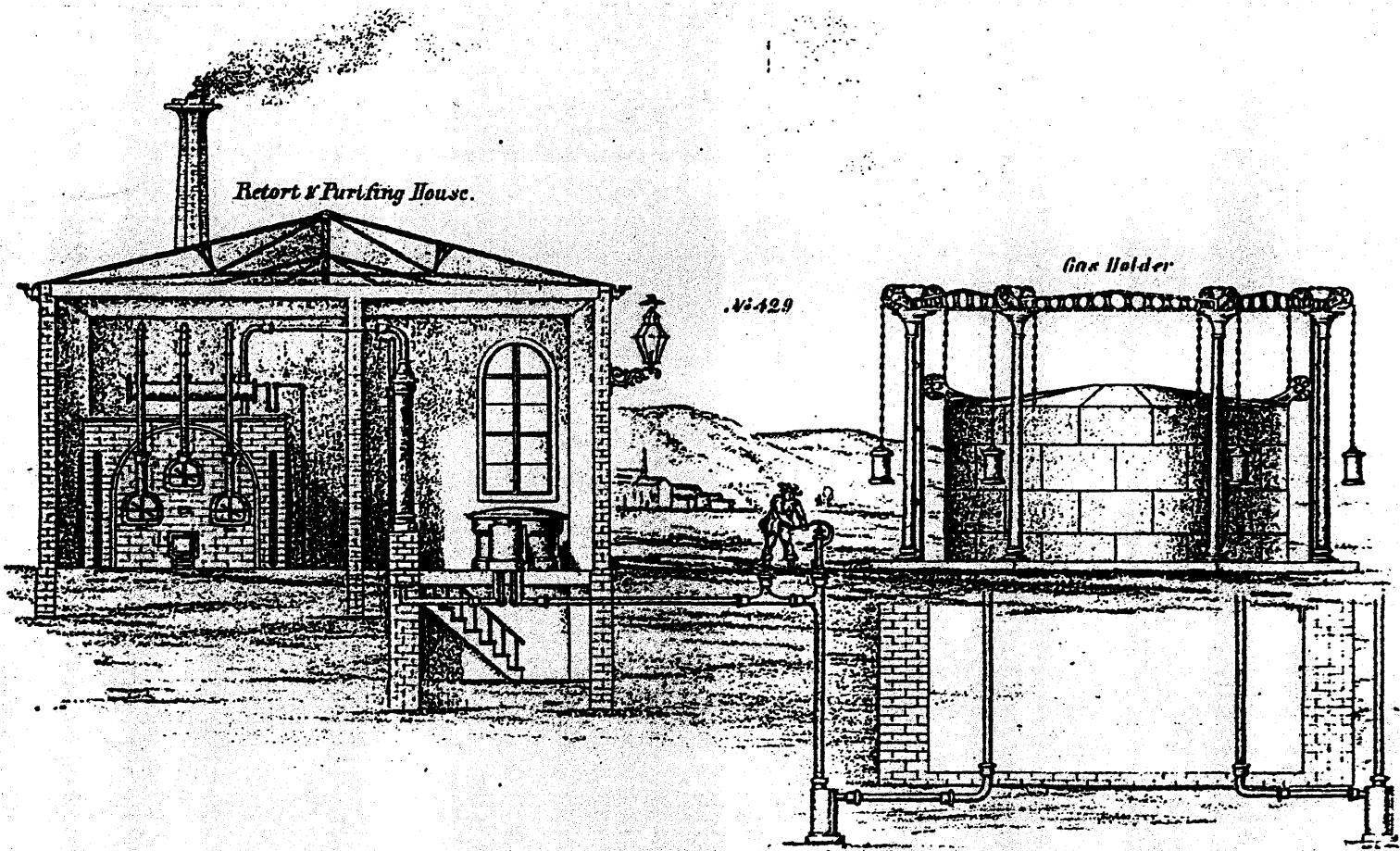
BASEBALL





HOW COAL GAS IS MADE

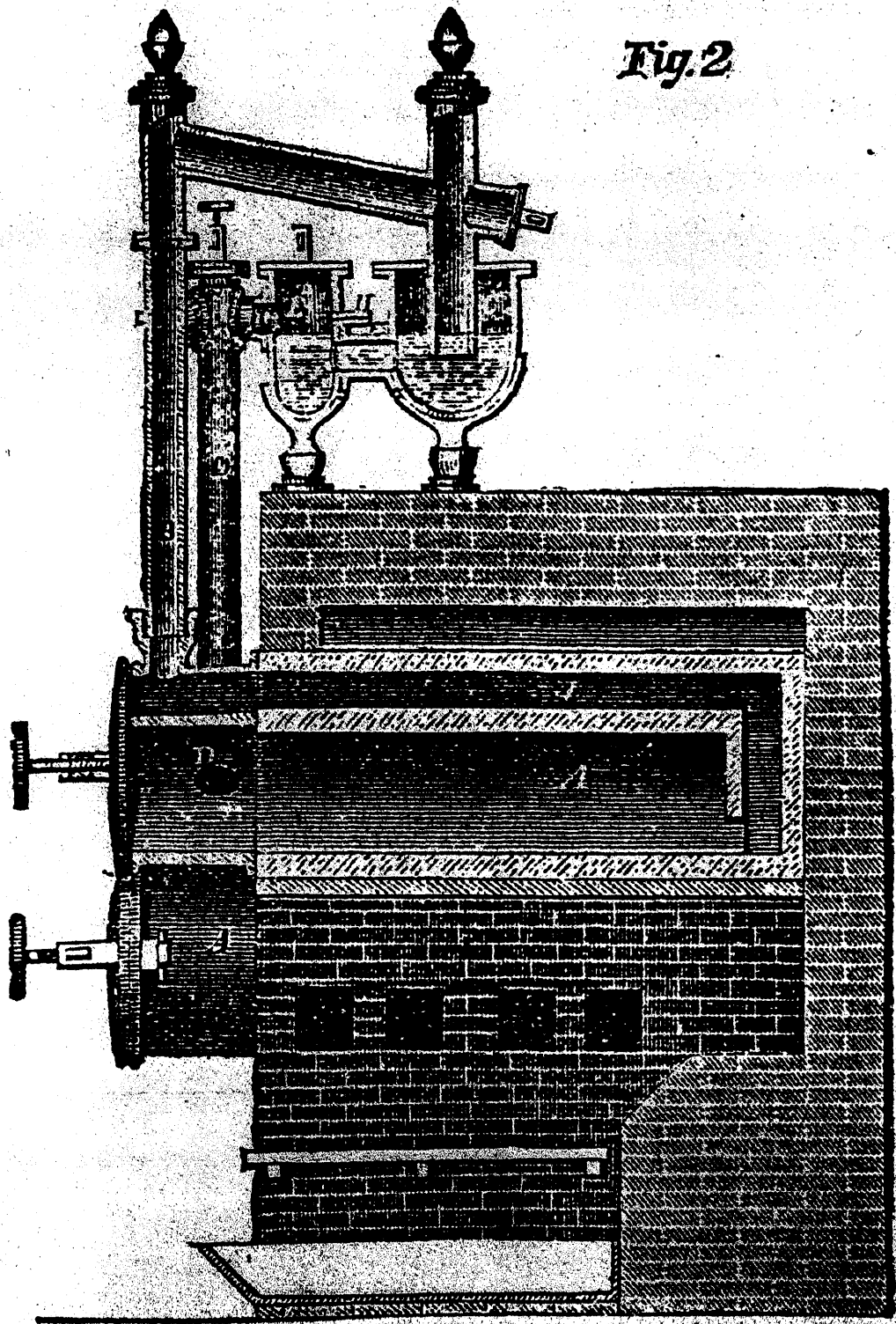




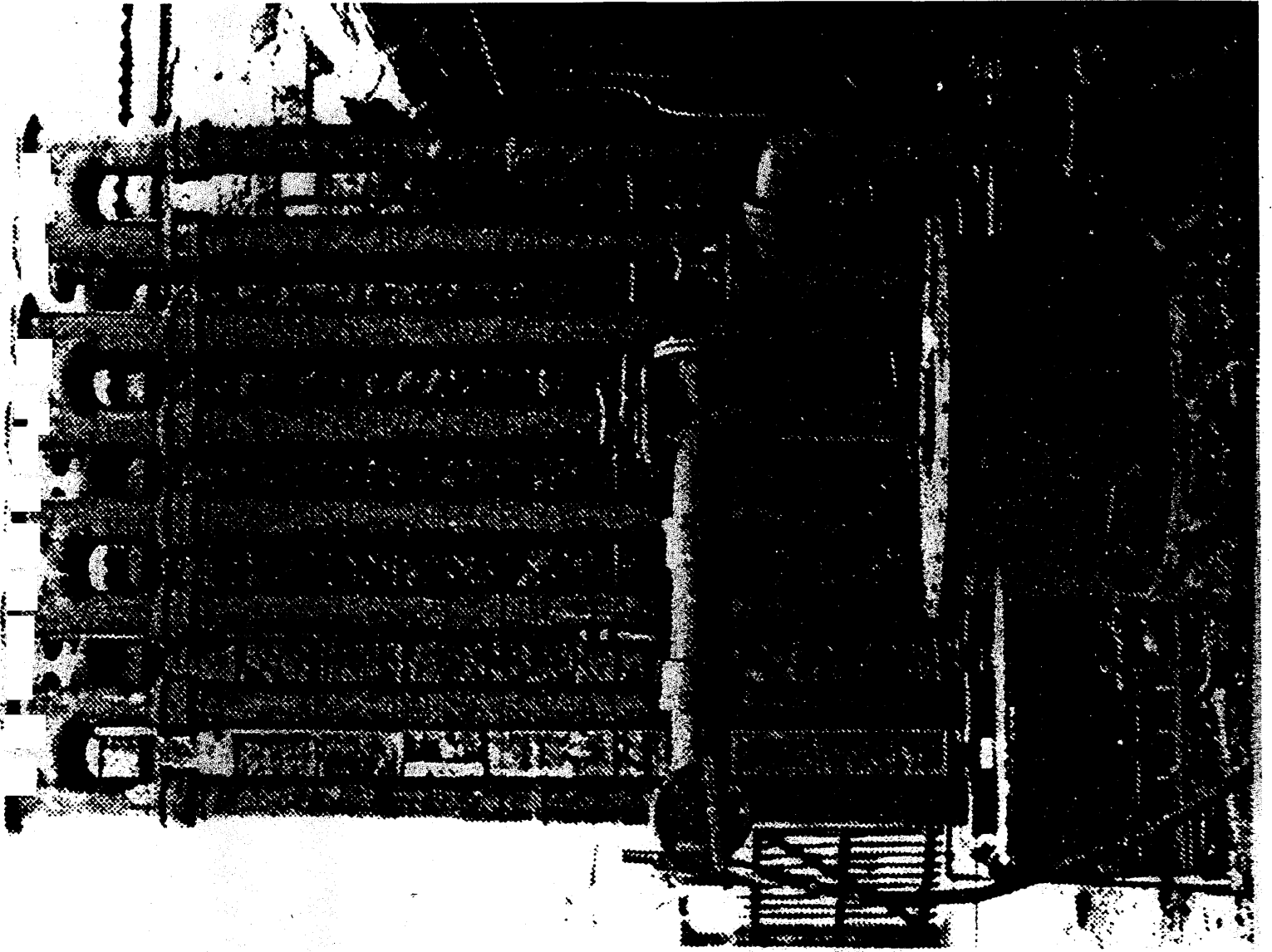
Coal Gas Works - One Bench.

MORRIS & TARKER
1871

Fig. 2



Report
GAS LIGHT JOURNAL
1870

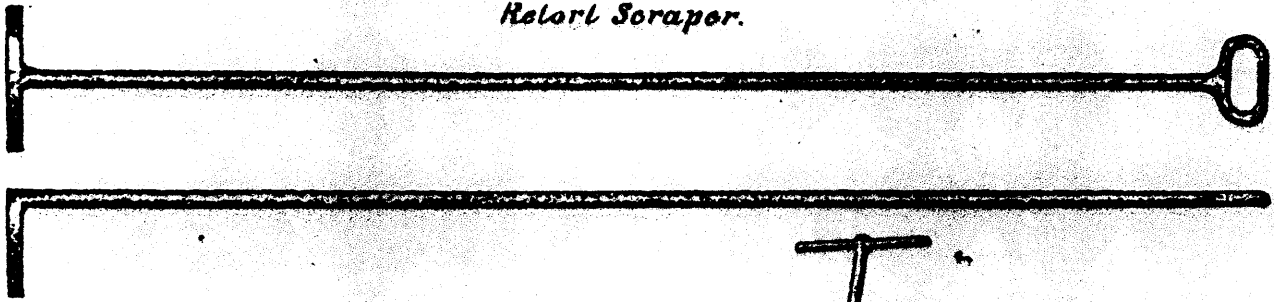


CONDENSER
BIGGAR GAS WORKS

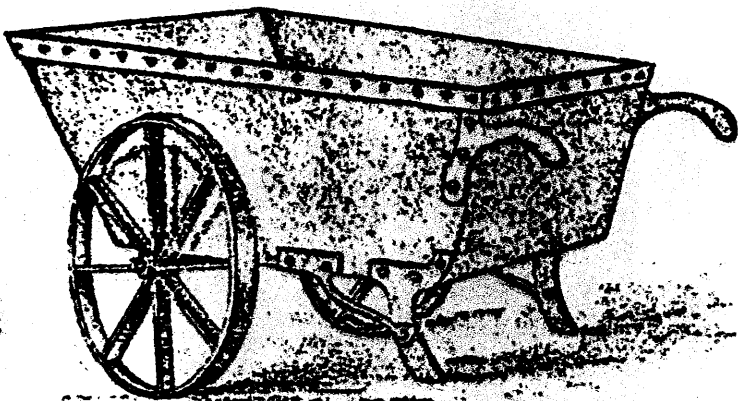


RETORT ROOM
BIGGAR Gas Works

31488.
Roller Scraper.

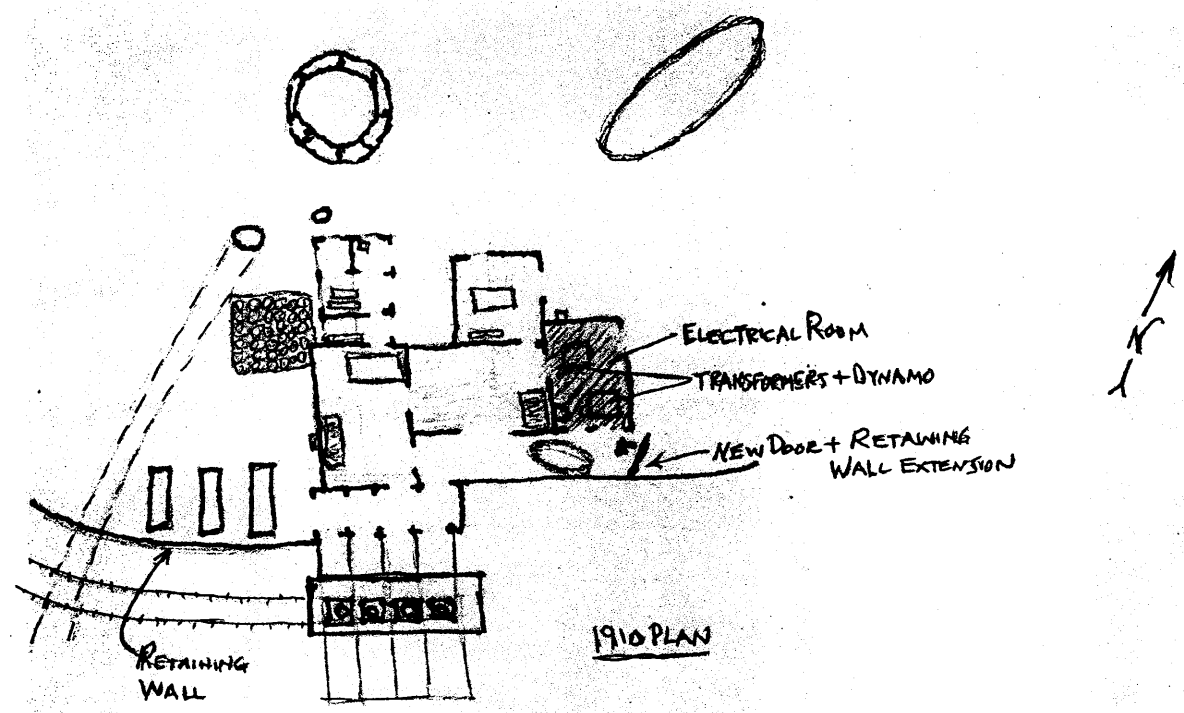
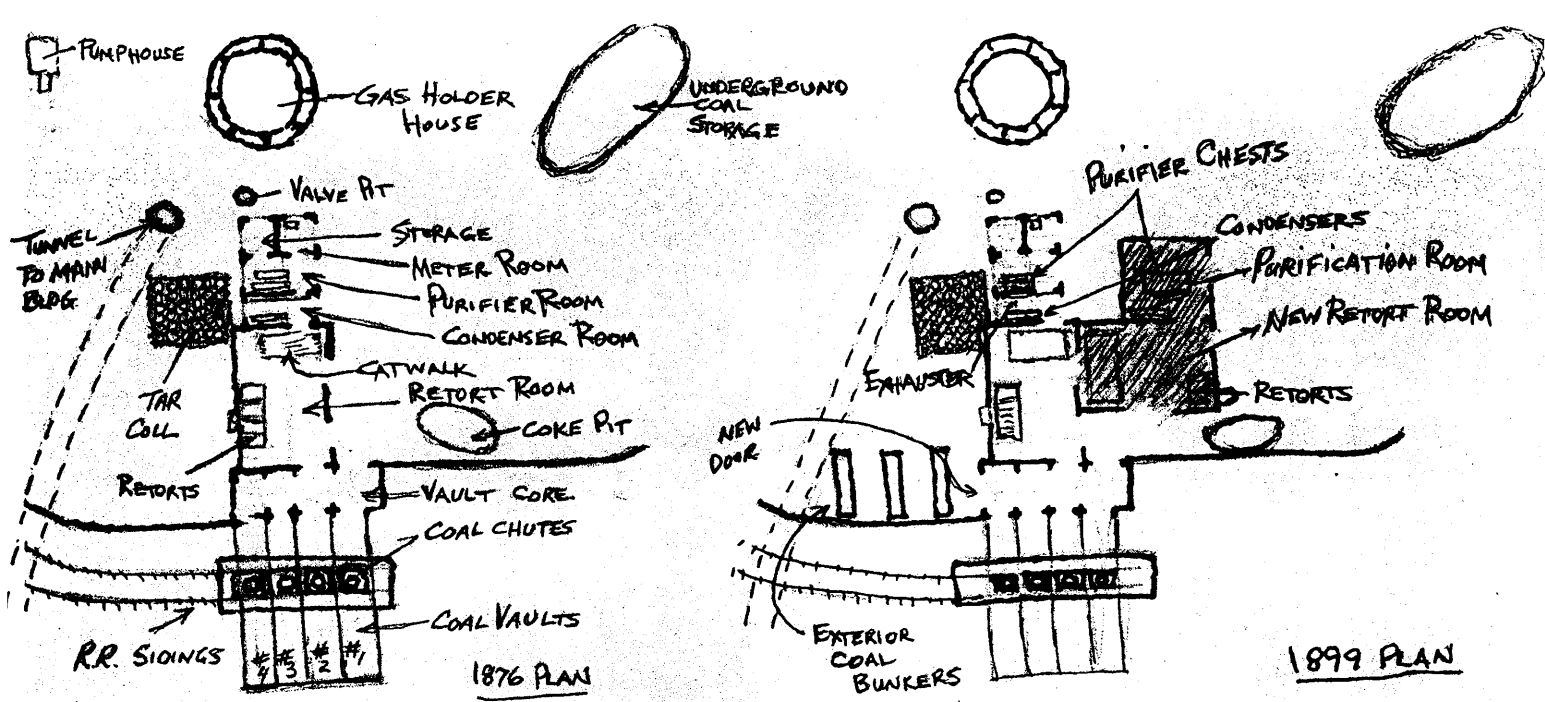


31490.
Coke Barrow.



31491.
Coal Barrow.





THE ILLUMINATION GAS PLANT OF
 THE NEW JERSEY STATE ASYLUM FOR THE
 INSANE AT MORRIS PLAINS
 MORRIS COUNTY, N. J.

SITE PLAN EVOLUTION 1876-1910

■ ADDITIONS