NPS Form 10-900
(Rev. 8-86)

OMB No. 1024-0018

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United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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JUL 2 8 1995
JAN 16 1996
HISTORIC PRESERVATION OFFICE
INTERAGENCY RESOURCES DIVISION
NATIONAL PARK SERVICE

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Edison Storage Battery Company Building
other names/site number

2. Location

street & number 177 Main Street NA ☐ not for publication
city, town West Orange ☐ vicinity
state NJ code 034 county Essex code 013 zip code 07052

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property		
		Contributing	Noncontributing	
☒ private	☒ building(s)	4	0	buildings
☐ public-local	☐ district	0	0	sites
☐ public-State	☐ site	0	0	structures
☐ public-Federal	☐ structure	0	0	objects
	☐ object	4	0	Total

Name of related multiple property listing: N/A

Number of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, 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. ☐ See continuation sheet.

Signature of certifying official — Date 12/8/95

Assistant Commissioner for Natural & Historic Resources/DSHPO
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

☒ entered in the National Register. ☐ See continuation sheet. — Patrick Andrus — 2/28/96
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
Industry: manufacturing facility	Industry/Manufacturing Commerce/Trade: Specialty Stores

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)
Late 19th and early 20th Century American Movements: Modern Utilitarian	foundation Concrete walls Concrete, Brick Metal: iron, Glass roof Concrete, asphalt other

Describe present and historic physical appearance.

SITE DESCRIPTION

The Edison Storage Battery complex is located on a single block in the town of West Orange in Essex County, New Jersey. The site, which is bordered by Main Street (formerly Valley Road), Lakeside Avenue, Ashland Avenue, and Charles Street, contains four significant buildings, the reinforced concrete factory buildings of the Edison Storage Battery Company. These factory buildings are the last surviving structures of Thomas Edison's industrial complex, which was a prominent presence in West Orange from the 1880s through the first third of this century. The factory buildings are across Lakeside Avenue from the Edison Laboratories, now owned by the National Park Service and open to the public as part of the Edison National Nistoric Site.

The four looming, pinkish-tan, reinforced concrete factory buildings in West Orange are a monument to the development of industry in the United States at the turn of the century and to the activities of Thomas Alva Edison (1847-1931), America's best-known inventor. Out of the dozens of edifices which comprised Edison's West Orange "empire," only this group of his factory buildings remains, complementing the well-preserved labs (now owned by the National Park Service) on an adjacent site. (Photo 1)

These factory buildings are of utilitarian in nature, made of unadorned, reinforced concrete, with column and beam construction. The lack of ornamentation reinforces the mass and solidity of the buildings. With the longest facade stretching 635 feet, the enormous structures are given rhythm by the columns which rise at 14' 11" intervals. These columns, which are

[X] See continuation sheet

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
[X] nationally [ ] statewide [ ] locally

Applicable National Register Criteria [X] A [X] B [X] C [ ] D

Criteria Considerations (Exceptions) [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G N/A

Areas of Significance (enter categories from instructions)
Architecture
Engineering
Industry

Period of Significance
1909-1931

Significant Dates

Cultural Affiliation
N/A

Significant Person
Edison, Thomas Alva

Architect/Builder
Unknown

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

SIGNIFICANCE

The Edison Storage Battery Company buildings are significant as the last surviving factory buildings of Thomas Alva Edison's empire in West Orange, New Jersey. This complex of buildings was the primary site for production of one of Edison's most important inventions, the storage battery. It is also a significant example of reinforced concrete construction of the period.

The factory complex is eligible for listing on the National Register of Historic Places by satisfying the following categories:

Criterion B: Person

The buildings "are associated with the lives of persons significant in the past." In this case, they represent one aspect of the numerous West Orange, New Jersey operations of Thomas Alva Edison, one of the best known of American inventors.

Criterion C: Design Construction

The buildings "embody the distinctive characteristics of a type, period, or method of construction" for being early examples of reinforced concrete construction for an industrial use.

All structures included in the proposed historic site were completed by 1915, thus they are over fifty years of age and eligible for designation on the National Register of Historic Places. The structures retain their architectural integrity and their industrial use.

[X] See continuation sheet

9. Major Bibliographical References

See Attached

☒ See continuation sheet

Previous documentation on file (NPS): N/A

- ☐ 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 # _____

Primary location of additional data:

- ☐ State historic preservation office
- ☐ Other State agency
- ☒ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Specify repository:

Edison National Historic Site
West Orange, New Jersey

10. Geographical Data

Acreage of property 4.4 Acres Orange Quad

UTM References

	Zone	Easting	Northing
A	18	561520	4514680
B			
C			
D			

☐ See continuation sheet

Verbal Boundary Description

☒ See continuation sheet

Boundary Justification

☒ See continuation sheet

11. Form Prepared By

name/title Janet W. Foster
organization Acroterion date 26 June 1995
street & number 382 Springfield Avenue telephone (908) 273-2964
city or town Summit state NJ zip code 07901

chamfered on the corners so as to protect them from weathering, rise straight past the upper floor to form the parapet crowning the building, which is topped with square caps. On the three-bayed ends of the structures, the parapet of the middle bay is raised higher than the side bays to create a stepped roof line. The roofs, hidden behind the parapets, are sloped to form a very shallow gable, and are covered with a bituminous coating.

The recessed wall area between the columns consists of the edge of the floor slab, spandrel, and sill, all in cast-in-place concrete. The lower edge of the floor slab doubles as the lintel above the window. The original double hung and pivoted awning windows (photo 7) are extant on a majority of the window openings facing Ashland Avenue.

The style of windows varies from structure to structure. Most typical are the double hung and awning types, which are constructed with metal frames, and are usually installed in groups of three. Some of the original windows have been replaced with new sash configurations or glass blocks, while others have been closed off with solid masonry units such as bricks or concrete blocks. (Photo 8) Utilitarian doors have been added in some of the facades to provide access to businesses within. (Photo 10)

The factory buildings are made up of expansive spaces on several floors[1] and the regularly spaced columns are the only elements in the wide open interiors. (Photo 13) The beams which run beneath the ceilings of upper floors have been pierced to provide access for piping and electrical conduits. A high pressure steam system which supplied power for the manufacturing operations ran throughout the buildings and the factories ran on direct current electricity which was carried in overhead wires. Edison always preferred direct current over the more popular alternating current, and the Storage Battery Buildings still have elevators and lighting running off the original direct current system.

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[1] See the floor plans in the appendix. They show space use as of 1915, when the buildings were new. Information was derived from numerous blueprints cataloged at the Edison National Historic Site Archives.

Most of the staircases and elevators are located in circulation cores attached to the sides of buildings as towers, or in corners of rooms. There are heavy fire doors at connection points such as bridges and staircases. Seven elevators serve the complex of four buildings; one elevator in the lobby of Building 130 is for transporting passengers and the others are for freight. The latter are accessible from both sides, from the exterior on the first floors and from the interior on the upper floors to allow delivery of items for manufacturing into the building and also for shipping out the finished products.

MATERIAL

All of the extant factory buildings are constructed of poured-in-place reinforced concrete of a distinctive pinkish-tan color, which becomes even more pronounced when the material is wet. Close observation reveals the composition of the matrix to be whitish gray Portland cement and reddish colored particles. The concrete also contains reddish brown, white, black, and gray aggregate. The widely varying sizes of stones incorporated into the mix also adds to its distinctive appearance. The reddish brown pieces are probably local brownstone, quarried in the vicinity of the West Orange factory complex. Around the turn of the century, several brownstone quarries were active along nearby Eagle Rock Avenue.[2] At Edison's storage battery complex, the quality of the aggregate varied slightly from building to building, an occurrence that was due to the length of construction, which spread over four years.

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[2] Williams, Samuel Crane. Historical Sketch of the Growth and Development of the Towns of West Orange. (75th Anniversary, 1937), West Orange, New Jersey, 1937. Use of brownstone gravel in a concrete mix was not uncommon in areas where such stone was native. Concrete mixed with a brownstone aggregate is evident in the factory building for F. Berg & Company, constructed in 1907, in nearby South Orange. Also, concrete pavement from the first quarter of the 20th century in nearby towns such as Summit were finished using the same material.

The concrete used for the Phonograph Works which stood across Lakeside Avenue from the Storage Battery Company buildings consisted of a 1-2-4 mixture of Edison Portland cement, local sand, and a coarse aggregate of crushed granite and other minerals.[3] Here, the local sand was noted as contributing to the building's characteristic color. The mixture for the Storage Battery Company is undocumented, but it may be assumed that the concrete for the storage battery complex was prepared using the same method as for the phonograph facilities.

Presently, many of the exposed concrete surfaces show severe weathering. Spalling and pop-outs are common failures which can be readily detected as one surveys the factory block. In comparing historic floor plans with a visual analysis of the site, it was observed that specific areas, most notably the "lean to" [4] on Building 137, were experiencing excessive concrete deterioration. It was noted that in areas where chemicals had been used, their leakage or splashing often penetrated the concrete, resulting in extreme damage. The most severe disintegration of the concrete walls, resulting in exposed reinforcement bars and inner concrete surfaces, is focused on the sill of the third floor of the "lean to." Historic records show that the great vats of acid and other chemicals utilized in the flake plating process were stored over this area, on the roof of the four story "lean to."

CONSTRUCTION

Construction of the Storage Battery Company buildings commenced in 1909 and continued through 1914. Unfortunately, information about the design of these manufacturing structures has been lost. No architects were found to be connected to this operation, and based on the straightforward, practical

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[3] National Fire Protection Association and National Board of Fire Underwriters. Report on Fire: The Edison Phonograph Works, Thomas Edison Inc. West Orange, N.J., December 9, 1914. West Orange: National Fire Protection Association and National Board of Fire Underwriters, Jan. 1915.

[4] The term "lean to" is used in early documents by the Edison Company to describe the four-story projection on the side of the six-story building.

"style" of the buildings, Edison's in-house engineering department was most likely responsible for their planning and design. The contractors are given as "various" in Edison Portland Cement Company's promotional publication which lists numerous works executed using their product. The only record located pertaining to construction of the Storage Battery Company is a record of the special meeting of the Board of Trusteēs of the Edison Storage Battery Company, which was held in December 1912 to authorize the construction of new buildings and the installation of additional machinery. (This was a mere formality, however, for by this time, construction had already begun.)

Though no written records are available, construction is documented in a remarkable series of black and white photographs, taken weekly from the roof top of the Edison Phonograph Works on the adjacent block across Lakeside Avenue, exist. These photos, now in the Edison National Historic Site Archives, provide vivid images of the labor intensive procedures required by this grand scale operation. (Photo 19, 20, 21, 22, 23)

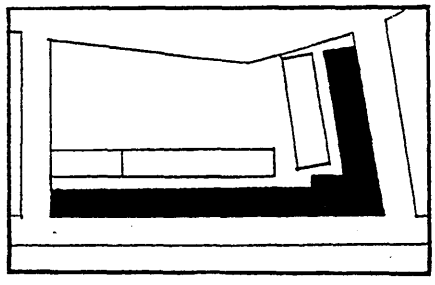
The first photographs were taken in the fall of 1911 and the record continues through most of the following year. They capture the events from ground breaking to the installation of windows for the two factory structures, the eastern wing of Building 130 and Building 137 with its "lean to." Though no specific construction dates are available, the four story structure, Building 135, at the western end of the block apparently did not exist in early 1912, as it does not appear in a dated photograph from that time. In the later photographs, it appears completed. Therefore, it was constructed during 1912 and 1913, while the other two, more closely documented structures, were going up.

The photographs give a clear picture of the construction sequence. Horses pulled mountains of wood and other materials by wagon onto the site. First, a wooden form was built to create the cast into which concrete was poured. Then, reinforcing bars were placed in these molds for columns and floor slabs. The floor slab was poured into place first, then the columns rising up to the next floor were constructed. This was repeated for every floor. A tall scaffolded tower with a pulley at the top can be seen in the photographs, which was used to hoist buckets of concrete up to the higher floors.

The forms were removed as the concrete cured and the buildings took shape. At this point, however, the structures consisted of only floors and columns. Wood frames for spandrels were formed and poured separately, then the sills were individually fabricated in place. The structure was given a finishing touch with the installation of metal frame windows.

The buildings are still in industrial use. Twenty-five small manufacturing and retailing businesses occupy space throughout the complex. The solid concrete construction means that the noise and vibration of the huge machines of the metal-stamping business on one floor are unnoticed on another floor. Forklifts run along a factory floor, with no effect on the customers in a retail shop below. The straightforward, functional buildings created for Edison's manufacturing empire at the dawn of the 20th century still carry out their intended function at the close of the century, a century thoroughly stamped with the products of Edison's genius.

a. **Building No. 130**
Storage Battery
Manufacturing Plant
(Photos 2,3,6,7,9,10,11,12,
13,14,15,19,20,21,22,24)



Building 130 was constructed of reinforced concrete in two phases. The first, (now known as building 130A) was completed in 1909. It is a four story building. The second phase (now known as building 130B) was executed between 1911 and 1912 as a six-story wing. Doubled columns can be seen along the connecting line of the two construction phases. The completed L-shaped building extends 635 feet along Ashland Avenue, turns the corner at Lakeside Avenue and continues for 320 feet to Main Street. Looming directly across the street from the Edison Laboratories, the Battery Building fills the whole block length on Ashland and Lakeside Avenues all the way to the lot line.

On the Ashland Avenue side at the thirteenth bay from the corner of Ashland and Lakeside Avenues there is a drive-through. Tracks connecting to the railroad system were brought onto the factory grounds for delivery of materials for manufacturing and for shipping of products. Today, six additional bays have been opened for vehicular entry into the complex. The railroad tracks are still partially visible inside the original delivery bay, although they have been removed from the grounds.

As constructed, a circulation tower protruded from the west side of Building 130, containing an elevator, a staircase, and toilet facilities. In later years this was transformed into a hyphen connecting the adjacent building (Number 137 nickel flake manufacturing plant) to Building 130. There is also another circulation core near the northern end of the building. The northern half of the narrow yard between Buildings 130 and 137 has been walled in with concrete blocks to create extra interior space for storage and manufacturing. Also, on floors above the first level, narrow bridges provide access between the buildings. During the middle of this century an elevator tower was added to the south side of the building using different colored concrete which makes the

addition conspicuous. (This addition is not shown on the floor plans.)

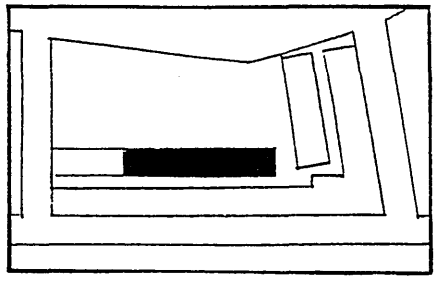
The main entrance of the factory complex is located at the northern end of this structure facing Main Street.[5] At the entrance, the middle bay of the first floor is distinguished from the rest of the building with the application of a simplified Classical portal also constructed of concrete. The door frame is accented by three blocks, reminiscent of elements composing an entablature and architrave of the Classical style.

A low wall separates the staircase to the main entrance from the sidewalk. In place of a railing is a parapet designed in the same manner as the three-bayed ends of the factory buildings, with the middle bay rising slightly higher than the side bays. The spandrels beneath the windows to the sides of the entrance are accented by cast-in-place concrete panels. These are the only decorative elements in the entire structure.

Judging from the discreet appearance of the entrance, it is no surprise that there is no grand lobby inside. In its place is a small hall with an elevator which carries the visitor to all floors of the factory; the factory spaces begin right behind this modest lobby. The floor of the lobby is covered with mosaic terrazzo tiles with the inscription "EDISON" embedded in the tiles in front of the entrance. The original switchboard system from Gamewell Company of New York, though no longer used, still exists in a cabinet by the entrance.

[5] Because Lakeside Avenue slopes up toward Main Street from Ashland Avenue, the lobby entrance is actually located on the second level of the structure.

b. **Building No. 132**
Part plating plant
(Photos 3,9,10)

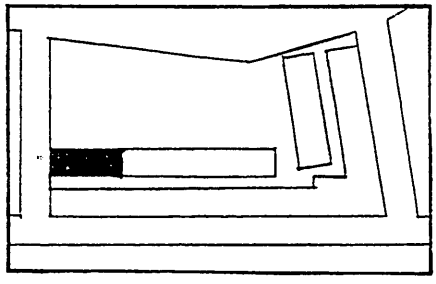


Construction on this, one of the first structures on the block, was begun around 1909. It is a one-story, steel frame and reinforced concrete building with clerestory windows above a low gable roof. It is three bays wide by twenty-three bays long. The concrete post-and-beam construction system is clearly evident inside and outside the building, and concrete walls containing metal windows fill in the spaces between the columns.

Beams span the width of the building without intermittent supports to interrupt the working space. While the space originally extended up into the gable roof, false ceilings have been added inside to create flat ceilings. The original steel trusses supporting the roof are still visible in the far western section of the building. The clerestory windows which originally tipped open to allow natural light and air into the building have been covered from the outside with boards, paint, or large signs advertising the activities of the present tenants.

Although the original building was constructed with entrances on both ends, new openings have been created along the lengthy facade to provide access to the numerous commercial operations presently occupying the building.

c. **Building No. 135**
Storage Battery
Manufacturing Plant
(Photos 4,8,10,25)



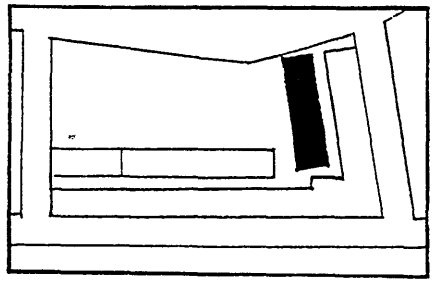
This four-story, reinforced concrete building, located to the west of Building 132, was completed sometime between 1912 and 1913. On the lower floors the interior beams exhibit closer center-to-center spacing, suggesting that in the original factory layout heavier than normal loads were to be carried on the first and second floors. The columns on the first floor are centered to create wide aisles for large machinery, while the columns on the upper floors correspond to the spacing of the exterior columns. In addition to overhead wires and pipes which run through holes in the beams, blowers for the original heating system, hung from the ceiling, are still extant in this building.

A freight elevator and a staircase create a circulation core at the southern end of the building. The freight elevator in this structure was different from the others, as it was equipped with a system which allowed the elevator to be called without requiring an operator in the cab. This unit retains the original wooden cab and frame, which was utilized to reduce sparking within the building.

Of the four structures on the site, this one has the greatest number of altered windows. Many have been replaced with glass blocks, particularly on the Charles Street side. Though much has been changed regarding entrances and windows, there still exists an original tongue-and-groove wooden door set in a cross-braced frame on the first floor of the south facade.

On the second floor, where the plating department was located, severe deterioration of the ceiling can be observed. This is due to the use of large quantities of potent chemicals required in the production of storage batteries.

d. **Building No. 137**
Nickel Flake
Manufacturing Plant
with "Lean-to"
(Photos 2, 23)



Building 137 was constructed during 1912-1913 at the same time that the addition was made to Building 130. The southern three bays are seven stories high creating the tallest tower in the factory complex. Here was the executive dining room, glazed on all sides, with views of the town of West Orange, and beyond, to Manhattan on a clear day. There is an elevator core and a staircase in this area which provides circulation for the building.

The "lean to" is separated from the main building by a glazed wall whose construction is similar to the exterior window arrangement of the complex. In fact, the interior wall of the main building facing the "lean to" is smooth, while the wall of the "lean to" facing the main building is broken off by columns which protrude out from the walls. Thus the "lean to " can be read as an exterior glazed corridor attachment. There is a difference in level between Building 137 and the adjacent Building 130. Therefore, there are steps at the "connector" where the two structures meet. Here, as in the other buildings, there are holes in the beams for overhead wiring and conduits.

Because this area was used to store chemicals for manufacturing batteries, extensive deterioration of concrete on the exterior can been seen.

THOMAS EDISON AND HIS FACTORIES

> "Wood will rot, stone will chip and crumble, bricks disintegrate, but a cement and iron structure is apparently indestructible. Look at some of the old Roman baths. They are still as solid as when they were built." Thomas Edison[1]

Thomas Edison (1847-1931) is perhaps best known for his development of the incandescent light bulb in 1879. But his real genius lay in turning technological advances into marketable products. His improvements and inventions affected all activities in society, from the automatic electric coffee maker and toaster on the breakfast table to the construction of bridges and highways.

Because Edison believed that innovations and efficient methods for distributing them went hand in hand, his products were manufactured at plants created specifically for each purpose. Laboratories for investigation of the products were located close to these factories so that research and production could be handled simultaneously thereby ensuring high quality and prompt delivery of merchandise.

From 1876 to 1881, Edison operated his first labs in Menlo Park, New Jersey, where he conducted his experiments with the incandescent lamp. In 1881 he moved his operations to New York, setting up his lab on Avenue B in Manhattan. The following year the Central Power Station was opened on Pearl Street in Manhattan which made electricity available commercially for the first time in history. Finally, in 1887, Thomas Alva Edison moved from bustling New York City to suburban West Orange, New Jersey. Here, established his laboratory, in time, the area would develop into Thomas Edison's "empire", with research and development facilities adjacent to the factories which produced many of his most famous inventions in marketable form.

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[1] Vanderbilt, Byron M. Thomas Edison, Chemist. Washington, D.C.: American Chemical Society, 1971: p 182.

In 1887, Edison purchased a residence within walking distance of his laboratory, in Llewellyn Park. This was one of America's earliest residential suburbs, developed by Llewellyn Haskell beginning in the 1850s. Edison's elaborately landscaped Queen Anne style mansion, "Glenmont," was on the hillside overlooking the center of the village of West Orange. Ironically, Llewellyn Park had been planned as a retreat from the urban, industrial world, a world which Edison brought to its front door. After purchasing a residence in West Orange, he purchased fourteen acres of land across Main Street from one of Llewellyn Park's original entrances, named Honeysuckle Avenue, as the site for a new laboratory.

Thomas Edison's choice was directed not by callous disregard for Llewellyn Park's suburban atmosphere, but because it offered the opportunity of a suitable home for his second wife, Mina, near a work site that was close to railroad connections to Newark and Manhattan. His laboratory buildings were designed by Henry Hudson Holly, the architect of "Glenmont", (although Holly was dismissed from the job before work was fully complete). In December 1887, six laboratory buildings, together with other related structures which formed the core of his enterprise, were opened for business. A decade after establishing the laboratory, Edison began to expand into commercial production on the site. Land for the Edison Phonograph Works was acquired adjacent to the laboratory property. Edison purchased adjacent lots in pieces until he eventually controlled four full city blocks.

By the turn of the century, Edison's research labs had become the largest "research and development" center in the country, employing over one hundred men. This lab and the adjoining factory complex became Edison's headquarters for directing numerous operations throughout the region. These enterprises included ore-milling, cement production, phonograph recording, motion picture production, and the manufacture of storage batteries.

THE STORAGE BATTERY

Edison's initial interest in the storage battery came from the need for supplying electricity for the electric lamp which he had invented in 1879. In the

same year Edison perfected the first practical and useful dynamo, and in 1880 he provided the electric motor, both of which were essential for the electric street truck. His idea was to provide all the components of a system including the central station, the motor, and the storage battery.

Edison had been interested in the creation of a storage battery since first establishing the lab because he was searching for an appropriate system for powering the phonograph. At this time the battery was still of the non-rechargeable type and the inventor was preoccupied with the idea of creating battery components that would not be consumed rapidly. He considered the conventional lead sulfuric acid type battery, which had appeared in 1882, to be inappropriate for widespread use. Its flaws included a short life and "fragile characteristics," in addition to the fact that it was extremely heavy.

Edison was convinced that electricity might become the predominant power source for appliances, particularly phonographs and kinetoscopes, if only a relatively cheap and reliable system could be established for delivering it to the public. Where electrical wires and connections were not practical, the storage battery would provide power, and Edison soon envisioned batteries moving the new vehicles that were becoming popular at the turn of the century.

The inventor's personal friendship with Henry Ford further reinforced his interest in the long-life battery, as part of the power system of the horseless carriage. Because vehicles powered by electricity could be stopped and started more easily than those powered by gasoline, in the 1910s the electric car came to be widely used for delivery trucks. Well established enterprises such as Tiffany and Altman's of New York City used cars with Edison's batteries. [2]

After closing his magnetic iron ore plant at Ogden, New Jersey in 1900; Edison started to work on the storage battery in earnest. In May 1901, Edison established a battery assembly plant at Glen Ridge, in an old brass rolling mill where he started full-scale production of the primary battery.

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[2] Carlson, W. Barnard. "Thomas Edison as a manager of research and development: The case of the alkaline storage battery, 1898 - 1915." IEEE Technology and Society Magazine (December 1988).

By 1902 Edison's determination to develop the perfect storage battery and surpass the conventional lead storage battery had been publicized.[3] His idea of using oxides of iron and nickel together with potash, a substance as "harmless as water" were already set. The new battery was to weigh one-third less per horse power than a typical lead storage battery.

To support Edison's battery plant in Glen Ridge, New Jersey, "The Works" at Silver Lake (Newark, New Jersey) was established for manufacturing high purity chemicals to insure the accuracy of the critical components of the battery. Production of the new storage battery was started in 1903, but soon, 14,000 Type E batteries had to be recalled due to design failure. The item was pulled from the market while Edison continued to tinker and experiment.

Early in his pursuit for the ideal battery, Edison told A.R.H. Beach of General Electric Company that, "I don't think Nature would be so unkind as to withhold the secret of a good storage battery if a real earnest hunt for it is made. I'm going to hunt."[4] It took more than 10,000 experiments to get any positive results for the new battery. All together, no less than 50,000 experiments were conducted before an acceptable result was achieved.

It was in 1908 that the first steel-alkaline storage battery to satisfy Edison's strict standards was ready to be placed on the market in its commercial form. In order to keep close watch over this new and improved product, and avoid embarrassment and financial failure, production was started at a new factory in West Orange in 1909. The battery was a success.

The Edison Storage Battery Company sold over one million dollars worth of

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[3] Baker, Ray Stannard. "Edison's Latest Marvel: The New Storage Battery." Windsor Magazine (November 1902).

[4] Meadowcroft, William. H. Edison and His Storage Battery. Orange, NJ: Edison Storage Battery Co., 1928: p 4.

batteries in 1910.[5]

By November 1910 the business was successfully re-established. The treasurer wrote to an inquirer, "You are undoubtedly aware of the unlimited field for a light reliable storage battery, such as we have, and we therefore think you will agree with us that the future looks exceedingly promising."[6]

As the business expanded, larger production facilities were required. A site across the street from Edison's lab was acquired for construction of the battery factory in 1909. The earliest production took place in a single-story concrete "shed" (Building 132). During 1911 to 1912, enlargement of the battery factory led to construction of a four-story concrete structure (Building 135). The largest factory buildings (# 130B and 137) were constructed on the strength of an order from Edison's friend, Henry Ford, for nearly four million dollars worth of batteries for a "new self starter" car.[7] Construction of the poured-in-place reinforced building was carried out from December 1912 to October 1913. By June 1913, the buildings were three-quarters finished and about one thousand cells were being manufactured daily.[8]

The Edison Storage Battery company did not neglect to promote their feature product in publications. On the cover of the September 1912 issue of the Edison Works Monthly: Facts(?) of Interest For The Employees [sic], an experimental residence in Llewellyn Park illuminated by Edison Storage Batteries paired with a dynamo was featured. The house was equipped with electrical appliances ubiquitous in the Modern era, but innovative then, such as

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[5] Carlson, W. Barnard. "Thomas Edison as a manager of research and development: The case of the alkaline storage battery, 1898 - 1915." IEEE Technology and Society Magazine (December 1988).

[6] General Correspondence, Vol. 3. (December 1, 1910), Edison National Historic Site Archives.

[7] Edison National Historic Site Archives, Letter to Mr. A. I. Clyer from Edison Storage Battery Company, December 27, 1912.

[8] General Correspondence vol. 3. Edison National Historic Site Archives (June 3, 1913).

a vacuum cleaner, a washing machine, wringer, irons, kitchen appliances, and a hot water system. In order to power the whole house, twenty-seven Type A-4 (150 ampere hour) storage cells, a four horse power gasoline engine, and a 1 1/3 kilowatt dynamo were employed.

Edison acquired the Lansden Electric Car Company of Newark so that his storage battery could be better promoted as a power source for cars. Much of Edison's financial success lay in this typical consolidation of product development, manufacture, and marketing into the same corporate empire. Edison also landed a government contract for the storage battery's use in submarines, to demonstrate their utility in powering ocean-going vessels. Since the 1880s, experiments on submarines using powerful electric motors had been carried out by John P. Holland, an inventor whose facilities were situated close to the West Orange complex. The technology was refined in the early twentieth century and was adopted by the navies of numerous countries, including the United States. Edison was commissioned to develop the technology for immediate wartime use and he soon entered a contract with the United States government. In 1915 the inventor was appointed president of the Naval Consulting Board, in which capacity he visited the Brooklyn Navy Yard and personally assisted in the execution of numerous experiments. Edison's storage battery, though expensive, proved to be light and reliable, and was adopted for use in the Navy's submarines. The idea was abandoned just before World War I, however, following an explosion in 1916 at the Navy Yard.

MANUFACTURING BATTERIES

The commercial production of Edison's nickel-iron alkaline storage batteries was described in detail in a booklet published in 1933, titled The Edison Nickel-Iron-Alkaline Storage Battery. The illustrated "trip through the factory" explained the innovative methods of producing the storage battery. The 150 ampere hour size battery, type A4, was one of the first products to be manufactured at the site. These were used in groups to power delivery trucks and passenger carrying vehicles. One of these batteries was a "cell" and this became the standard measurement for quantity of output from the factory.

By the 1930s, the factory was producing one million A4 equivalents per year, and thus was coined the name the "Million Cell Plant."

The storage battery operation required a great deal of space and utilized over four hundred thousand square feet spread over the floors of four large factory building. Practically all of the machines for manufacturing had to be invented by Edison and his staff, as many of the processes were original to this type of battery.

In the production of batteries, the first step was to make "plates" to hold the active chemicals of the battery. Rolled carbon steel was passed through two rollers and perforated. These plates were then finished by grinding with emery wheels and brushing off the remaining dust with automatic wire bristles. Next, they were nickel plated by being passed through various baths of chemicals and water of different temperatures. Lastly, the ribbons were annealed for stabilization. Both elements for the positive and the negative were formed into required shapes by machinery. The positive was made from nickel hydrate in perforated steel tubes; the negative was made from iron oxide in perforated steel pockets.

In Edison's storage batteries, nickel flakes were added to the nickel hydrate solution filling the positive to act as a conducting element much more efficient than using simple nickel hydrate. Nickel flake manufacturing was such a critical procedure that Building 137 was dedicated solely for that purpose. A series of automatic traveling cranes, carrying ten revolving copper cylinders, occupied full floors of the building. The cylinders were dipped into individual copper baths where a copper film was deposited onto their surfaces. They were then sprayed thoroughly with water and lowered into individual nickel baths for the creation of a film of nickel. This sequence of copper bath, water, and nickel bath was repeated under precise control for five hours until there were alternating layers of 125 films of copper and 125 films of nickel on the surface. The total thickness of these 250 layers was specified to be 0.0075 inches.

The sheet was removed from the cylinder and then cut into 1/16 square inch pieces. They were placed into a solution to dissolve the copper to acquire

4/100,000 inch thick nickel flakes. The flakes were then washed, spun to remove water, and dried over steam coils. Lastly, they were screened. The "snow-flakes" were then ready to be sent to the tube-loading machines. These flakes were described as being "so thin that when they are dried they will float in the air like thistledown." [9]

The tubes were filled using specially designed machines. Alternating layers of nickel hydrate and nickel flakes were funneled into the positive tubes. After each layer had been deposited, metal rods with a force of 2,000 pounds per square inch compressed the layers. This process was repeated about three-hundred times creating a compacted material in a tube only 4 1/2 inches high. The tubes were then reinforced with sheet steel rings. Thirty of these tubes were mounted onto a nickel-plated steel grid to create a plate. The negative pockets were filled with black iron oxide in a method similar to that of the positive pockets. Twenty-four of these tubes were placed onto another grid to form a plate.

For one Type A4 Edison Cell, four positive plates and five negative plates were necessary. These nine plates were layered alternating the positive and the negative with space between each layer. With other required elements attached, the assembled components were finally set into welded nickel-plated sheet steel containers and specially designed rubber pieces were inserted for insulation. After these were completed, the tops of the batteries were finally welded on, leaving openings on the tops for gases to escape. The completed products were tested before shipment to assure consistent product quality. The batteries were filled with potash, the active ingredient in the Edison Storage Battery. Six cycles of charge and discharge were repeated in order for the batteries to become fixed in the forming room. If they did not reach the company's standards in voltage or ampere-hour capacity, they were rejected. Lastly, a coat of paint or insulating compound was applied onto the body. The batteries were finally ready to be delivered to the public.

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[9] Pierson, David Lawrence. History of the Oranges to 1921: Reviewing the Rise, Development and Progress of an Influential Community, vol. 3. NY: Lewis Historical Publishing Co., 1922: p 32.

CONCRETE AS A BUILDING MATERIAL

Around the turn of the century, concrete began to gain popularity as the material of choice for construction. With the introduction of metal reinforcement, structures could span greater distances, thus creating larger spaces for the massive machines and continuous operations of 20th century industrial processes. In addition, concrete was considered fire-proof when compared to conventional brick buildings with floor joists and interior finishes of wood.

In 1867, Joseph Monnier, a French gardener, filed the first patent in the world for reinforced concrete.[10] In 1875, the first residence in reinforced concrete was constructed for W.E. Ward in Port Chester, New York even before Thaddeus Hyatt recorded the first patent for this concrete construction in the United States in 1878.

Ernest Ransome of San Francisco contributed immensely to the development of the Portland cement industry in this country with his innovations using cement together with metal reinforcement. In 1884 the Ransome system, which used twisted square bars made of iron or steel within a concrete mixture, was patented. Use of metal in this way prevented the reinforcement from sliding in the concrete and contributed increased strength and elasticity to the cast element.[11],[12] By the 1890s, the idea of using reinforced concrete in American buildings was being introduced through specialized publications addressing its beneficial characteristics.

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[10] Giedion, Sigfried. Space, Time and Architecture: The Growth of a New Tradition. (5th edition, revised.) Cambridge: Harvard University Press, 1967: p 325.

[11] "The Ransom system and its effects on Portland cement," Cement Age (Dec. 1906).

[12] Twisted reinforcement bars with square sections, very similar to those devised by Ransome, can be seen in areas where the concrete has been damaged at the Edison Storage Battery Company buildings.

The first large scale application of reinforced concrete based on Ransome's ideas for factory and mill construction was at the Pacific Coast Borax Company in Bayonne, New Jersey, completed in 1898. The first of their structures was built in 1897, and although this adopted reinforced concrete as construction material, the surface was grooved to replicate masonry work. The second phase, completed by Ransome in 1902, set the form for the typical American factory of the first half of the 20th century, with exposed concrete walls and wide expanses of glazing on all sides. The ornamentation was minimal. The earlier Ransome construction withstood a fire in 1902, proving the durability of the concrete. It stood until it was demolished in the 1960s.[13]

In spite of concrete's growing legitimacy as a building material at the end of the 19th century, domestically manufactured Portland cement was considered unreliable by a majority of engineers into the 1890s. Imported cement made concrete construction costly. The first manufacturer of Portland cement in the United States was David O. Saylor of Lehigh Valley, Pennsylvania. He acquired a patent for the manufacturing process in 1871 and began commercial production shortly after. Even as American-produced cement improved, this key component of concrete continued to be imported from England because local production could not keep up with the high demand for the "new" material at that time. It was not until 1897 that more than one half of Portland cement consumed in the United States was actually made in this country.

THE PORTLAND CEMENT INDUSTRY AND REINFORCED CONCRETE STRUCTURES

Edison's involvement in the Portland cement industry was the only field in which he entered an already existing market. The Edison Portland Cement Company was established in June 1899 at New Village, New Jersey, a location

[13] Banham, Reyner. A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture. Cambridge, MA and London: MIT Press, 1989: p 72.

in close proximity to a deposit of naturally occurring cement, at Lehigh Valley, Pennsylvania. Construction of the mechanized plant for manufacturing cement was begun that year and ready for operation in 1902. Edison adapted the skills and equipment acquired through his failed iron ore concentration project to produce Portland cement.

In New Jersey and Pennsylvania, Portland cement was made from a mixture of two or more substances; typical combinations were limestone and clay, shale and limestone, or clay and chalk. From 1890 to 1900, nearly three-quarters of domestically manufactured Portland cement came from this district while the market was still shared among English and American cement manufacturers.

Though the Portland cement industry itself was not founded by Edison, he did not refrain from improving machines for its manufacture. Grinding the raw materials and burning them in a kiln were crucial steps in production. A vertical kiln, later followed by a rotary kiln, had been the conventional facilities used. However, neither satisfied Edison. In 1899, Edison's cement operation made an announcement proclaiming that it "proposes to burn cement in a gigantic rotary kiln 110 feet in length and 10 feet in diameter."[14] This innovation increased production four hundred percent over conventional methods, and the rotary kiln is still the industry standard

In 1909, Thomas Edison filed a patent for kilns 150 feet or longer. Eventually, 125 foot long kilns became the standard in the United States, a size more than double the typical kiln in use before Edison's entry into the Portland cement business. In addition to the kiln, Edison devised the steam shovel for transporting large heavy rocks and a well-drill for drilling. His grinding process could pulverize cement to the finest powder and mix ingredients precisely.

Increased availability of cement and reliability of reinforcing techniques unleashed a great outpouring of information on concrete building in the first

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[14] Edison Portland Cement Company. The Romance of Cement. Providence, NY, Boston: Livermore & Knight Co., 1926: p 20.

decade of the twentieth century. Cement industries were enthusiastic in promotion, providing practical information through the media. Numerous articles appeared in engineering periodicals on applications of the "new" material, concrete. In many cases, whole issues were dedicated to surveys of actual construction sites, explaining in detail the design processes and merits of using reinforced concrete. The material was praised for its characteristics for fire-proofing, durability, suppressing vibration, carrying loads, and spanning long distances. These qualities enabled large interior spaces, sound proofing, sanitary conditions, and low-cost construction, all of which were necessary in industrial buildings. Illustrated examples ranged from water towers, garages, printing houses and ice cream factories to long span bridges and stadiums.

A pamphlet titled The Romance of Cement was published by the Edison Portland Cement Company in 1926 to inform the public about the history of cement, back to the time of Vitruvius, and explained the numerous merits of using the material as well. This publication boldly announced, "Take away concrete and America would live in ruins." There are numerous examples, mostly in the Northeast region, of use of the company's product ranging from the Massachusetts State House in Boston to Yankee Stadium in New York City. Edison Portland Cement Company covered shipping territories "between Maine and Virginia, Cape Cod and Pittsburgh."

The company literature promoted the use of cement in industrial structures for its ability to withstand fire and claimed that its durability would assure that "saving from insurance and maintenance alone are sufficient to warrant their erection over and above any higher initial cost." It also announced that, "From 10 to 15% more may be spent on a building on this account, than for one whose service life is limited," thus promising that the structure would be economically advantageous.

Given the enthusiasm for concrete construction in the first decade of the 20th century, and Edison's entry into the field of cement production, it is no surprise that the factories constructed in West Orange after 1900 were all made of concrete. An extensive fire started in the Phonograph Works in December 1914, destroyed most of the brick buildings east of Lakeside Avenue, except Edison's brick laboratory, which was miraculously spared. The concrete

factories of the Phonograph Works were gutted, but the frames were still usable, and the buildings were able to be repaired. The fire never crossed Lakeside Avenue, and the recently completed Storage Battery Buildings served temporarily for several administrative departments displaced by the fire. The fire dramatically illustrated the value of reinforced concrete construction, and bolstered Edison's promotion of his cement product.

Concrete was at last featured as a distinctive material rather than a replacement for conventional masonry construction. Perhaps the most notable event of the time was the completion of Frank Lloyd Wright's Unity Temple in Oak Park, Illinois in 1906, which remains a ground breaking monument of Modern architecture, executed in concrete.

CONTEMPORARY EUROPEAN ARCHITECTURAL MOVEMENTS

Around this time, European architects began to give heed to industrial structures and factories in the United States as models for a new, non-historical architecture. Le Corbusier, in his Toward a New Architecture (1923) devoted pages to the works of American engineers. He wrote:

> Thus we have the American grain elevators and factories, the magnificent FIRST FRUITS of the new age. THE AMERICAN ENGINEERS OVERWHELM WITH THEIR CALCULATIONS OUR EXPIRING ARCHITECTURE.[15]

and suggested that these industrial works needed to be studied further by his European colleagues.

Le Corbusier was not the only architect with this insight. Hermann Muthesius in the Werkbund Jahrbuch for 1913 praised factory buildings in the "motherland of industry" for their "overwhelming monumental power."

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[15] Le Corbusier, Charles-Edouard. Frederick, Etchells, translator. Towards a New Architecture. NY: Dover, 1986 (reprint of 1931 edition): p 31.

Erich Mendelsohn in Amerika, his photographic essay on the United States completed in 1926, included numerous shots of grain elevators in Chicago and Buffalo along with canyons created by skyscrapers in New York City.

Even earlier in the twentieth century, Peter Behren's AEG factory had gone up in Berlin in 1908 and Walter Gropius and Adolf Meyer's Fagus Works was completed in Alfeld, Germany in 1913. Both of these designers were searching for new, appropriate styles for industrial architecture. The former created a Greek temple out of concrete and steel to house high-ceilinged spaces for machinery. The latter attached a fully glazed element, reminiscent of the Bauhaus headquarters in Dessau, on the major facade of the factory complex; this was designed to carry out a commission to create an "American style" factory in Europe. These well-known monuments of Modern architecture are contemporaries of the Edison factory complex at West Orange.

American industrial structures differed from the European version in that they had flat roofs. Before the appearance of American factory buildings, such facilities had been housed in traditional brick pier mill construction with gabled ends. After adopting concrete for slab and column construction, fire-proof factory structures became a ubiquitous form of construction throughout the United States from the early twentieth century. Perhaps the most significant factor was that this type of "daylight factory" construction let more natural light into the interior, maximizing efficiency for factory operation. These were massive edifices, made up of modular repetitive bays of engaged columns and glazing. They were stripped of ornamentation and the windows were unadorned. Cornices and moldings were reduced to mere strips of concrete highlighting the top edge of the building and concrete surfaces were left unfinished. These factories were the outcome of the no-frills efficiency required by rapid industrial growth at that time.

The Edison Storage Battery Company complex is a representative example of this style of architecture. In order to allow freedom of usage the spaces within were completed without partitions. Ample natural light from the wide windows on all elevations provided good illumination for

work, and was supplemented, of course, by Edison's own light bulbs. The structures were serviced by freight elevators which moved goods through the manufacturing processes. The introduction of railroad tracks onto the factory grounds provided easy access to the markets for acquiring supplies and for the shipment of goods.

IMPACT ON THE WEST ORANGE COMMUNITY

The town of West Orange was established on March 11, 1862 and named West Orange in 1863. There are two mountain ranges which run through the township like spines, both running from northeast to southwest, parallel to each other. The main road which ran through the valley was appropriately named Valley Road, now partly renamed Main Street.

Shoe making long remained a prominent industry in the area. This, however, was overshadowed in the 1840s by numerous hat manufacturers and by the late nineteenth century, West Orange had become on of the "leading hatting centers of the country."[16] As many as thirty-five firms and two-thousand workers relied on this industry at its peak.[17] These industries known as "Valley shops," forced the construction of rows of small houses on White and Beaver Streets and became the primary force in the early growth of the city.

By the time of Edison's arrival in 1887, an industrial center was extant along Valley Road, served by railroads of the Morris and Essex line which ran parallel to the roadway. But Edison established his laboratories and factories farther east than along Valley Road, in a part of town that

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[16] Williams, Samuel Crane. Historical Sketch of the Growth and Development of the Town of West Orange, New Jersey 1862-1937. (75th Anniversary March 7-13, 1937) West Orange: 1937: p 11.

[17] The Oranges and Their Leading Business Men. Newark: Mercantile Publishing Co., 1890: p 31.

had consisted mostly of grand estates.

At its peak, in the 1910s and '20s, the Edison Corporation complex consisted of dozens of structures for manufacturing and administration. Edison's operations at his labs and factories promoted the sudden growth of the city of West Orange at the turn of the century. Workers' housing was constructed by developers outside Edison's organization to accommodate the new work force. New housing, along with churches, stores, and trolley lines sprang to life in West Orange in response to the growth of the Edison industrial empire. It was recorded in 1937, after Edison's death, that, "One of the primary reasons behind the extension of the car line into West Orange was the growth of the Edison industries,"[18]

The development of Edison's industrial complex beginning in 1887 and continuing until the 1920s dramatically transformed West Orange. With the large factory complex, Edison became the area's most prominent employer, hiring 3,000 in 1900 and 8,000 in 1914. [19] By 1922, Edison's complex was quoted as "the largest establishment in the Oranges devoted to industrial pursuits."[20] In 1937, the town of West Orange noted a seventeen-fold growth of its population in the seventy-five years since the town's founding in 1862.[21]

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[18] Williams, Samuel Crane. Historical Sketch of the Growth and Development of the Town of West Orange, New Jersey 1862-1937. (75th Anniversary March 7 - 13, 1937) West Orange: 1937: p 17.

[19] Millard, Andre. Edison and the Business of Innovation. Baltimore and London: John Hopkins University Press, 1990: p 289.

[20] Pierson, David Lawrence. History of the Oranges to 1921: Reviewing the Rise, Development and Progress of an Influential Community, vol. 3. NY: Lewis Historical Publishing Co., 1922: p 643.

[21] Williams, Samuel Crane. Historical Sketch of the Growth and Development of the Town of West Orange, New Jersey 1862 - 1937. (75th Anniversary March 7 - 13, 1937) West Orange: 1937.

The factories brought large-scale employment opportunities to the community and attracted recent immigrants to the area. Employees including laboratory workers in the nineteenth century were predominantly from northern Europe while in the twentieth century, the working hands became Mediterranean. [22] Looking through the payrolls of the 1920s, the surnames of factory workers represent countries all over Europe, including Greece, Italy, Ireland, Germany, Poland, and England.

About 800 to 850 workers were employed by the Edison Storage Battery Company at this time. Their jobs ranged from "chemical operation," "inspection," and "tube loading" to "sales production," "research," and "firemen." One working week for employees at Edison's plant was five week days plus one half day on Saturdays. At the time of the complex's peak, as many as 10,000 people worked for Edison.[23]

EDISON INDUSTRIES AFTER EDISON

After his death on October 18, 1931, the laboratories remained as Edison had left them, awaiting proper "preservation." In 1955, Glenmont was designated a National Historic Site. In 1956, the labs were donated to the United States government by Thomas Edison Industries and they became a National Historic Park. Subsequently, Thomas Alva Edison, Inc. merged with the McGraw Electric Company in 1957 and the West Orange complex began to be taken apart. Finally, in 1962, some auxillary buildings near the laboratories, and Glenmont, the family home, were added to the Park Service's holdings to create the present Edison National Historic Site. This consists of a museum and research divisions dedicated to educating the public about Thomas Edison's achievements throughout his long productive life. It covers a total of 20.08 acres, 4.41 acres at the lab site, and 15.67 at the Glenmont site.

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[22] Ibid.

[23] Ibid.

While the labs continued to preserve the spirit of Thomas Edison and draw visitors and inquiries from all around the globe, the factory buildings on adjacent blocks remained in private hands, and lost their association with Edison. Many of these structures continued to be used for their original purposes by subsidiary or spin-off corporations until well into the 1960s. The factory buildings of the Edison Phonograph Works had not been fully occupied since the 1920s, and the entire block was razed for urban development in 1972. They were replaced by mediocre structures and parking lots. The first center of the American recording industry is buried under concrete paving with no hint of its past glory.

The Storage Battery Division of the McGraw-Edison Company continued to manufacture batteries using Edison's production techniques until 1960 in the West Orange plant. In that year, the division was sold to the Electric Storage Battery Company. Manufacturing continued in West Orange and Silver Lake until November 1965, under the name Exide Power Systems Division.

With the demolition of the phonograph works and other urban renewal around the Edison National Historic Site, the Storage Battery complex became the last of Edison's factory buildings to stand. The property has been privately owned by Industrial Properties, Incorporated, since 1966. The complex is presently known as the West Orange Edison Industrial Center and provides space for twenty-five tenants manufacturing such diverse items as interior finish supplies, furniture, clothing and electronics.

Because the Storage Battery Company facilities remained in use through the 1970s, the historic structures managed to escape the dismal fate of the adjacent blocks. As a result, this is the final block to remain of Edison's manufacturing facilities which once dominated West Orange, and American industry.

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Boundary Description

The Edison Storage Battery Buildings occupy a single lot in the town of West Orange, Essex County, New Jersey, known as block 66, lot 1. It is bounded by Main Street (formerly Valley Road), Lakeside Avenue, Ashland Avenue, and Charles Street. The site contains four significant buildings; all reinforced concrete factory buildings of the Edison Storage Battery Company. Two wood frame commercial \ residential structures also located along Main Street within the same block were never part of Edison's manufacturing complex and are not included in the nomination.

Boundary Justification

The Edison Storage Battery site includes all significant extant buildings associated with Edison's manufacture of the storage battery. The buildings are located within a single square block adjacent to the Edison National Historic Site. The factory buildings are the property of a single owner:

Mr. Lawrence Rosenthal
177 West Main Street
West Orange, New Jersey 07052

Appendix 1

Structures of the Edison Storage Battery Company from
"Map of Edison Interests - Real Estate, Winter 1919."
(in the Edison National Historic Site Archives)

Refer to the attached site plan for building locations, and the photographs for building illustrations.

A. Extant in 1995

Building no. 130 (Photos 1, 2, 6, 11, 12, 13, 14, 15)
storage battery manufacturing plant, 4- and 6-story reinforced concrete

Building no. 132 (Photo 3)
part plating plant, single-story steel frame and reinforced concrete

Building no. 135 (Photos 5, 8)
storage battery manufacturing plant, 4- story reinforced concrete

Building no. 137 (Photo 2)
nickel flake manufacturing plant, 4- and 7-story reinforced concrete

159 Main Street (Photo 16)
store with apartments above, 2-story frame structure

161 Main Street (Photo 17)
store with apartments above, 3-story frame

B. Non-extant in 1995

Building no. 5
oil house, 1 story concrete

Building no. 131
benzine wash house, 1 story reinforced concrete

Appendix 1 (continued)

Building no. 133
accumulation and scrap shed, 1 story frame

Building no. 136
scrap sheds

Building no. 138
hydrogen plant, 1 story steel frame

(on the lot across Ashland Avenue)
Building no. 139
boiler house

Building no. 140 and 141
lumber sheds

Appendix 2

Floor area in each of the extant Edison Storage Battery Company Buildings

building no.	number of floors	floor area/floor [sq. feet]	total floor area [sq. feet]
130 (A)	4	25,000	100,000
130 (B)	6	30,000	180,000
132	1	14,000	14,000
135	4	7,000	28,000
137	2	12,000	24,000
	4	16,400	65,600
Total floor area:			411,600 square feet

Photographs
Edison Storage Battery Company Buildings

Photographed by Janet W. Foster, Acroterion Historic Preservation Consultants
May and June 1995
Negatives held by the property owner at the site:
Larry Rosenthal
Industrial Properties
177 Main Street
West Orange, New Jersey 07052

Photo Number (identified on back of each photo)

1. Edison Storage Battery Buildings (background). Edison Laboratories National Historic Site, buildings and parking lot. View South from Main Street and Edisonia Terrace, West Orange. May 1995.

2. Edison Storage Battery Company. Building 137 in Foreground, Building 130 (B) in background. View east form Main Street. May 1995.

3. Edison Storage Battery Company. Building 132 (one story) with Building 130 (A) in background. View south from Main Street. May 1995.

4. Edison Storage Battery Company. Building 135 in background; 159 West Main Street on far right of photo. View southwest from Main Street. May 1995.

5. Edison Storage Battery Company. Building 135. 161 West Main Street on far left of photo. View south from Main Street. May 1995.

6. Edison Storage Battery Company Building 130 (A). View east along Ashland Ave. May 1995.

7. Edison Storage Battery Company, Building 130 (A). View east along Ashland Avenue. 1913. Reprint from Edison National Historic Site Archives.

8. Edison Storage Battery Company. Building 135. View north from Charles Street. May 1995.

9. Edison Storage Battery Company. Alley between Building 132 and Building 130 (A). Concrete supports for acid tanks on right. View west. May 1995.

10. Edison Storage Battery Company. Alley between Building 132 and Building 130 (A). Enclosed bridges between Building 130 (A) and Building 135 in distance. View west. May 1995.

11. Edison Storage Battery Company Building 130 (B). Detail of entrance facing main Street. View southeast from Main Street. May 1995.

12. Interior: Main Lobby at Main Street entrance of Edison Storage Battery Building 130 (B). May 1995.

13. Interior: Edison Storage Battery Company. Building 130 (A). Typical space. May 1995.

14. Interior: Edison Storage Battery Company. Building 130 (A). Typical Space. May 1995.

15. Interior: Edison Storage Battery Company. Building 130 (B). Loading dock in lower level off Ashland Ave. May 1995.

16. "Ghost" of tracks in pavement for internal railway delivery system. View east, along northwest elevation of Building 135. May 1995.

17. View northwest toward Edison Storage Battery Buildings to left; Edison Laboratory and powerhouse to right (part of Edison National Historic Site). May 1995.

18. Aerial view of Edison Industrial Complex, West Orange, N.J., 1925. Reprint from Edison National Historic Site Archives.

19. Edison Storage Battery Company, Building 130 (B) under construction. January 9, 1913. Reprint from Edison National Historic Site Archives.

20. Edison Storage Battery Company, Building 130 (B) under construction. February 12, 1913. Reprint from Edison National Historic Site Archives.

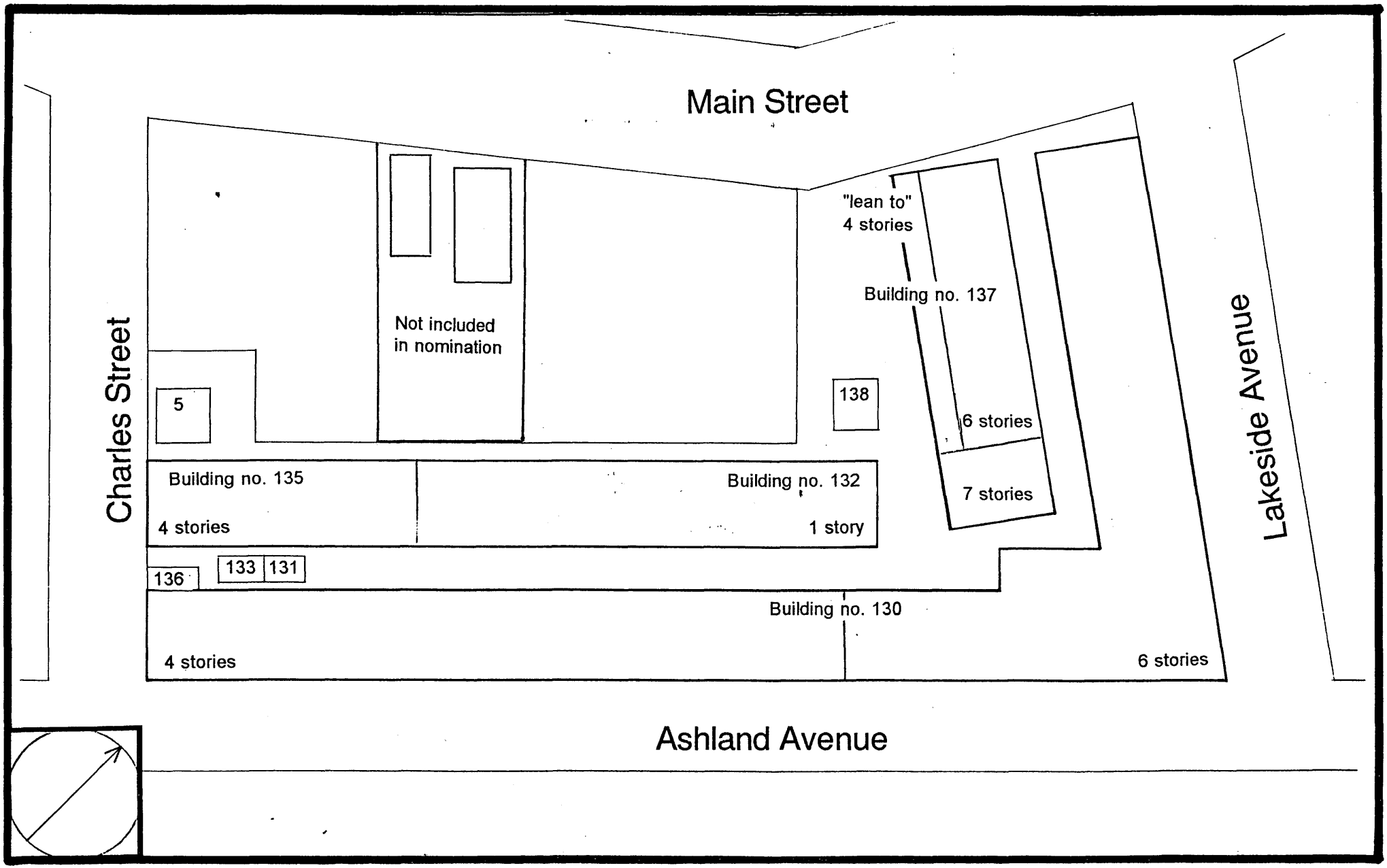
21. Edison Storage Battery Company, Building 130 (B) under construction. March 12, 1913. Reprint from Edison National Historic Site Archives.

22. Edison Storage Battery Company. Interior, Building 130 (B) nearing completion. May 14, 1913. Reprint from Edison National Historic Site Archives.

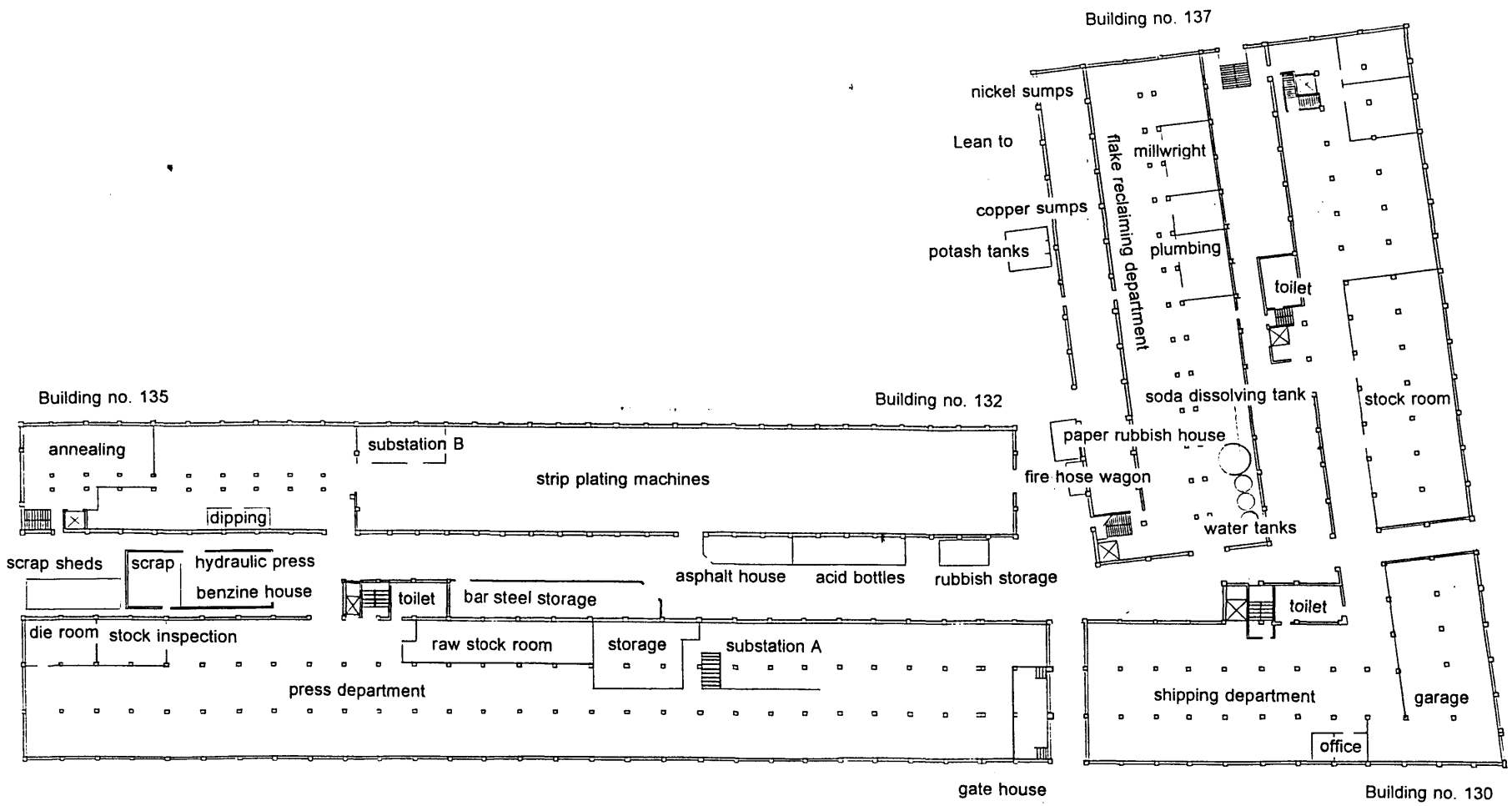
23. Edison Storage Battery Company, Building 137 under construction. July 30, 1913. Reprint from Edison National Historic Site Archives.

24. Edison Storage Battery Company. Interior, Building 130 (B) Battery Inspection. ca. 1920. Reprint from Edison National Historic Site Archives.

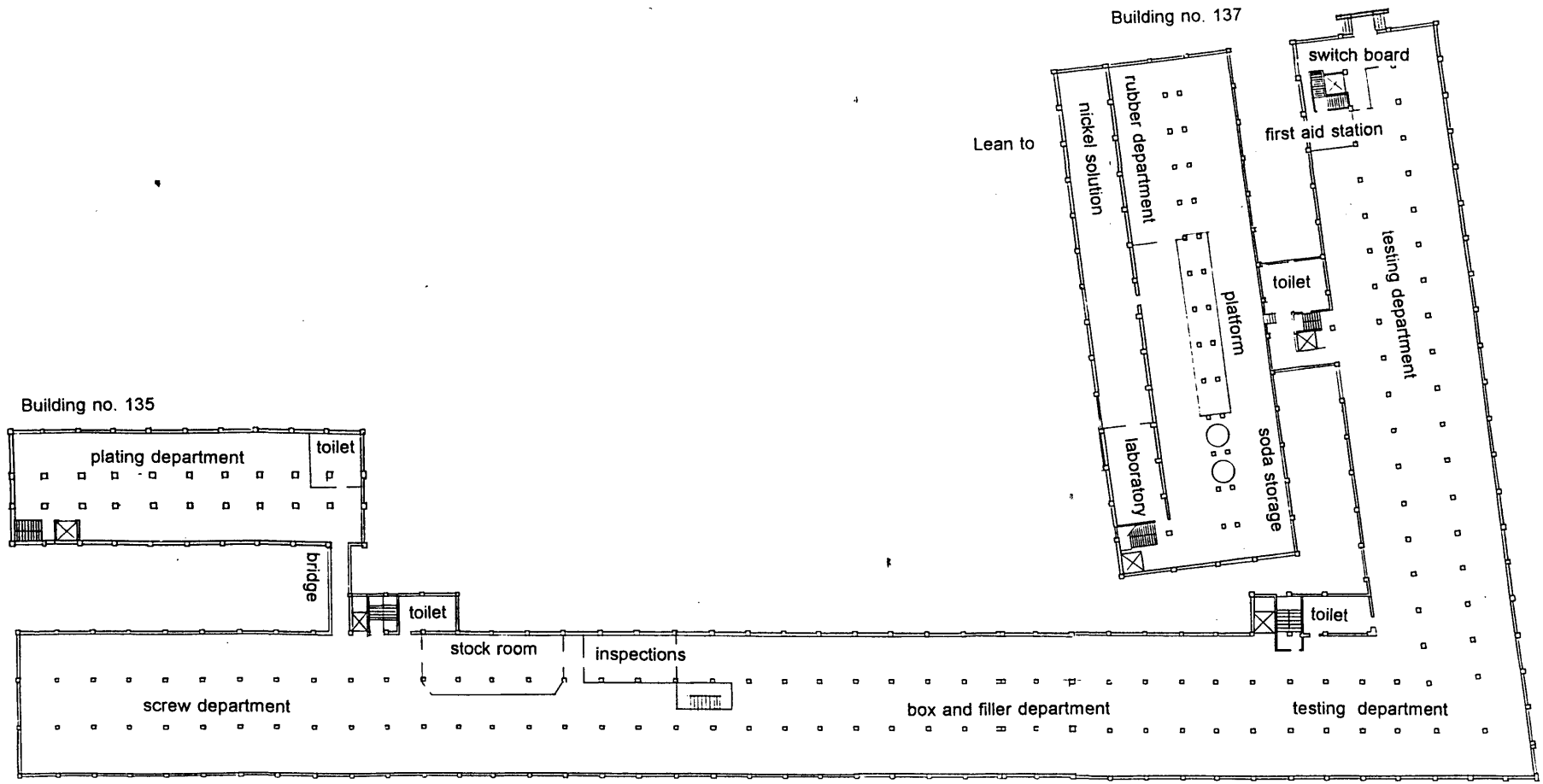
25. Edison Storage Battery Company. Interior, Building 135. Research Department, ca. 1920. Reprint from Edison National Historic Site Archives.



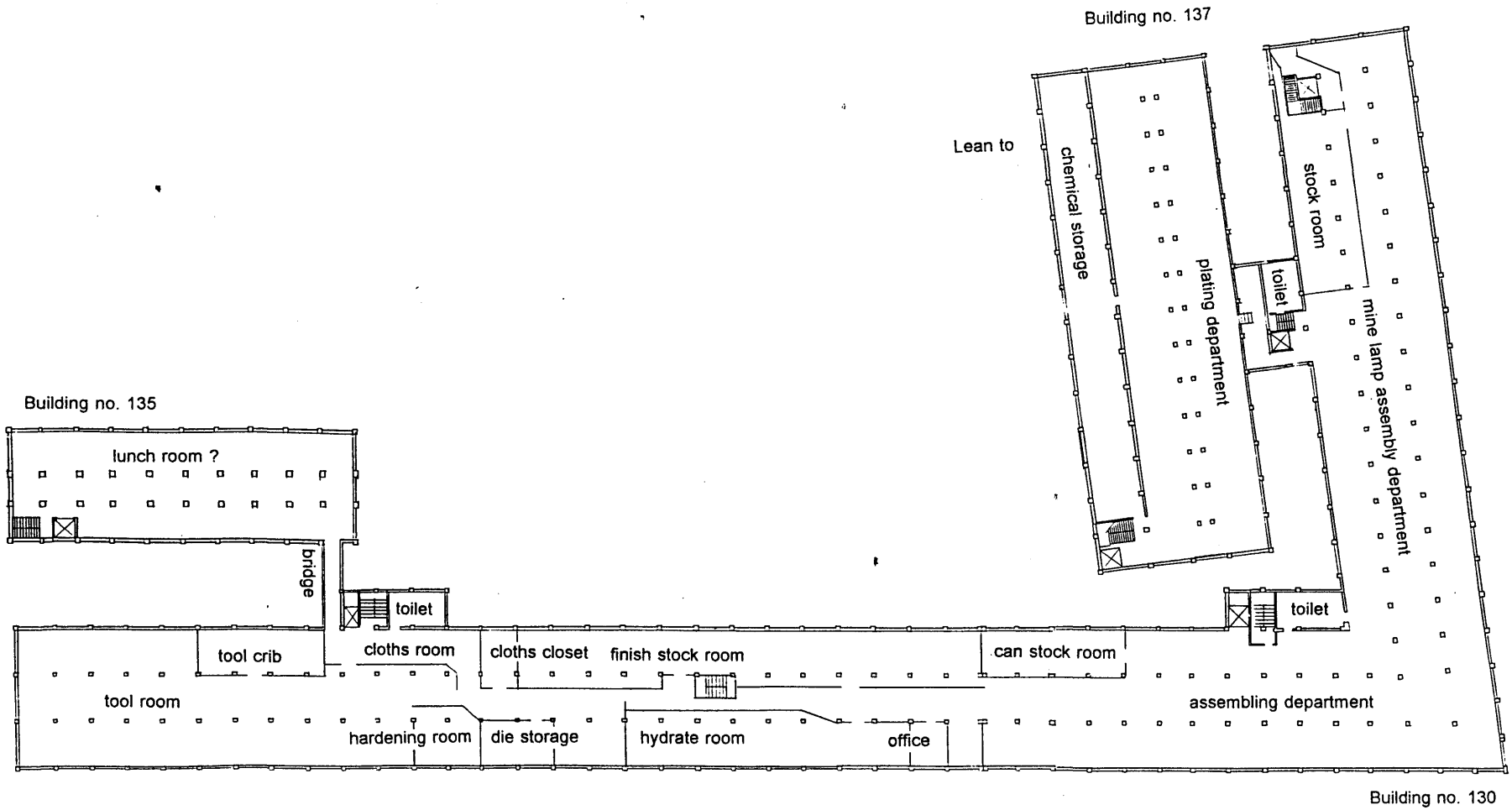
Edison Storage Battery Company Buildings West Orange, NJ (Essex County) Site Plan



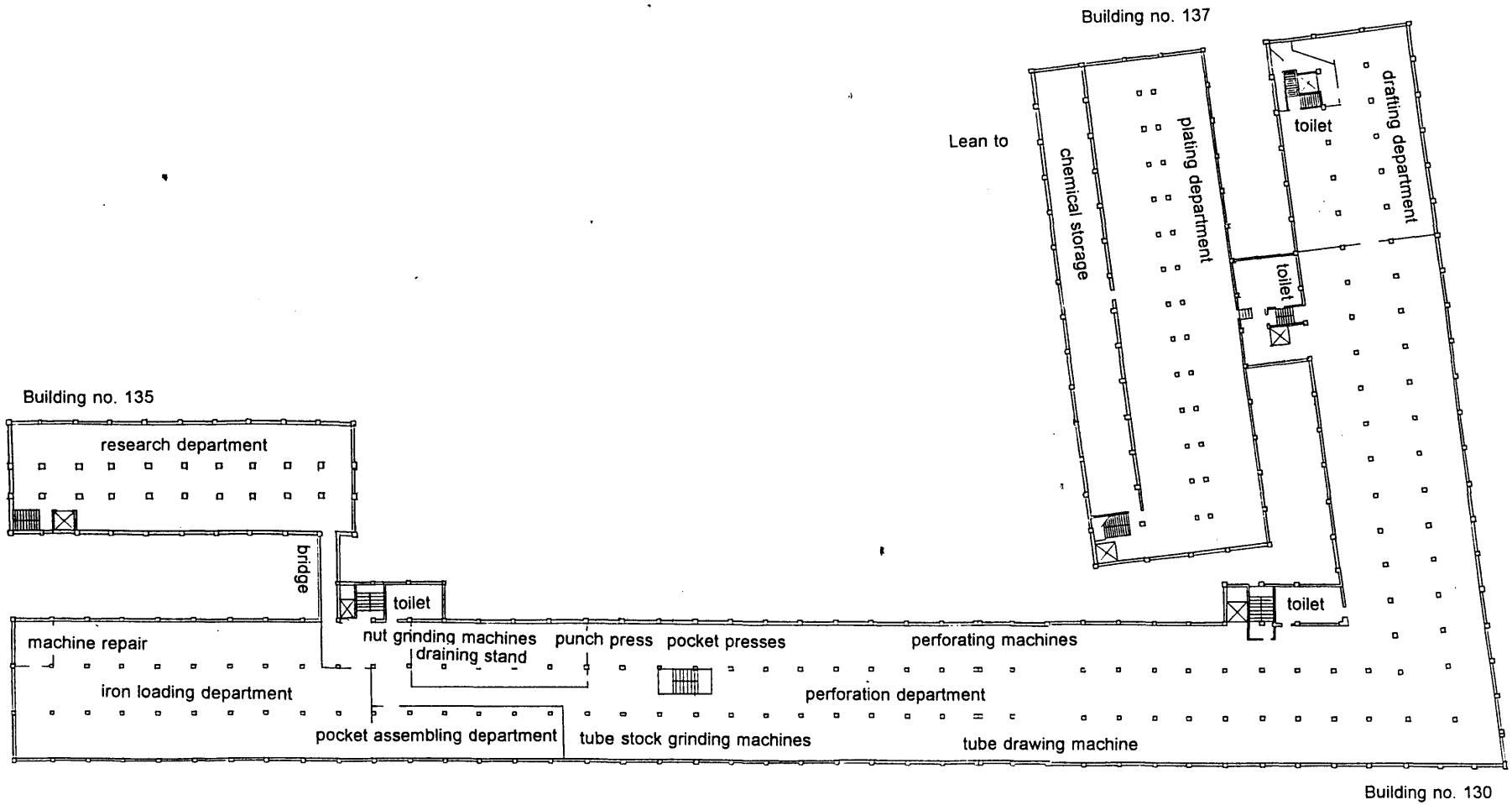
Edison Storage Battery Company Buildings West Orange, NJ (Essex County) First Floor Plan



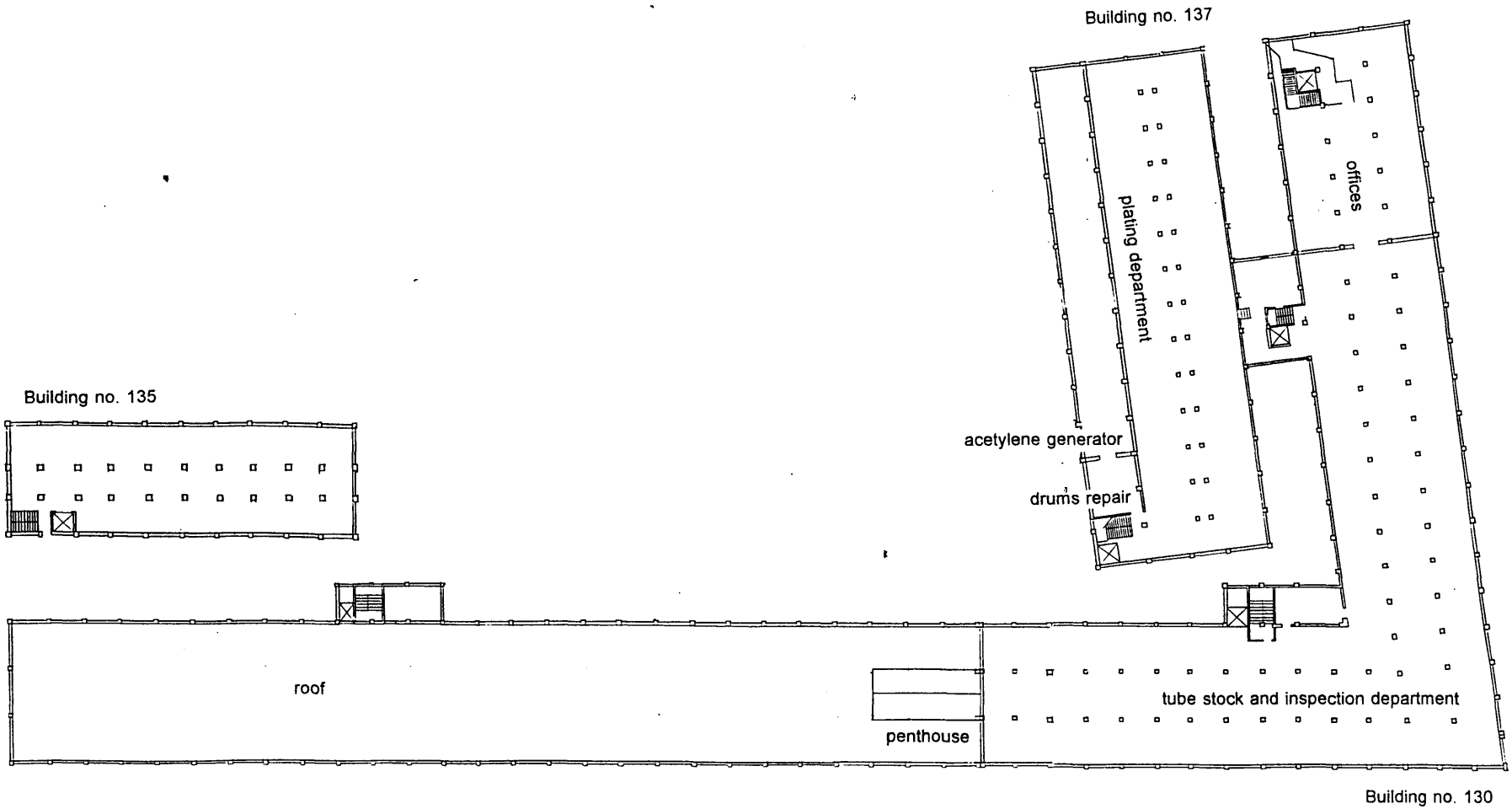
Edison Storage Battery Company Buildings West Orange, NJ (Essex County) Second Floor Plan



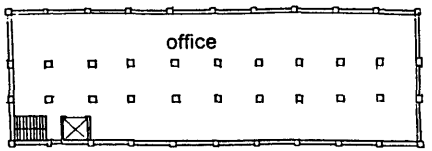
Edison Storage Battery Company Buildings West Orange, NJ (Essex County) Third Floor Plan

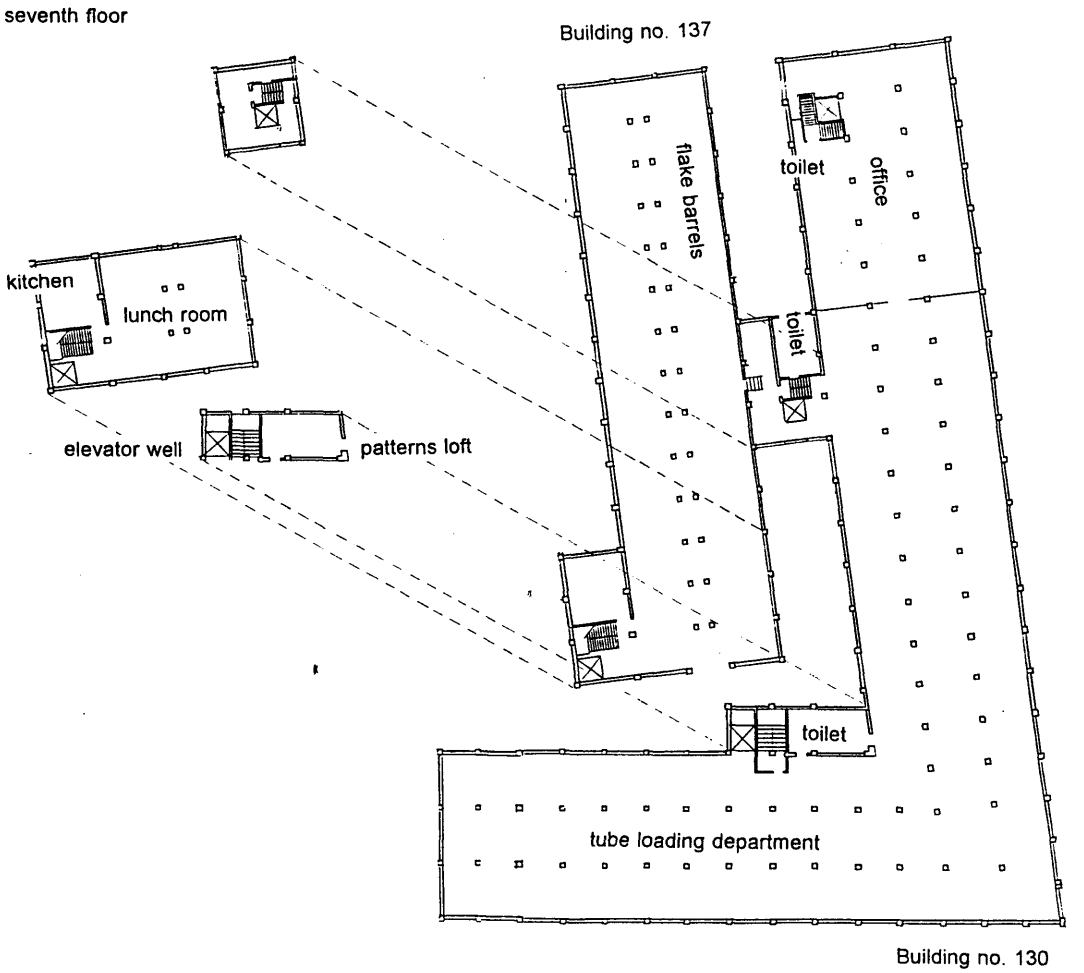


Edison Storage Battery Company Buildings West Orange, NJ (Essex County) Fourth Floor Plan



Edison Storage Battery Company Buildings West Orange, NJ (Essex County) Fifth Floor Plan





Edison Storage Battery Company Buildings

(Essex County)
West Orange, NJ

Sixth and Seventh Floor Plans