CULTURAL LANDSCAPE REPORT
FOR
THE EDISON NATIONAL HISTORIC SITE:
Laboratory Unit

by

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A project submitted in partial fulfillment of the requirements for
the
Master of Landscape Architecture Degree

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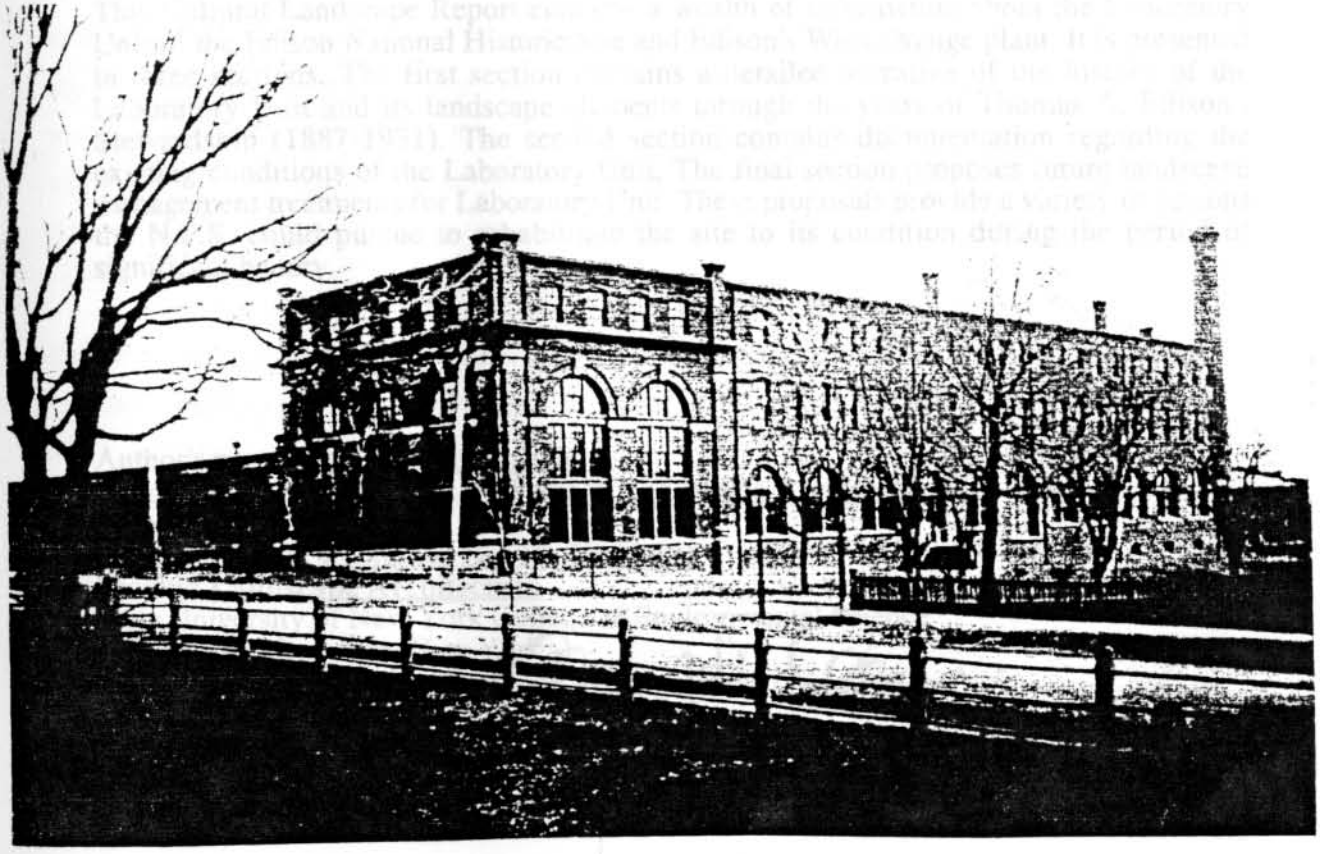

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This project presents the results from a year and a half long study towards the completion of a Cultural Landscape Report for the National Park Service. It includes the past and present conditions of the landscape elements within, and surrounding, the Laboratory Unit at the Edison National Historic Site in West Orange, New Jersey. The project was conducted under a cooperative agreement between the National Park Service and the State University of New York, College of Environmental Science and Forestry.

This Cultural Landscape Report contains a wealth of information about the Laboratory Unit of the Edison National Historic Site and Edison's West Orange plant. It is presented in three sections. The first section contains a detailed narrative of the history of the Laboratory Unit and its landscape elements through the years of Thomas A. Edison's Stewardship (1887-1931). The second section contains documentation regarding the existing conditions of the Laboratory Unit. The final section proposes future landscape management treatments for Laboratory Unit. These proposals provide a variety of options the N.P.S. could pursue to rehabilitate the site to its condition during the period of significant history.

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The development of the Cultural Landscape Report was a cooperative effort between the National Park Service's North Atlantic Regional Office, the Edison National Historic Site and the State University of New York College of Environmental Science and Forestry Faculty of Landscape Architecture. Several other individuals that I would like to thank are part of the various staffs that were involved with this project. From the National Park Service staff I would like to thank Nora Mitchell, the Regional Cultural Landscape Program Manager for the National Park Service's North Atlantic Regional Office. Members of the Edison National Historic Site staff that I would like to thank include Maryanne Gerbauckus, Superintendent of the Edison National Historic Site; Nancy Waters, Supervisory Museum Curator; and Doug Tarr, Archivist Technician.

Finally I would like to thank my wife, Elizabeth, for her never ending support and prayers.

PREFACE

This Cultural Landscape Report for the Laboratory Unit of the Edison National Historic Site in West Orange, New Jersey, was prepared for the National Park Service under a cooperative agreement between the North Atlantic Region of the National Park Service and the State University of New York College of Environmental Science and Forestry. The project was administered by the Research Foundation of the State University of New York and the State University of New York College of Environmental Science and Forestry. The project began in September, 1991 and was completed in January, 1993.

The development of the Cultural Landscape Report was a cooperative effort between the North Atlantic Regional Office, the Edison National Historic Site and the State University of New York College of Environmental Science and Forestry Faculty of Landscape Architecture. The project manager was Nora Mitchell, the Regional Cultural Landscape Program Manager for the National Park Service's North Atlantic Regional Office. The staff at the Edison National Historic Site included: Maryanne Gerbakus, Superintendent of the Edison National Historic Site; Nancy Waters, Supervisor of the Archive Staff; Doug Tarr, Archivist; and other members of the Edison National Historic Site's Archive, Maintenance and Park ranger Staffs. The Project Director was Professor George W. Curry and the Research Project Assistant was Eric Joseph of the Faculty of Landscape Architecture. Other Faculty of Landscape Architecture members involved with the project were Associate Professors Scott Shannon and Matthew Potteiger. Pete Auyer served as a Project Aid.

CONTENTS

INTRODUCTION

Thomas Alva Edison (1847-1931) in the 1880's[1]

By the mid-1880's, Thomas Alva Edison was America's leading inventor. Over the previous fifteen years, he had developed major improvements to the telegraph, telephone, and phonograph. Yet by far Edison's most resounding success had been his incandescent lighting system. From 1878 to 1882, he had perfected the first high-resistance lamp, which was followed with a complete system of dynamos, conductors, meters, and accessories. Not satisfied with selling isolated systems to individuals and firms, Edison insisted on developing central stations that sold the service of lighting to a broad base of customers and thus, helped to create the modern utility industry.

His electric lighting business required him to spend much time in New York City; and in 1881 Edison abandoned his famous laboratory at Menlo Park, New Jersey, and moved his research and family into Manhattan. [The laboratory at Menlo Park was where Edison invented the incandescent light bulb] For the next several years, Edison maintained his office at 63 Fifth Avenue, the headquarters of the Edison Electric Light Company and conducted his experiments on the top floor of Bergmann's factory at Seventeenth Street and Avenue B.

Although Edison may have planned to leave New York and someday return to Menlo Park, two events prevented him from going back. First, Edison's wife, Mary Stillwell, died in the summer of 1884. Upset by her death, Edison may not have been able to face returning to the home they had shared at Menlo Park. Second, shortly after this tragedy, Edison's house and property at Menlo Park were put up for sale in a sheriff's auction. The auction occurred because Edison had failed to pay off two promissory notes dating back to 1874 and a New Jersey court had ordered that the money be raised by selling his New Jersey assets. Although Charles Batchelor, a personal friend and employee of Edison, had purchased the Menlo Park property at the auction for Edison , this incident was enough to discourage him from returning to work at Menlo Park.

Since Edison did not wish to return to Menlo Park, he began thinking about building a new laboratory. By January 1886, Edison started to sketch designs for his new laboratory in one of his

notebooks. In his original scheme, he portrayed a substantial laboratory in the French Mansard style then popular for public buildings. A key defect of this mansard style laboratory was that it was not sufficiently flexible for Edison's ever-changing projects. Perhaps for this reason, Edison set his design aside and concentrated on other personal and technical matters.

One of the personal matters that distracted Edison from his laboratory scheme was his remarriage. Through 1885, Edison courted Mina Miller, the daughter of Lewis Miller, a successful agricultural implements manufacturer from Akron, Ohio. Edison and Mina were married in February 1886 and spent their honeymoon at Edison's new winter home in Fort Meyers, Florida. When they returned from their honeymoon, the newlyweds established their household at Glenmont, a spacious estate located in Llewellyn Park, a planned community in West Orange, New Jersey.

In June, 1886, Edison was forced to turn his attention to production problems at the Lamp Works, an Edison industry located in Harrison, New Jersey. For the remainder of 1886, Edison stayed at Harrison, working to return the lamp manufacturer back on a solid basis. Because he was so busy with the Lamp Works, Edison moved his laboratory from New York to that site. However, by December, Edison had become tired of the day-to-day supervision of the Lamp Works, especially since he was unable to devote much time to inventing.

It was during the last few months in 1886 that Edison decided to start building a new laboratory. Although Edison could have located his laboratory at one of his existing factories, he decided that it would be best to pursue his inventions at a new facility. Experience probably told him that while invention and production should be located near each other, they also should be kept separate in order that experimental work did not interrupt long production runs. Supported by funds from the various Edison companies, Edison intended to use this new facility to concentrate on what he did best, invention and development.

Edison decided to locate the new laboratory near his family and home in Llewellyn Park. With the laboratory close to his home, Edison could keep his irregular working hours and occasionally still see his new wife and family. Just as he done with Menlo Park, Edison chose a rural site for the laboratory in order to be away from the noise, confusion, and distractions of the city. Nevertheless, he also wanted to be close enough to New York City so that he could draw on the city for materials, skilled workers, and the investment capital of Wall Street.

Edison abandoned his early 1886 plans for an ornate, French mansard style laboratory building and began sketching a series of more functional structures. To turn his sketches into reality, Edison called upon his close associate Batchelor to handle the details and hire an architect. Batchelor retained Henry Hudson Holly, the New York architect who had designed Glenmont. During the construction of the Main Laboratory, Edison was displeased with Holly's work and replaced him with Joseph Taft. Taft was a contractor and oversaw the final construction of the Main Laboratory and the construction of the attached Power House.

Although the Main Laboratory was to have had 40,000 square feet of workspace, Edison decided during its construction that this would be insufficient. To supplement it, Edison commissioned Taft to build four one-story buildings. Each of the smaller buildings was used for a different purpose: one was for electricity, another for chemistry, a third for woodworking and chemical storage and the last for mining, metallurgy, and blacksmith work. By the end of December 1886, all of the buildings were constructed and the "Edison Laboratories" opened for business.

The Evolution of the Edison Laboratories and Edison National Historic Site

The Edison Laboratories was established as an "invention factory." Experiments would be conducted within the experimental rooms and small laboratories, while prototypes were designed and constructed within the Main Laboratory's machine shops. When it was obvious that some of the projects would be able to be mass produced, Edison expanded his real estate interests within West Orange and erected factories to produce his inventions. The first manufacturing facility to be erected was the Edison Phonograph Works. This facility was constructed by 1889 and was located within the same block as the Edison Laboratories. By 1899, both the Edison Phonograph Works and Edison Laboratories were considered to be the "West Orange Plant," the name of the combined sites.

During the early part of the twentieth century, the West Orange plant had expanded greatly in size, in terms of both land owned and the number of factories erected. The number of Edison companies within the West Orange plant had also expanded. During this period the National Phonograph Company and the Edison Storage Battery Company were established, each with their own facility. The expansion, although prosperous at first, almost created a financial crisis for Edison and his companies. As a result, the Thomas Alva Edison Incorporated (T.A.E., Inc.) was created in 1911 and al of the Edison companies were organized under one central administration.

After the formation of the T.A.E. Inc., activity at the West Orange plant increased, despite a fire in 1914, which almost destroyed all of the Edison Phonograph Works' buildings. America's involvement in World War I also added to the prosperity of the West Orange plant. However, this prosperity was short-lived. The years after the war were years of depression and retrenchment for the West Orange plant. To keep the West Orange plant financially secure layoffs became a common practice. The Edison Laboratories was transformed from a research facility to an engineering facility that supported the manufacturing industries within the West Orange plant.

In 1928, the reigns of the West Orange plant were handed down from Edison to his son, Charles. For the next several years, Edison was experimenting at the Edison Laboratories and at his laboratory and home in Fort Meyers, Florida. His last project focused on finding a domestic source of rubber. By 1930, Edison's health had deteriorated to a point where he was confined to his bed. In May of that year, Edison sold the Edison Laboratories to the T.A.E. Inc. In 1931, Edison passed away and the Edison Laboratories was closed by Edison's family.[2]

During the years that followed Edison's death, the Edison Laboratories became a storage facility for T.A.E. Inc.[3] By 1939, a plan had been developed to turn the Edison Laboratories into a museum. The plan focused around the library in the Main Laboratory (Building No. 5). The plan called for a complete set of photographs of the Edison Laboratories and the clean up, sorting, and storing of materials. The photographs were taken in 1939 and organized into three albums. (*See Appendix A*)

During World War II, the Edison Laboratories, except for the library was used as a research facility. However, the drive to convert the Edison Laboratories into a museum continued.[4] In 1946, a year before Edison's centenary, the Thomas Alva Edison Foundation, Inc. was created. The Foundation obtained a lease from the Edison company to open the Edison Laboratories as the Edison Museum on February 11, 1948.

Charles Edison continued his pursuit of establishing the Edison Laboratories as a memorial to his father's work.. In 1954, Conrad Wirth, the Director of the National Park Service, came to visit the site. Following the Director's visit, the National Park Service (N.P.S.) commissioned a study of the site. Negotiations followed for the donation of Edison's home, Glenmont, and the Edison Laboratories to the N.P.S..

In 1955, the Edison Laboratories was presented to the Secretary of the Interior, Douglas McKay, as a donation by the T.A.E. Inc. and the Edison Corporation. During the special ceremony at the Interior Department in Washington, D.C., Charles Edison and Mrs. John Eyre Sloane, (Madeleine Edison), the inventor's daughter, presented to McKay the deed to the Edison Laboratories as "...the first step toward establishing it as the Edison Laboratory National Monument in the national park system."[5] Included in the donation were all of the buildings and exhibits erected within the Edison Laboratories and the 1.51 acres of land. As part of the agreement, the Thomas Alva Edison Foundation was to continue to operate the site until the N.P.S. assumed the responsibility a year later. When the N.P.S. assumed responsibility in 1956, the Edison Museum became the Edison Laboratory National Monument.

On September 5, 1962, an Act of Congress was passed that combined the Edison Laboratory National Monument and Glenmont into the Edison National Historic Site (E.N.H.S.), and authorized the Secretary of the Interior to accept donations of land and personal property for inclusion.[6] In 1963, it was projected that the site was going to attract approximately 67,300 visitors annually[7], and, in time it become one of the biggest tourist attractions in northern New Jersey.

The Laboratory Unit currently contains all of the buildings and exhibits that were donated in 1962--with the exception of a wood shed, which was destroyed while a tree was being pruned. The only other alterations to the Laboratory Unit since 1962 have been a series of land donations, which has expanded the site to 5.58 acres. The largest land donation was the result of a West Orange Urban Renewal Plan, which resulted in donation of the parcel of land north of the Edison Laboratories to the N.P.S.. This land was originally owned by the National Phonograph Company and composes almost half of the current N.P.S. Laboratory Unit. The land formerly recognized as the Edison Laboratories composes the remaining half.

The N.P.S. currently is using the buildings for: office space housing the site's administrative and archival staffs (Bldg. No. 1, 4, 5); storage of archival material (Bldg. No. 4, 5, 12, 32, 33); a Visitors Center (Bldg. No. 6.); and as interpretive facilities for visitors (Bldg. No. 1, 2, 5, 13). The N.P.S. has identified a need to construct additional facilities at the E.N.H.S to preserve the historic buildings. The new facilities will accommodate: a Visitors Center; offices for the various staffs and a storage area for the five million archival resources. The required total floor space for the new facilities has been estimated at 17,600 square feet. Concurrent with the need to locate these new facilities, the N.P.S. has intensified its initiative regarding cultural landscapes within the system. Thus in 1991, the N.P.S. and the College of

Environmental Science and Forestry entered into an agreement to produce this Cultural Landscape Report.

Cultural Landscape Report

The cultural landscape program was initiated by the N.P.S. in 1980. The service's initial research for and publication of Cultural Landscapes & Rural Historic Districts in the National Park Systems was produced in 1984 by Robert Melnick. The manual articulated the concept of a cultural landscape as a resource in the service and that the preservation of a cultural landscape involved a process of managing change rather than attempting to halt change. Melnick developed broad (landscape) components by which the landscape could be analyzed and evaluated. Cultural landscapes were formally identified as a type of cultural resource in the system when, in 1988, they were included in a revision of the N.P.S. Management Policies. Cultural landscapes now are recognized to include four general types: historic designed landscapes, historic vernacular landscapes, historic sites and ethnographic landscapes.

With the development of the concept of cultural landscapes, it was recognized that a systematic method for identifying and evaluating landscape resources was necessary . As research concerning cultural landscapes proceeded, reports began to focus on the identification of character defining features, materials and qualities of a landscape. The components identified by Melnick were further articulated. Reports began to address historic development and evolution to establish significance and started to analyze existing conditions to evaluate integrity. Cultural landscape reports now also include recommendations for treatment and management.

Scope & Methodology

The Edison National Historic Site is unique in that it is composed of two properties that are located approximately a mile apart. Glenmont, Edison's home, is located in the rural landscape of Llewellyn Park, while the Laboratory Unit is located approximately a mile east, in an urban industrial area. The focus of this Cultural Landscape Report is the Laboratory Unit of the Edison National Historic Site. Although the current Laboratory Unit is only 5.58 acres and contains 11 buildings, it once was part of a much larger industrial complex owned by Edison: the West Orange plant. During its peak, the West Orange plant covered almost 20 acres and contained over fifty buildings. To undertstand the Laboratory Unit in its historic and physical context detailed research into the history of the West Orange plant was conducted.

Before the primary research began, a notation system was established so that every piece of pertinent information reviewed for this Cultural Landscape Report could be well documented. The basis for this notation system was a landscape category format that organized different landscape elements into defined landscape categories: Enivronmental Context, Landscape Site/ Setting, Response to Natural Features, Spatial Organization, Landform, Vegetaion, Buildings & Structures, Mechanical Systems, Circulation, Views & Vistas, and Furnishings & Objects (*For definitions of these categories see Appendix B*) In addition to the landscape category format, "Archive File" forms were created to record the archival source. (*See Appendix C*)

During the development of the notation system, a search was conducted for a basemap of the Laboratory Unit. The search primarily focused on, but was not limited to, the N.P.S.'s Technical Information Center in Denver, Colorado. Another map source was the Map File located in the Edison National Historic Site Archives. All of the maps and surveys reviewed were well detailed in terms of building and utility locations, but lacked documentation regarding vegetation, furnishings and other landscape features located within the Laboratory Unit. Thus, historic photographs were extensively used to document the landscape features. In addition, extensive field work was conducted to accurately document the existing conditions of the landscape features.

In order to fully understand how the West Orange plant evolved, primary research was conducted on the properties owned by the West Orange plant. Through a deed search a chronological outline of the West Orange plant's development was created. These deeds are located at the Newark Hall of Records in Newark, New Jersey. Other historical materials used for this Cultural Landscape Report were the Edison Personal, Laboratory, and Business Records located at the Edison National Historic Site Archives. These materials included vouchers, maps, correspondence, legal documents, films and photographs. Many of the period maps presented in the Site History section were developed from historical maps and supplemented with information from the historical photographs. The existing conditions basemap was constructed from a site survey that was conducted in November 1991.

The secondary reference materials were provided by the N.P.S. Technical Information Center in Denver, Colorado. This material included masterplans and analytical reports prepared for or by the N.P.S. since 1950. Other secondary reference materials included articles and books on Edison and the history of West Orange.

Limitations

The archival collection at the Laboratory Unit contains approximately 3.5 million items of original material documenting the life, work and enterprises of Thomas Alva Edison. The collection consists of correspondence, memoranda, laboratory notebooks, legal files, Edison's library, photographs, sound recordings and ephemeral material dating from ca. 1850 to the 1950's. Due to the time constraints of the project, the research of this collection was limited to those items that related most closely to the scope of this Cultural Landscape Report and were possible to review in-depth within the time frame given. For instance, the Voucher Series, located within the collection, potentially contains a wealth of information relating to the development of the site. However, the Voucher Series contains almost every voucher generated at the West Orange plant and it was not possible to completely review the entire series. Thus, only the vouchers from the beginning years of the Edison Laboratory, 1887-1891, were reviewed.

The initial schedule for this project was amended to provide more time to research and document the Laboratory Unit's site history. As a result, the Site History section provides a strong foundation for the proposed landscape treatment recommendations. It also has been useful in the preparation of the Laboratory Unit's Historic Furnishings Report which currently is being written. In addition, this Cultural Landscape Report provides new and additional material that will strengthen and allow for a more complete interpretation of the Laboratory Unit by the staff.

Organization of Report

The Cultural Landscape Report is organized into three chapters:

1. The history of the Laboratory Unit and its landscape elements through the years of Thomas A. Edison's Stewardship (1887-1931).
2. The existing conditions of the Laboratory Unit.
3. Proposals for landscape management treatments.

Chapter One presents the history of the Laboratory Unit site during the time Edison owned it (1887-1931) and is divided into three periods: 1887-1899, 1900-1914, and 1915-1931. The periods of history are related to various events that led to changes at the Laboratory Unit. Because the site's most dramatic changes occurred during 1900-1914, this period has been identified as the Laboratory Unit's "Period of Significance." To better illustrate how the Laboratory Unit appeared during these years,

reproductions of many of the photos used in the research are provided in conjunction with the text. In addition, half-size reproductions of maps that document the site's landscape elements each period are provided.

Chapter Two documents the existing conditions of the Laboratory Unit and its various landscape elements. The format for this documentation is based on the landscape categories used in the Site History chapter. In addition to the text, a half-size reproduction of a map that presents the existing landscape elements within the Laboratory Unit is provided.

Chapter Three is the Treatment Plan for the Laboratory Unit and serves as the conclusion for the report. The proposals are organized according to the landscape categories used in chapters one and two. For each category the historic landscape elements, as they appeared during the period of significance, are compared to the existing condition. . Each comparison is followed by one or more treatment proposals that would rehabilitate or restore the landscape elements to their appearrance during the period of significance.

Following Chapter Three are the Endnotes and the Appendices:

Appendix A	Reproduction of a series of 1939 photos of the Laboratory Unit and a map that documents the locations of the photos.
Appendix B	Definitions of the landscape categories used in this report.
Appendix C	Examples of the forms created to document the source and value of a specific archive resource.
Appendix D	Outline of "The Secretary of Interior's Standards for the Treatment of Historic Properties."
Appendix E	Primary References
Appendix F	Secondary References
Appendix G	Full scale reproductions of the period and existing condition maps.

SITE HISTORY

Introduction

When Edison began sketching designs for his new laboratory in January 1886, it was clear that he wanted a building that would reflect "...his prestige as a famous inventor and a man of substance. "[8] The sketch, from a lab notebook, is of a three-story building with a mansard roof. The building was in the shape of a large square with an open courtyard in the middle. The tower and courtyard form in the sketch often were found in the textile mills of Newark, N.J. and gave the proposed design the dignity of a public building. The layout for the building designated each wing as a separate facility. The east wing was to contain the experimental rooms, as well as Edison's personal room. The west wing was to contain a chemical laboratory. The machine shop and power plant were to be located within the north wing. Although the use of the south wing was not clearly documented, it was most likely the location of the library, which was called for in all of Edison's plans.[9] The library was critical to Edison's work since all of his projects began with a thorough search of the scientific literature.

Edison's sketches and plans were turned into a reality in 1887 by two well-known local architects, Henry H. Holly and Joseph Taft. Although the proposed designs underwent many changes, Edison's plans for individual facilities still remained, as did the courtyard. Rather than incorporate each facility as a wing of a single structure, the facilities were housed in a seperate building. This division provided more experimental space for Edison and his staff. Shortly after the buildings were erected, Edison and his staff moved and the new invention factory began to operate.

From the moment the West Orange plant began operation it was destined to evolve into one of the biggest, and most unique, industrial empires in the United States. In order to document the physical changes that occurred at the West Orange plant during Edison's ownership, the site's history is divided into three periods; 1887-1899, 1900-1914, 1915-1931. Each period of history is related to various events that led to changes at the Laboratory Unit site.

The first period is the Thomas Alva Edison Stewardship: 1887-1899. This period begins with a detailed description of the actual construction and equipping of the Edison Laboratories and its opening in

late 1887. The period includes the intense experimental activity in the phonograph and electrical fields that took place at the Edison Laboratories and the impacts it had within the site and its immediate environment. The period ends with the decline of activity that occurred as a result of an ore-milling project that Edison had pursued in Ogden, N.J.. The chronological boundaries for the period are the groundbreaking for the Edison Laboratories in 1887 and the end of the ore-milling project in 1898, which marked Edison's return to full time work in the Edison Laboratories.

Thomas Alva Edison Stewardship: 1900-1914 is the second period of history and begins with the Edison Laboratories'focus on a smaller number of successful experiments. The success of these projects, and the profits generated from them, allowed Edison to aggressively expand the Edison Laboratories into a business empire based on innovation and integrated manufacturing and marketing operations. The early twentieth century was a time of extensive building that transformed the Edison Laboratories and its surrounding area into the "Edison District". The district encompassed several square blocks of manufacturing and industrial research. During this period, the site underwent many changes, both physically and administratively. In 1914, however, this empire was nearly destroyed by a devastating fire that swept through the site. The chronological boundaries for the second period are the beginning of the storage battery project in 1900 and the 1914 fire.

The third period is the Thomas Alva Edison Stewardship: 1915-1931. The period begins with the rebuilding of the West Orange plant. Within this period there was a fundamental change in the Edison Laboratories' role from a basic experimental facility to a support facility for the manufacturing divisions that had developed at the West Orange plant. This change, as well as the changes brought on by World War I and the post war depression, had a significant effect on the West Orange plant. In a ca. 1911 letter to the Internal Revenue Service, Edison stated "...the experimental period is over ..."[10] As the depression set in, the labor force was reduced and Edison handed the reigns of the company to his son Charles. In 1931, Edison died at his home, Glenmont. Thousands came to pay their last respect to the "benefactor of mankind. " The chronological boundaries for the third period are the rebuilding of the West Orange plant in 1915 and Edison's death in 1931..

These periods provide an accurate description of the evolution and development of the Laboratory Unit site and its individual landscape features, as well as, the surrounding environment of West Orange, N.J.. The site history details the development of this unique research and industrial landscape.

Thomas Alva Edison Stewardship: 1887-1899

THE WEST ORANGE PLANT

This period of site history began with an intense level of experimentation on various electrical and phonograph experiments conducted by Edison and his staff at the Edison Laboratories. Some of the electrical experiments were a continuation from the experiments conducted earlier at the Edison Lamp Works in Harrison, N.J.. (During the construction of the Edison Laboratories, the Edison Lamp Works was used as a temporary experimental laboratory).

The intense experimental activity at the Edison Laboratories lasted only a brief period. In the early 1890's, Edison purchased a mine in Ogden, N.J. for his ore-milling project. The purpose was to process low-grade ore using his magnetic ore-milling technology and demonstrate its practicality.[11] The ore-milling project was unsuccessful and absorbed a great amount of Edison's time and kept him away from the Edison Laboratories. It also absorbed great amount of his personal finances. During the mid-1890's the strain on Edison's finances from the ore-milling project was made worse by a failing economy brought on by the 1893 Depression.

The ore milling project and the onset of a serious depression were the two influential forces in the history of the Edison Laboratories during this period. After a brief period of intense experimental activity from 1887 to about 1892, the Edison Laboratories witnessed a time of retrenchment and cutbacks in experiments and construction. Many of the experimental projects related to the phonograph were terminated. Work on the phonograph project also diminished and only the experiments on cylinder reproduction continued.[12] In 1896, when the country was coming out of the depression, more effort was put into the phonograph product. The end of the disastrous ore milling project in 1900 (the plant officially closed a few years later) formed a watershed in the history of the Edison Laboratories. Edison returned to West Orange for good and began to plan his business strategies for the new century.[13]

This period of history has as its chronological boundaries the official opening of the Edison Laboratories in 1887 and the beginning of the ore milling project's downfall in 1899. The period begins with the construction of the six original buildings in West Orange, N.J. known as the Edison Laboratories. During this period, the Edison Phonograph Works was constructed to the southeast of the Edison Laboratories. (*See photo [A10] page 15.*) These facilities, erected in 1889, were the result of the great phonograph campaign; and they expanded Edison's real estate interest from Valley Road to Watchung

Avenue. (*See map [MA1], page 16.*) Although each of the facilities was recognized as an independent entity, the overall site of the Edison Laboratories and the Edison Phonograph Works became known as the West Orange plant.

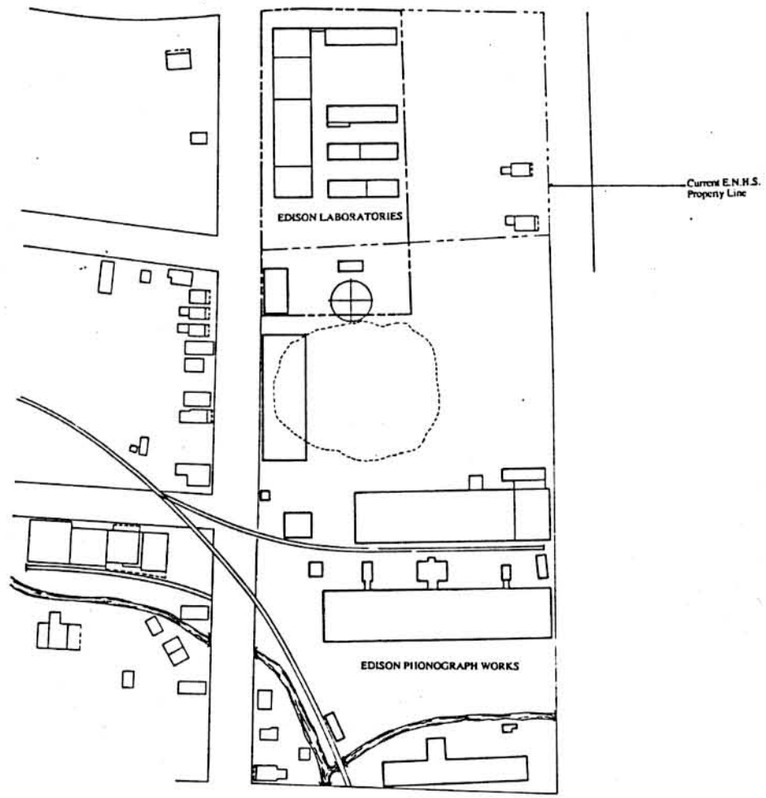
Environmental Context:

Natural - The natural environment that surrounded the West Orange plant consisted of the wooded hillsides, plateaus and valleys of the Watchung Mountains (also known as the Orange Mountains). The Watchung Mountains consists of two parallel mountain ranges that run southwest through northern New Jersey; the First and Second Watchung Mountains.[14] The central area of West Orange was established at the base of First Watchung Mountain's southeast slope. West Orange's main road was located at the base of the mountain and marked the western boundary of the lower valley, hence its name, Valley Road. The southeast slope of First Watchung Mountain continues throughout the lower valley, but at a more gradual grade, until it reached the lower valley's eastern border, the Passaic River. Within the West Orange area are several streams that cut their way into the southeast slope of First Watchung Mountain. These streams carried the storm water runoff away from First Watchung Mountain and into the lower valley area. The water was carried through a network of larger streams and rivers, then into the Passaic River.[15]

Within the West Orange area, the elevation along the ridges of the First and Second Watchung Mountains is over 600', although it varies greatly along the Second Watchung Mountain ridge.[16] It was this mountainous setting and its views that attracted some of the wealthy businessmen in New York City to reside in West Orange.

> From the rugged cliff at the summit of Orange Mountain the panoramic view, in the clear nineteenth century air, extended a hundred miles. From Sandy Hook and Lower New York Bay at the south it swept northward to the Tarrytown Hills, Haverstraw Bay, and the Highlands of the Hudson, over New York City's forest of ships' masts and church spires to Brooklyn, Long IslandSound, and the Atlantic glimpsed beyond. In the intervening lowlands lay farms, woods and villages, and the city of Newark in the middle distance. The view was generally acclaimed as unequaled this side of the Catskills.[17]

[A10] Figure 1.1. The Edison Phonograph Works. [Source: E.N.H.S. Archives]



Map [MA1]

CULTURAL LANDSCAPE REPORT: EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
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Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: THOMAS ALVA EDISON STEWARDSHIP:1887-1899

ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER
—

SHEET NUMBER
— OF —

SCALE: 1" = 100' - 0" (Approximately)
0 100 200 400 Feet
0 50 100 Meters

One of the wealthy businessmen attracted by the mountainous setting was Llewellyn S. Haskell, a prosperous New York City drug importer, and an enthusiastic lover of natural scenery, especially wild mountains and forests. (He was also a friend of Andrew Jackson Downing and Calvert Vaux and an ardent supporter of the proposals to establish Central Park in New York City.)[18] By 1857, his passion had led him to purchase 350 acres of land on the southeast slope of First Watchung Mountain in West Orange; only a little more than 1000' west from the future location of the Edison Laboratories. This property was described as:

> old tangled and disheveled spot...a wild tract of mountainous land...covered with thick woods...threaded by mountain streams, pierced with picturesque ravines, rimmed and ribbed with rocks, monumented with venerable trees as old as the Pilgrim Fathers, and altogether diversified with a beautiful brokenness of scenery.[19]

Throughout the mid-1850's, the 350 acres that Haskell had purchased was transformed into Llewellyn Park, the "...first major romantically landscaped residential park in America."[20] Llewellyn Park was conceived by Haskell and was created by several prominent landscape gardeners and architects of the time: Eugene A. Baumann, a European landscape gardener who had recently come to America; Howard Daniels, architect and landscape gardener, who was awarded fourth place in the competition for the design of Central Park; McKim, Mead & White, who constructed several houses within the park; Alexander Jackson Davis, who also designed several houses within the park including Haskell's estate; and Calvert Vaux, who designed one of the houses within the park.[21] . With a mean elevation of 350', Llewellyn Park provided its residents with panoramic views of the surrounding countryside, including the West Orange valley located 150' below to the southeast.[22] The terrain of the property consisted of:

> ...a gradual, mile-long slope marked by a series of natural terraces. The slope was cut diagonally by the irregular course of a plunging mountain brook whose deep ravines were made into a mountain park of about fifty acres. Villa sites; reached by winding roads, were laid out along the borders of the brook and on the natural terraces. The fifty acre park was central to Haskell's concept...From 1856 to 1860 it alone bore the name Llewellyn Park; when in 1860 this name was extended to include the residential area as well, the park land became known as the 'Ramble'.[23]

Thomas Edison had a special relationship with this area: it was the location of both his homes. Glenmont, his and his family's home, and the West Orange plant, the home of his laboratories and the Edison Phonograph Works, which were located directly southeast of Glenmont. Glenmont is situated along the eastern edge of Llewellyn Park and is partially bordered by the Ramble.[24] The Ramble forms

the southern and western edge of Glenmont and continues northwest toward the ridge of First Watchung Mountain. To the southeast of Glenmont is an expansive lawn and then a wooded hillside that has a moderate to steep slope. At the base of the hill was Valley Road (now Main Street) and directly across the road was the West Orange plant. The brook that runs through the Ramble is known as Wigwam Brook and it extends easterly beyond the Ramble, across Valley Road and ran adjacent to the West Orange plant. The brook continues easterly and connects into the Second River, which empties into the Passaic.

Cultural - At the beginning of this period of history, the town of West Orange was more concerned with roads and street railways than in publicizing the existence of Edison and his family as its new resident.[25] The town's growth depended on the expansion of its industries, such as the Edison Laboratories, and the development of forms of transportation other than the railroad. It was believed that the development of the streetcar and trolley transportation systems would be the solution to developing the mountainous area. Around 1892, the Orange & Newark Horse Railway Company helped introduce streetcar service to West Orange by extending its service to the West Orange line. For the next two years this line was expanded further and ran along Main Street, in the City of Orange, to the town of West Orange boundary and then along Valley Road.[26] Valley Road was the principal entrance road for the Edison Laboratories and was considered the main street for the town of West Orange.

The growth of the West Orange plant began to have an impact on the town of West Orange streetcar lines. The town believed that industrial development would increase the use of proposed transportation systems and in 1894, the Orange Cross-Town Company installed a new trolley line that ran through the residential area along Eagle Rock Avenue and nearby the West Orange plant. The new line provided commuter transportation for the Edison workforce, which was composed of West Orange residents and people from the surrounding communities of East Orange, Orange, South Orange, and Newark.[27] This new line became an asset to the town of West Orange when the West Orange plant became the catalyst for industrial growth in the northern section of the town of West Orange. As a result, the West Orange plant played a significant role in shaping the development of its surrounding environment.

In the late nineteenth century West Orange began to break its ties to the neighboring City of Orange. Instead of depending on the City of Orange for its public services, West Orange established itself as a self-sufficient community. New public services and utilities began to be approved: a police department (1884), a fire department (1894), a system of running water (1892-1893), electric lighting and

road systems.[28] Since Edison was busy with his own business affairs, he did not actively participate in the town's civic affairs. He did, however, make time to address the needs of the town when brought to his attention. For example, in 1895 Edison gave the fire committee permission to mount the township's fire whistle on top of the main laboratory.[29] Edison also made time to address complaints that were filed by the residents. In 1890, the residents nearby the West Orange plant complained to the Town Board of West Orange about a water drain near Edison's property. As a result, the Edison Phonograph Works was notified of the necessity of opening the gutter on the south side of Lakeside Avenue.[30] (The Edison Phonograph Works response to this notification was not documented.)

In 1888, Edison began to purchase property several miles away from the West Orange plant in Silver Lake, New Jersey.[31] The original plan for this site was a manufacturing plant for joint ventures by Edison with investors as part of his 1888 "Edison Industrial Works" scheme. In 1889 this plan fell through and Edison set up the Edison Manufacturing Company with his own money on the forty-seven acres he had acquired in Silver Lake.[32] This plant provided the West Orange plant with some of the chemicals needed in phonograph records and batteries and other various supplies.

Business - This period of history began with a flurry of experimental activity in the Edison Laboratories. Edison was full of enthusiasm, full of ideas for experimental projects, and he had plenty of money coming in from the electrical industry he established earlier in his career. Less than a year after the Edison Laboratories' opening, it was operating at full capacity.[33] The first great experimental campaign on the phonograph was in full swing while other experimenters maintained the effort in electricity and ore milling. During the phonograph campaign, Edison and his staff constructed the Edison Phonograph Works on the eastern end of the site. Edison's secretary, Alfred O. Tate, reported that he had over a hundred men that were at work on about 60 different experiments around 1888.[34] According to the payroll records from this period, there was a high turnover of employees and a constantly changing workforce. Edison was sensitive about labor costs and practiced continual pruning of his laboratory staff force. It has been estimated that the number of workers at the Edison Laboratories in the beginning of this period was around 50 and the payroll records for 1890 indicates 85 men at work.[35]

In the early 1890's, Edison embarked on his ore milling venture and set up the Ogden plant in the highlands of New Jersey. This was a turning point in the history of his laboratory in the nineteenth century. He took many key employees with him and the financial strain of enlarging the Ogden plant led him to cut back expenditure at West Orange. His first step was to reduce the labor force. In 1891, the

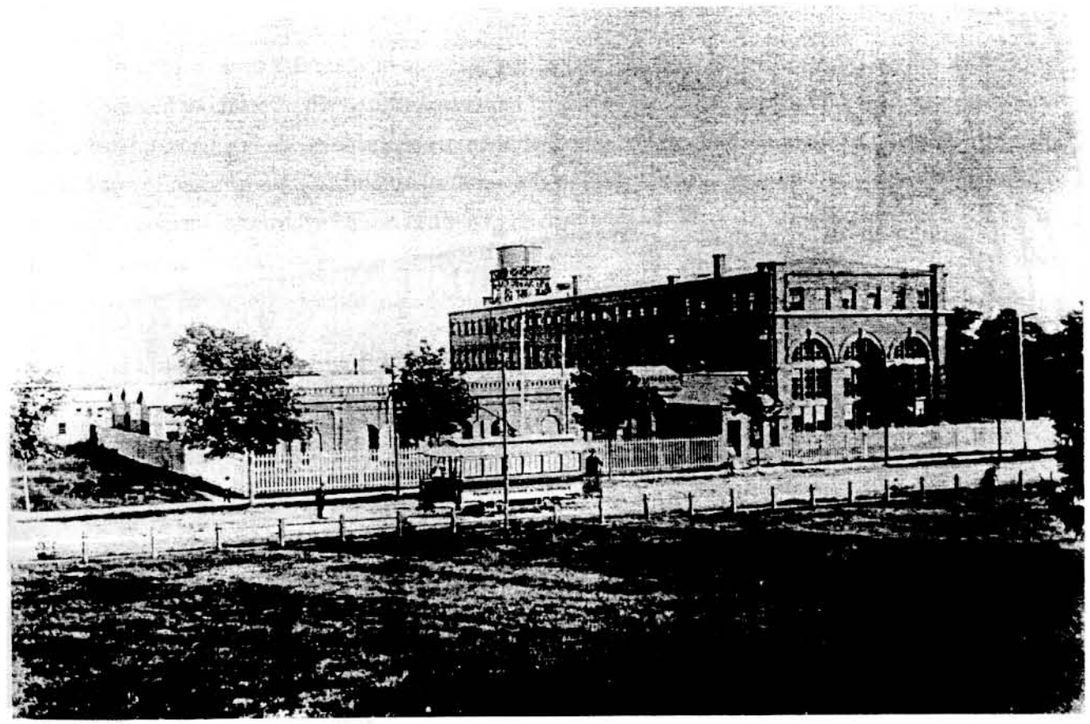
Edison Laboratories employed around 65 men and only 160 employees remained in the Edison Phonograph Works--a significant decrease from 1890 when 500 worked there.[36] Much of the work begun in 1887 at the West Orange plant was discontinued and only the most promising experimental projects were kept alive.

The West Orange plant also was hit hard by the 1893 Depression which lasted through the end of the century. The impact of the depression was felt in the West Orange plant as early as 1890 in the decline of sales of phonographs and in 1893 with the cutback of contract research for the electrical industry.[37] By 1896, the factory inspectors of the state of New Jersey found only 10 men at work in the Edison Laboratories and just over 100 in the Edison Phonograph Works. The next year, there were 28 workers in the Edison Laboratories and 144 in the factories around it.[38]

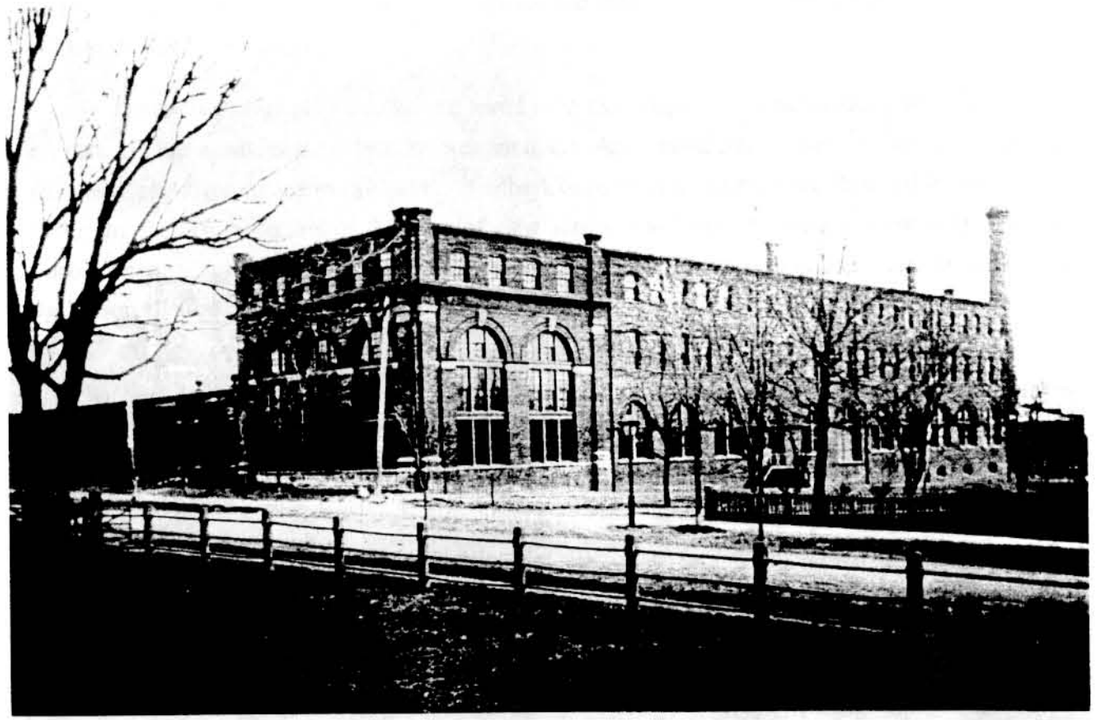
Landscape Site/ Setting:

The original parcel that Edison purchased for the Edison Laboratories was part of a vacant block located northeast of the intersection of Valley Road and Lakeside Avenue. (*see map [MA1], page 16*) The parcel was approximately two (2) acres in size and was considered Edison's personal property until a year before his death.[39] Because of its location, the parcel evenly divided (the immediate portion of) the block between the site and the "unimproved"[40] lots to the North. (*see photo [A5], page 21*)

Directly to the west of the Edison Laboratories was Valley Road. During this period of history, Valley Road still retained its original dirt construction and was bordered on either side with sidewalks and stately lined with trees. (*see photo [A5], page 21.*) The trees were spaced approximately 25' on center and were planted along the shallow banks that led down to road. To the south of the Edison Laboratories was Lakeside Avenue. Although it was considered a secondary road, Lakeside Avenue also was lined with



[A5] Figure 1.2. View east of the Edison Laboratories. Notice the unimproved lots to the left of the photo.



[A3] Figure 1.3. View northeast of the Edison Laboratories. The intersection of Valley Road and Lakeside Avenue is located in the center of the photograph. Lakeside Avenue extends into the background of the photo with its stately lined trees.[Source: Neg. No. 10.381/ 8, E.N.H.S. Archives]

trees, similar to Valley Road. (*see photo [A3], page 22.*) During this period of history, Lakeside Avenue continued westerly across Valley Road and into Llewellyn Park. Where Lakeside Avenue crossed Valley Road, a set of gates was erected across Lakeside Avenue and its neighboring sidewalks.

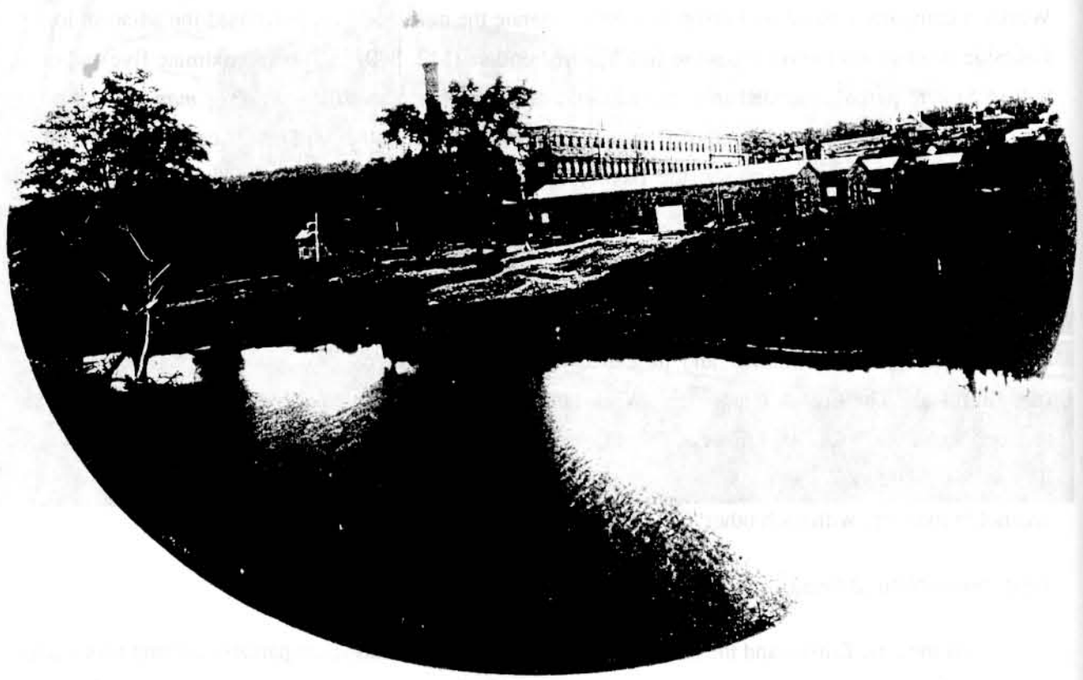
In 1888, Edison was ready to move on to a second industrial phase: mass production. Edison had always wanted to create "...the best equipped and largest laboratory extant and the facilities superior to any other for rapid and cheap development of an invention."[41] In order for him to achieve this goal the acquisition of more land for additional facilities was needed. On May 18, 1888, the Edison Phonograph Works, a company created by Edison in 1888 to operate the new facilities, purchased the adjacent lot on Lakeside Avenue for twelve thousand five hundred dollars ($12, 500).[42] The approximate five and one-half (5.5) acre parcel extended from the Edison Laboratories site southeasterly. (*see map [MA1], page 16.*) It was said that as the phonograph neared perfection in 1888, the workers "...could look out from their experimental rooms and see the factory buildings of the Phonograph Works rising up on the farmland next to the laboratory."[43] The Phonograph Works was completed in January 1889.[44]

The Edison Laboratories and the Edison Phonograph Works were considered separate entities. The Edison Laboratories was primarily a research facility whose sole purpose was to develop and conduct experiments in several related and unrelated fields, such as electricity, photography and geology (metallurgical). The Edison Phonograph Works, on the other hand, was essentially a manufacturing plant that conducted very few experiments. Dependence of the two on each other was minimal since each had its own facilities, including separate powerhouses and entrances, which allowed the two to run efficiently and not to interfere with each other.

Response to Natural Features:

At the time Edison and the Edison Phonograph Works purchased the parcels, the land was a large meadow. Any wildlife that might have existed lived within the vegetative successional growth that existed on the western parcel. The eastern parcel was farmland that was owned by a Mr. Elias M. Condit & wife, Sarah.[45] Separating this farm from the field was Crooks Pond. The sites' natural drainage system collected the storm water runoff into this pond. Its oval shape was approximately two hundred fifty feet by two hundred feet and was perpendicular to Lakeside Avenue.[46] (*See photo [A9], page 24.*)

After Edison purchased the sites, their natural systems were altered to accommodate the new facilities. The Edison Laboratories was located on a field, while the Edison Phonograph Works was



[A9] Figure 1.4. View west of the Edison Laboratories. Crooks Pond is located at the bottom of the photo. [Source: E.N.H.S. Archives]

constructed on the abandoned farmland. The wildlife of the sites most likely would have fled during the construction of the two facilities. The most obvious alteration was done to Crooks Pond. Because Edison was a business man as well as an inventor, he viewed land as a commodity. In response to his demand for more building space, Crooks Pond was filled in during 1890.[47]

One remaining natural feature was a brook that entered the Edison Phonograph Works site from the north, by the watchman's house and exited the southeastern end of the site, by the railroad bed. (*See map [MA1], page 16.*) After the brook traveled under the tracks it emptied into Wigwam Brook, which ran along the southeast boundary of the West Orange plant.[48]

Spatial Organization:

Throughout the West Orange plant, Edison and his staff stressed efficient use of the land and the spatial arrangements of the proposed structures. The West Orange plant illustrates the use of two spatial arrangement objectives.

Before he came to West Orange, Edison had worked in several laboratories and research facilities. As a business man and an inventor Edison came to realize the value of good communication between the various workers and himself. Although a phone system was installed at the West Orange plant, Edison and his workers needed to be able to find and meet in person to discuss problems that would arise regarding the various experimental projects. Thus this communication need resulted in a spatial arrangement objective, which influenced the density and arrangement of the facilities at the Edison Laboratories and the Edison Phonograph Works. All of the structures for both the Edison Phonograph Works or the Edison Laboratories were constructed at relatively close distances and at right angles to each other. This provided Edison and his staff with quick, efficient movement by reducing the amount of time needed to travel from building to building. In addition, moderate amounts of open space were preserved for the future growth that Edison had planned for the West Orange plant.

The other spatial arrangement objective was triggered by the need for efficient circulation of materials throughout the West Orange plant. Since the West Orange plant was composed of experimental research facilities and manufacturing facilities, there were a great number of diverse materials that circulated about the site. To direct the various flows of materials, Edison and his staff arranged the buildings within the Edison Laboratories and the Edison Phonograph Works so that they would define a

hierarchical circulation system. The simplicity of this system is illustrated in the fact that it is based on two components: the main transportation corridor, and several specialty access corridors.

In between the northern facade of the Main Laboratory (Building No. 5) and the southern facades of the smaller laboratories (Building No. 1-4) was the main transportation corridor. It extended eastward from the Gate House (Building No. 9) on Valley Road toward the Edison Phonograph Works and provided direct access to both the Edison Laboratories and the Edison Phonograph Works. Extending from the main transportation corridor, in a northeast-southwest fashion were the specialty access corridors that provided direct access to special loading areas, as well as access to the different entrances to the larger buildings. Since the majority of the buildings and structures within the West Orange plant were located perpendicular to the main corridor, the specialty access corridors were the spaces between them. One specialty corridor of note within the Edison Phonograph Works was defined by the rail road branch that extended into the site to deliver supplies, as well as transport the finished phonographs of the site. Another, more significant corridor, was the courtyard. Although its size might not suggest a true corridor, it did provide Edison and his workers access to a large open testing area, as well as access to the Physic's Laboratory and Chemical Laboratory (Building No. 1 & 2, respectively) It was within the courtyard that many of Edison's experiments tested and refined. Edison and his staff used the courtyard as an unrestricted work space for their larger projects. In addition, the courtyard served as a testing ground for the packaging of the products that were produced at the West Orange plant.[49] (*see photo [B14], page 31.*)

These two spatial arangement objectives made the Edison Laboratories and the Edison Phonograph Works an efficient industrial plant. They produced a dense building coverage with a clear and strong pattern of spatial organization.

THE EDISON LABORATORIES:

After sketching his concepts for the Edison Laboratories in his laboratory notebooks, Edison hired the architect who designed Glenmont, H. Hudson Holly, to turn his concepts into working drawings. In mid- May of 1887, Taylor and Mead, a local surveying company, surveyed the Edison Laboratories site. Construction began with the Main Laboratory and Power House (Building No. 5 & 6, respectively). During the first year of the Edison Laboratories' construction Edison established a temporary laboratory at the Edison Lamp Works in Harrison, N.J. where he and a skeleton crew of approximately 10 experimenters continued the development of electric light, ore milling, and phonographs. While the

construction continued on the Edison Laboratories, Edison received reports about the poor workmanship of the masons. It was suggested to Edison (by Jeff Waldron, a construction inspector hired by Edison) that since Holly hired the masons, he (Holly) and the masons were working together in trying to rob Edison by overcharging him for hours worked and building materials.[50] Upon hearing this, Edison deemed it necessary to come to the site in July 1887. During the visit, Edison became furious about the poor workmanship and fired Holly. Several days later he hired Joseph Taft, a local contractor, to supervise the final construction of the Main Laboratory.

The idea for smaller satellite laboratories (Building No. 1-4) originated during the construction of Main Laboratory,[51] As the Main Laboratory was being completed, it became obvious to Edison that the Main Laboratory's 37,500 square feet of floor space was not going to be enough for the kind of laboratory complex he had in mind. Subsequently the smaller laboratories (Building No. 1-4) were added to the master plan. In addition to supervising the final construction on the Main Laboratory, Taft was given the responsibility of supervising the construction of the four satellite buildings.[52] With this additional space, Edison began to produce drawings that divided functions among the structures.[53] Edison specified that the four satellite buildings (Building No. 1-4) be constructed of the "best hard burnt New Jersey brick" and be 100' long and 25' wide. The same length to width ratio as Building No. 5, 4:1. The front wall of the building that faced Valley Road (Building No. 1) was to be of "Hackensack front brick."[54] On July 2, August 15, and August 23 Mead & Taylor surveyed the site for the four smaller structures. On August 10, 1887, a contract was awarded to V.J. Hedden & Sons to construct the four smaller satellite buildings (Building No. 1-4).[55]

By September 1887 the Edison Laboratories began to take shape. The Main Laboratory was complete and work was underway on the four satellite buildings. Edison's close associate, Charles Batchelor, was given the task of supervising the construction of the mechanical systems for all of the buildings, as well as fitting out the interior of the Edison Laboratories. Batchelor was a close assistant to Edison since 1871 and was no stranger to industrial complexes, having been born in the industrialized "Black Country" of England.[56] Batchelor came to America as a skilled machinist and originally went to work in the textile mills in New England. After meeting Edison in Newark (on a job he was sent to do) he never returned home. Edison and Batchelor developed a close working relationship and Batchelor became the "conservative"[57] element needed to counterbalance Edison's thinking. It was apparent after the construction of the laboratories that Batchelor integrated the mill construction skills he learned while he was in New England.

At the end of September 1887, Batchelor began moving equipment from the temporary laboratory in the Harrison Lamp Works to the Edison Laboratories. During October and November loads of "experimental stuff" were shipped by horse cart from Harrison.[58] As soon as the experimental apparatus was installed, Edison and his men arrived from Harrison and started work.

Landscape Site/ Setting:

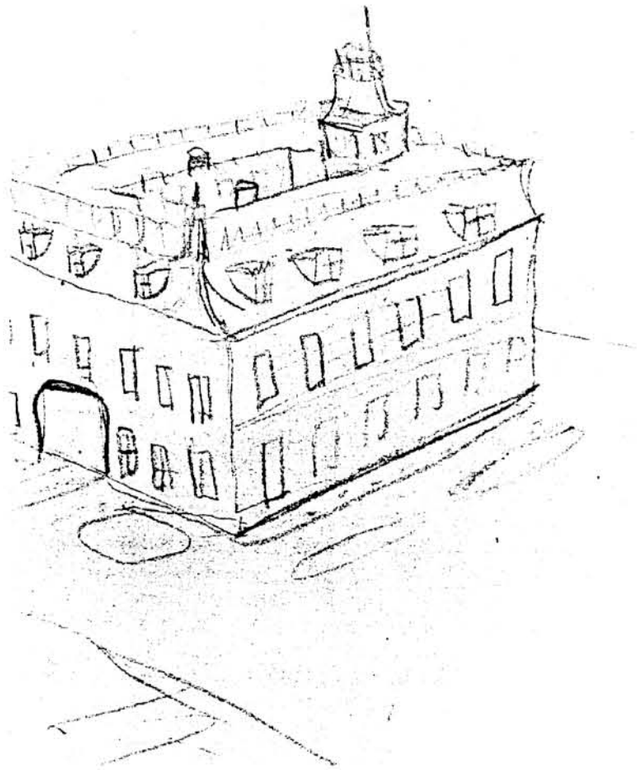
The Edison Laboratories originally was composed of six buildings, all of which were assigned building numbers. Building No. 5 was considered the Main Laboratory and was the largest of all the other buildings. The three story structure was erected with a width to length ratio of 4:1 (50': 200')[59] and as a result was rectangular in shape. The Main Laboratory 's 200' length was elongated to 250' by Building No. 6, which was attached to the Main Laboratory's eastern end. Building No. 6 was the Power House for the Edison Laboratories and was only a single story, but with a smoke stack that rose several stories. Since the Power House and the Main Laboratory were attached, they were considered as one structure, but separate units. The other four buildings were all single story structures that were erected with the same width to length ratio as the Main Laboratory, 4:1 (25':100')[60]. These four remaining buildings were referred to as Building No. 1-4.

The distance between Building No. 2-4 is approximately 30', while the distance between Building No. 1 and 2 was approximately 96'.[61] (*See Map [A1], page 30,*) and could be used as a courtyard. This courtyard effect was stressed by Edison in his early proposed designs, which focused on a single building encompassing a courtyard. (*see photo [A11], page 29.*)

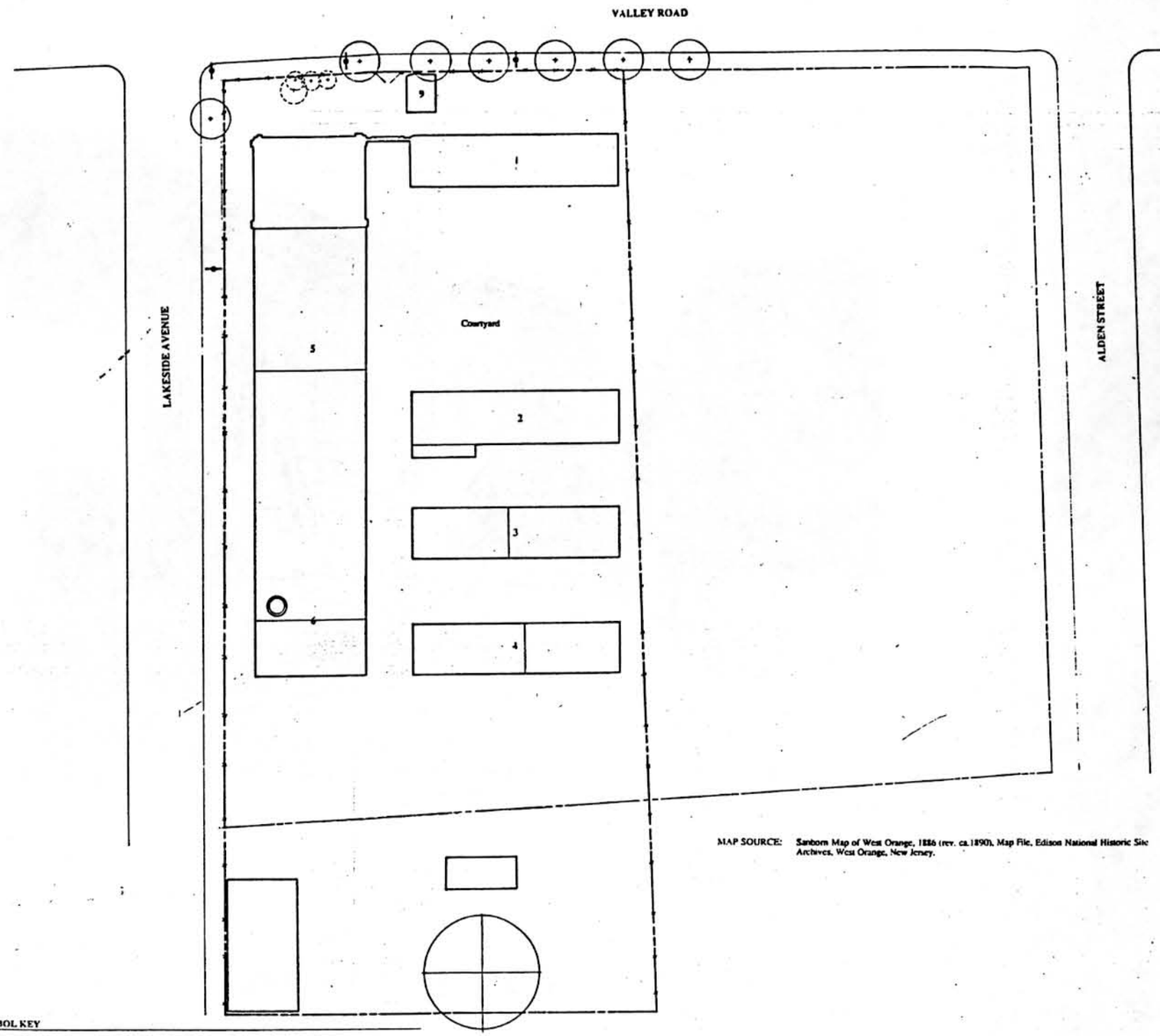
This arrangement of the Edison Laboratories was nestled into the corner intersection of Valley Road and Lakeside Avenue, with the longer Main Laboratory running down Lakeside. One of the possible reasons for this arrangement was so that the facade of the Main Laboratory could face and impress the visitors traveling west from New York City along West Orange's main road, Valley Road.

Landform:

The West Orange plant was located along the southeast base of First Watchung Mountain. The land southeast of the base was generally level forming a valley floor that drained into the Passaic



[A11] Figure 1.5. One of Edison's sketches for the new laboratory, drawn in a notebook in 1886.[Source: E.N.H.S. Archives]



MAP SOURCE: Sanborn Map of West Orange, 1886 (rev. ca.1890), Map File, Edison National Historic Site Archives, West Orange, New Jersey.

BUILDING KEY

Building No.	Building Name	Building Construction
1	PHYSICS LABORATORY	1 Story Brick Building
2	CHEMICAL LABORATORY	1 Story Brick Building
3	CHEMICAL STORAGE & PATTERN SHOP	1 Story Brick Building
4	METALLURGICAL BUILDING	1 Story Brick Building
5	MAIN LABORATORY	3 Story Brick Building
6	POWER HOUSE	1 Story Brick Building
9	GATE HOUSE	1 Story Wood Building

SYMBOL KEY

Symbol	General	Symbol	General	Symbol	Vegetation
	FENCE & PROPERTY LINE		UTILITY POLE		DECIDUOUS TREE
	E.N.H.S. PROPERTY LINE (1992)		BUILDING ERECTED DURING THIS PERIOD		DECIDUOUS TREE REMOVED DURING THIS PERIOD
	EDISON LABORATORIES PROPERTY LINE		LOCATION OF BLACK MARIA		
	GATE				

Map [MA1]

CULTURAL LANDSCAPE REPORT: EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement CA1600-1-9013: 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: EDISON LABORATORIES: THOMAS ALVA EDISON STEWARDSHIP:1887-1899

ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

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SCALE: 1" = 30' - 0" (Approximately)
0 30 60 120 Feet
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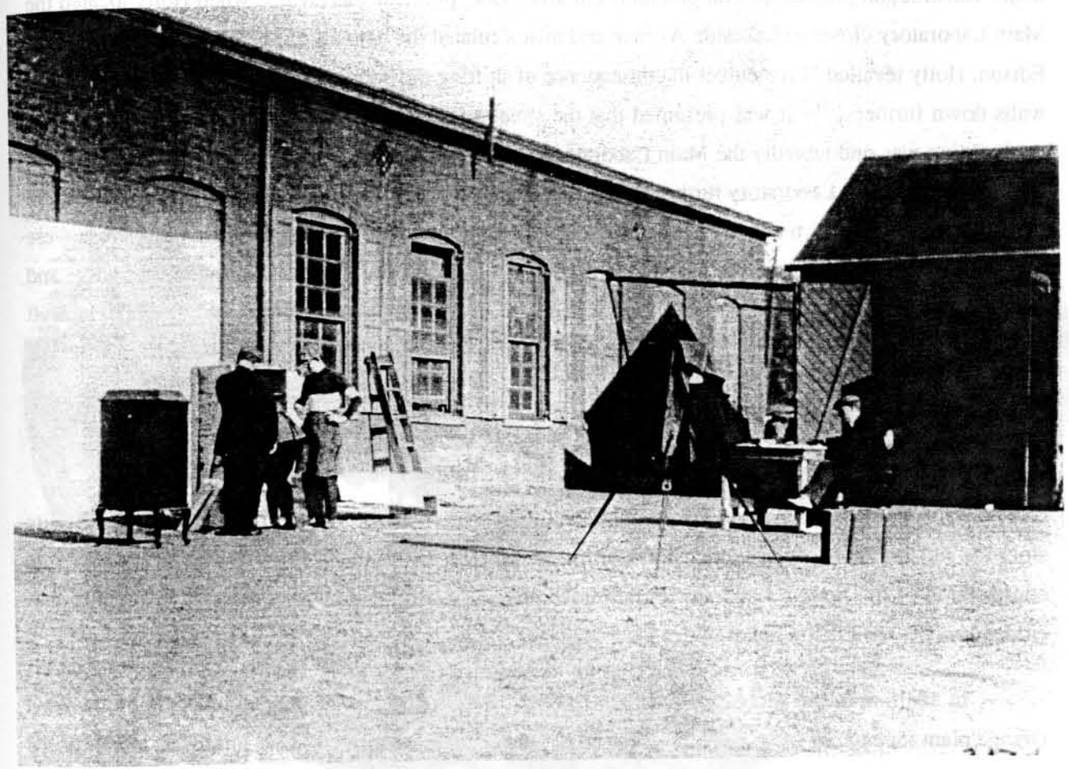


[B14] Figure 1.6. (1912) Packaging of Phonograph in Courtyard. View north from within the courtyard. [Source: Album #10, E.N.H.S. Archives]

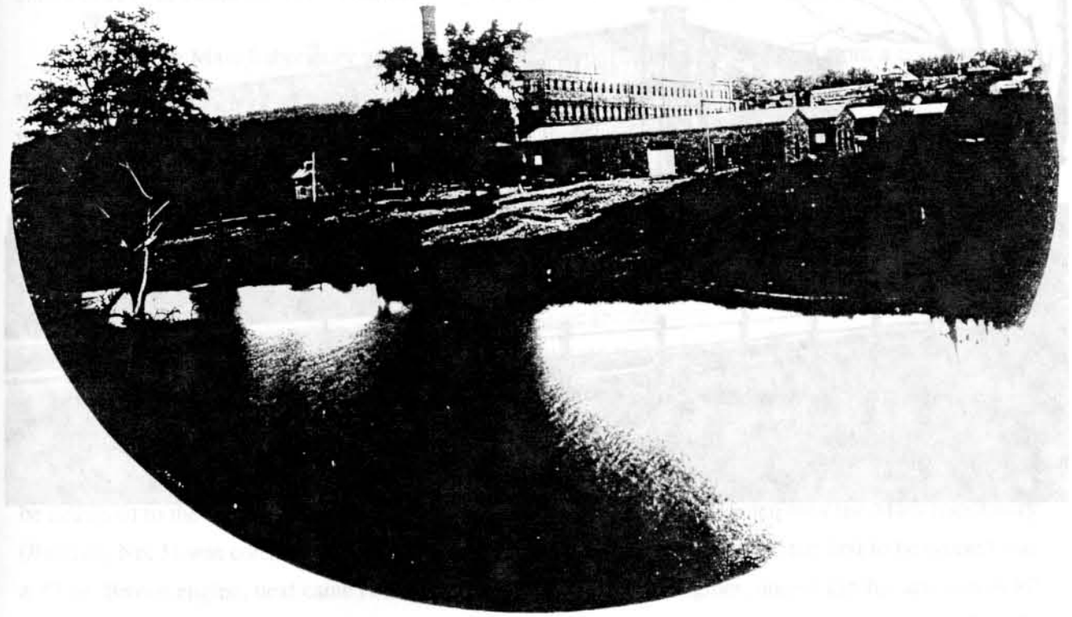
River. This resulted in the West Orange Plant having a slight to moderate slope, which allowed Edison and his staff to erect the buildings within the plant without many grading changes. However, as with any major construction project, several problems did arise. One problem was created when Holly located the Main Laboratory closer to Lakeside Avenue and miscalculated the amount of brick needed. In a letter to Edison, Holly recalled "I remember in consequence of shifting the building nearer the street it carried the walls down further...."[62] It was presumed that the street referred to by Holly was Lakeside Avenue and the building was undoubtedly the Main Laboratory since it was the only building he was involved with. By moving the Main Laboratory further southeast, more of the southeastern facade of the building would have been exposed thus requiring a greater number of brick to cover it. Other problems that arose were typical of excavation projects, such as removing the excavated material in order to bring the entrances and exits to grade. In a letter to Edison, Holly was concerned about this issue and stated "Would it not be well to have the grading started now! Mr. Everetts entrance calls for him to grade the earth arising from the excavation, but considerably more will be required."[63]

Vegetation:

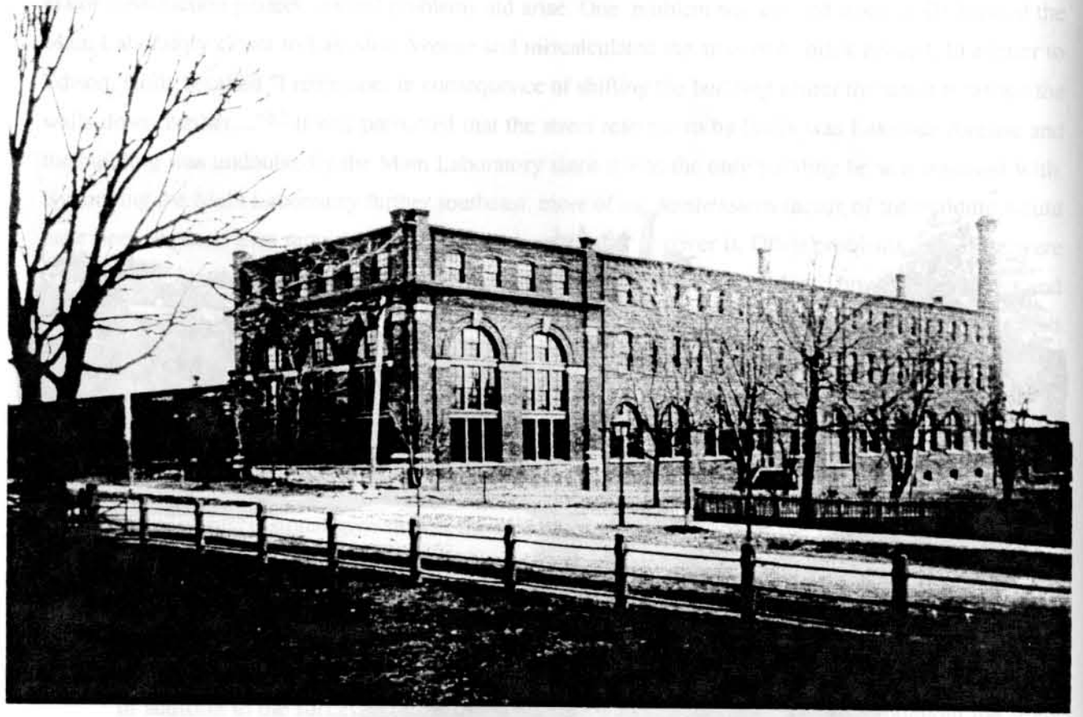
Primary successional growth was the major form of vegetation at the Edison Laboratories site since the Edison Phonograph Works site. During this period most of the vegetation was removed for the construction of the Edison Laboratories buildings. The remaining successional growth eventually was eroded away as the Edison Laboratories work force used the site.

In addition to the successional growth, several mature trees were scattered throughout the West Orange plant (*See photo [A9], page 33.*) Several of these trees were located at the southwest corner of the Edison Laboratories site. These trees grew along eastern edge of the sidewalk that ran parallel with Valley Road and were directly west of the Main Laboratory's library facade. In addition to the trees, the western elevation of the Edison Laboratories contained small flowering plants located along the western foundation of the Physics Laboratory (Building No. 1). (*see photo [A3], page 34.*)

No information was found to identify these plants or any other types of vegetation that existed at the Edison Laboratories site during this period. Since Edison was more concerned about the operations of his new facilities than their appearance it would be rational to conclude that there weren't any new plantings during the Edison Laboratories' construction.



[A9] Figure 1.7. View west of the Edison Laboratories. [Source: E.N.H.S. Archives]



[A3] Figure 1.8. View northeast of the Edison Laboratories. Notice the small plants planted along the western facade of the Physics Laboratory (Bldg. No. 1)[Source: Neg. No. 10.381/ 8, E.N.H.S. Archives]

Buildings and Structures: (Original)[64]

The Main Laboratory (Building No. 5) - The first design to be seriously considered for the Main Laboratory was the work of H. Hudson Holly. The architect produced a plan for a three -story rectangular building 250' long (including the 50'x50' Power House [Building No. 6]attached on the eastern end) and 50' wide. This was like the commercial structures that Edison had always worked in, but it had impressive two story arched windows at one end, which gave it the air of a public or academic building.[65] The exteriors of both buildings were constructed entirely out of brick laid in a running bond pattern.

Since the Main Laboratory was erected along a slope, its foundation varied from a crawl space at the western end to a full basement at the eastern end.. The first floor was given over to Edison's spacious library and a large machine shop. Adjacent to the machine shop was the Power House's (Building No. 6) engine room whose boilers and steam engines provided power and heat to the Edison Laboratories. A system of overhead shafts and pulleys turned the belts, which ran the machine tools. This system was typical of the mills and factories of industrial America. Steam was carried from the boilers through the pipes which ran along the walls of the lab buildings, providing heat for the New Jersey winters.[66]

The Power House (Building No. 6) - This structure is divided into two rooms: the boiler room (positioned next to the Main Laboratory [Building No. 5]) and the engine house. In 1887 Edison purchased three Babcock and Wilcox Boilers of 219 horsepower arranged into two batteries. These large boilers were made to order and came with ornamental fronts. They were the first pieces of machinery to be delivered to the Edison Laboratories, arriving on September 17, 1887, when only the Main Laboratory (Building No. 5) was constructed.[67] The boilers fed steam into several engines: the first to be erected was a 40 hp. Brown engine; next came two Armington and Sims steam engines, one of 125 hp. and one of 80 hp., to drive the overhead shafts and belts of the machine shops in the Main Laboratory (Building No. 5). By November 25, 1887, all of the engines were installed, steam pressure had been raised in the boilers and the large brick chimney rising out of the Power House (Building No. 6) was emitting smoke--work had begun at the Edison laboratory in West Orange. [68]

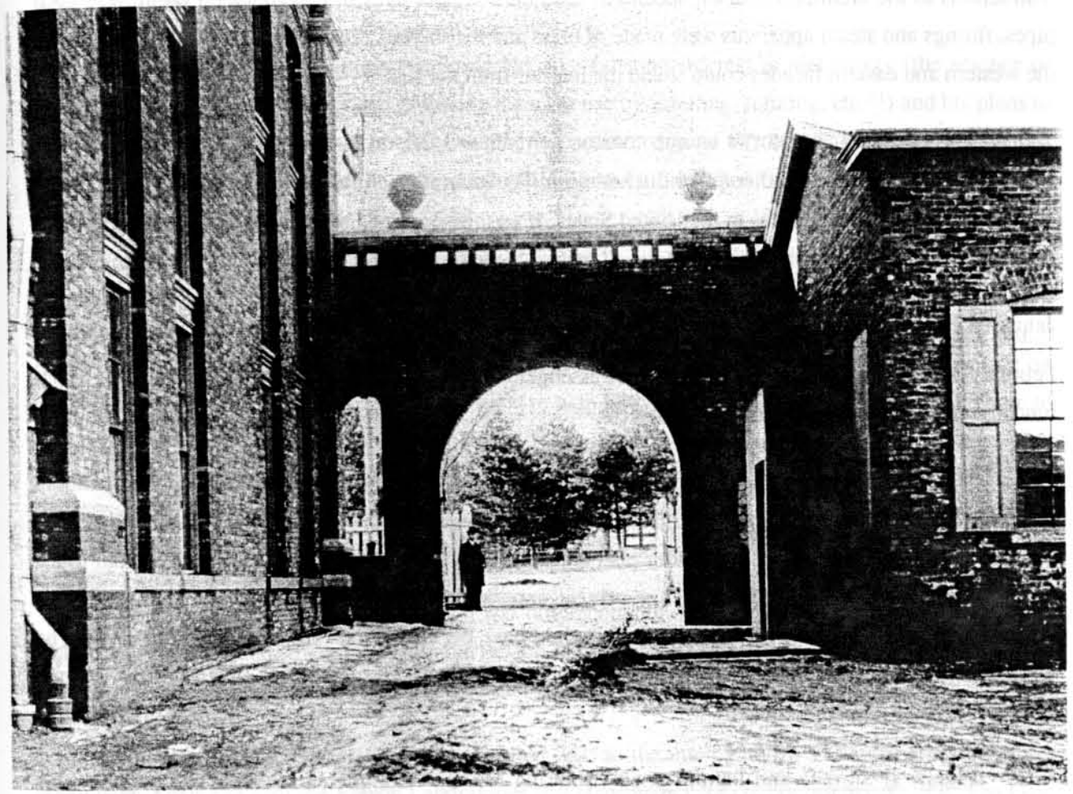
These engines also ran a set of Edison dynamos that were brought to the lab in December 1887 to produce electricity. The Edison Machine Works, another one of Edison's business ventures (located in Schenectady, N.Y.) provided a number of the dynamos used at the West Orange plant. This equipment was delivered with the switches, circuit boards, meters, and regulators required to set up and run a central

station system. The switchboards, which operated as the central station, were installed in the basement of the Main Laboratory (Building No. 5).[69] Charles Batchelor installed this equipment and with the help of several experimenters began to wire the system through the Edison Laboratories. Each laboratory building within the Edison Laboratories was wired for several different voltages and amperages. There was a 100 volt direct current system in all rooms running from 3/8 inch wire. Batchelor dug trenches in the Edison Laboratories' courtyard to run underground cables from the Power House (Building No. 6) to the rest of the Edison Laboratories.[70]

In December 1887, just after the Edison Laboratories opened, Edison had Batchelor run the power lines to houses in Llewellyn Park. Although the initial plan was to light and power Edison's house, Glenmont, it also was evident that he now had a small electricity supply system to test dynamos and central station measuring equipment. This was a time of rapid growth in the electrical supply industry and new equipment was being developed at a hectic pace. During the 1880's and 1890's that the Power House (Building No. 6) was possibly referred to as the "dynamo room" since many different pieces of equipment were tested here.[71] (This was the site of the infamous electrocution experiments of the "Battle of the Systems." Edison set out to prove that alternating equipment was dangerous and succeeded in this goal by a series of highly publicized experiments carried out in this building. A Siemens alternator was acquired and connected to a metal sheet placed on the floor. Several small animals were coaxed onto the sheet and the current applied. The newspapers provided artist's impression's of the experiments, which were greatly exaggerated, but there were no photographs ever published of the interior of this building during the "Battle of the Systems."[72])

The Physics Laboratory (Building No. 1) - This building, which was referred to as the "Galvanometer Room" by Edison and his men, was the next building to be completed in 1887. (*See photo [A1], page 37.*) Electricity had been an important and profitable field for Edison's experiments and his plans for the lab had always included an experimental area for electrical work. His business plan for the Edison Laboratories hinged on a steady income from contract research from the electrical utility staff.[73]

The original drawings made by Joseph Taft show a storage space at the front of the building and a line of 6 pier tables on which to mount the galvanometers and other electrical measuring equipment. Because of the sensitivity of this equipment, special precautions needed to be incorporated into the Physics Laboratory's building specifications. To absorb any shocks that might possibly affect the equipment, the foundation for the Physics Laboratory was constructed from a combination of brick and



[A1] Figure 1.9. View west from within the Edison Laboratories' courtyard. The building on the left of the photo was the Physics Laboratory (Bldg. No. 1)[Source: Album #64, E.N.H.S. Archives]

concrete. In addition, the entire Physics Laboratory was constructed out of non-ferrous materials. (Farrous materials would have interfered with the sensitive magnetic measuring devices installed in the lab.) In his instructions to the architects, Edison specified "...all nails copper nails in galvanometer building."[74] All pipes, fittings and steam apparatus were made of brass and the shutters directly outside the windows along the western and eastern facades could shield the interior from the sun.

The Physics Laboratory's unique construction allowed Edison and his staff to conduct electrical experiments without fear of disruptive disturbances. The laboratory in this building was one of the best equipped electrical laboratories in the United States. It was the pride of Edison and the center piece of the Edison Laboratories. David Trumball Marshall, one of the experimenters of the Edison Laboratories (who were called "muckers"), was sometimes given the task of showing visitors around the lab. He claimed that "...the star exhibit was the galvanometer room."[75] This impressive facility suffered a major setback in February of i892 when the Newark Electrical Passenger Railway laid its tracks along Valley Road , which rendered its sensitive testing equipment useless.[76]

The Chemical Laboratory (Building No. 2) - This building was established as a chemical laboratory and was completed in 1887. Its concrete floor was inclined so that liquids would run into two drains.[77] The Chemical Laboratory's floor plan contained one main experimental room and a room in the back. The rear room might have been a private experimental room for Edison--something he was determined to have in his new laboratory--or it might have been reserved for measuring equipment. The work of the Chemical Laboratory was centered on two projects: insulation for electric wires and the cylinder record for phonographs.[78]

Chemical Storage and Pattern Shop (Building No. 3) - Completed in 1887, the plan for this building shows it neatly divided into two equal parts. The front part of Building No. 3 was reserved for general storage and the storage of bulk chemicals. This was certainly not the only storage facility in the West Orange laboratory. Chemicals also were stored in the main stock room in the Chemical Laboratory (Building No. 2) and in several parts of the Main Laboratory (Building No. 5).[79]

The rear half of Building No. 3 was established as a carpenter's shop. In addition to making wooden shelving and cupboards for the Edison Laboratories, this shop had the important task of making the patterns used in mass production at the Edison Phonograph Works. Edison's grand strategy for the Edison Laboratories was to use it to refine the process of mass production of the new products coming

from the experimental rooms. He envisaged "The Laboratory supplying the perfected invention (s) models pattern (s) and fitting up necessary special machinery in the factory for each invention."[80] The patterns were to be made in this shop.

The Metallurgical Building (Building No. 4) - Edison's interest in metallurgy (the science of separating metals from their ores and preparing them for use by smelting, refining, etc.[81]) and his plans to extract ore magnetically were the motives behind the construction of this building, which was the last building completed in 1887. The Metallurgical Building had a brick floor in a herringbone pattern and was fitted with rock crushers and assaying equipment.[82]

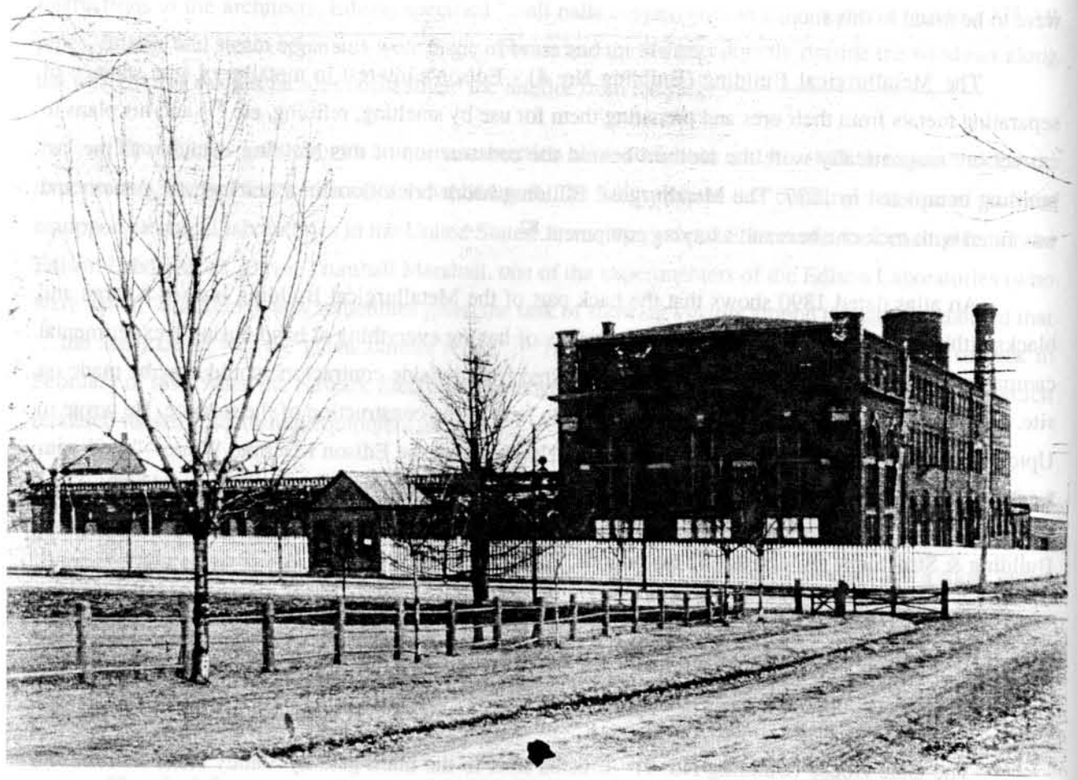
An atlas dated 1890 shows that the back part of the Metallurgical Building housed a forge and blacksmith's shop. This was part of Edison's strategy of having everything at hand during a experimental campaign. Castings, that had previously been acquired from outside contractors, could now be made on site. Edison asked his old employee Francis Upton to help in the construction of the furnace. He wrote to Upton that he wanted the furnace just like the one Upton had at the Edison Machine Works--"send your bricklayer to lab, it is to go into metallurgical building."[83]

Building & Structures: (Added during the period)[84]

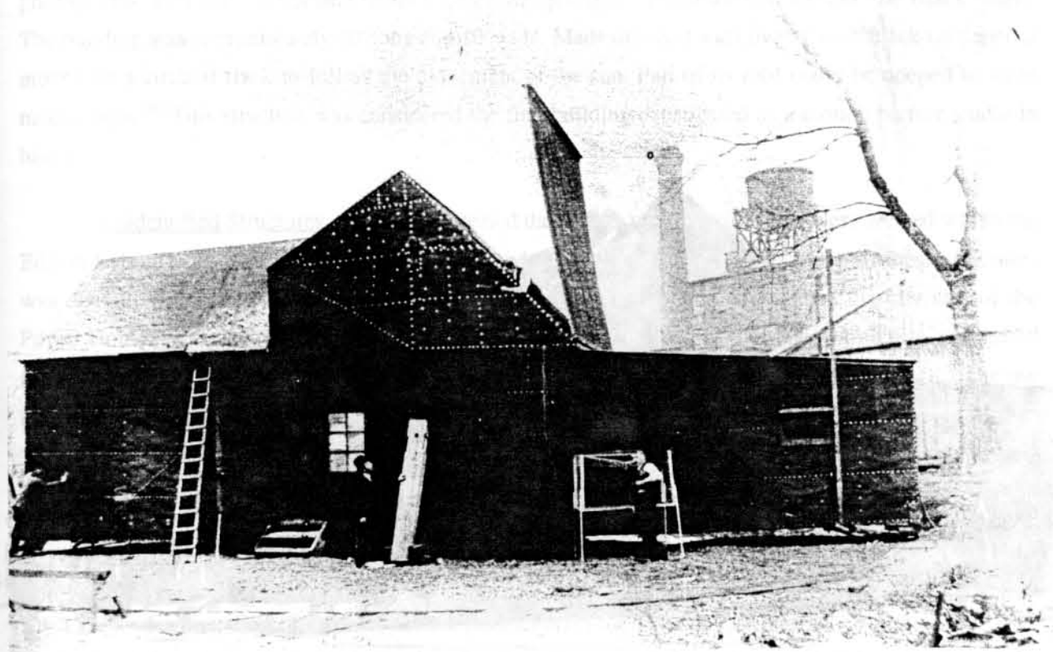
Throughout the 1880' s and 1890' s it was not uncommon for members of Edison' s staff to build additional small wooden structures within the Edison Laboratories. These sheds and lean-tos were built so they could each accommodate a particular invention.[85]

The Gate House (Building No. 9) - Erected next to the main gate by Valley Road in 1890. So many people came to visit the Edison Laboratories that steps were taken to control access to it. The Gate House was meant to keep unauthorized people out of the Edison Laboratories. (*See photo [A(B)], page 40.*)[86]

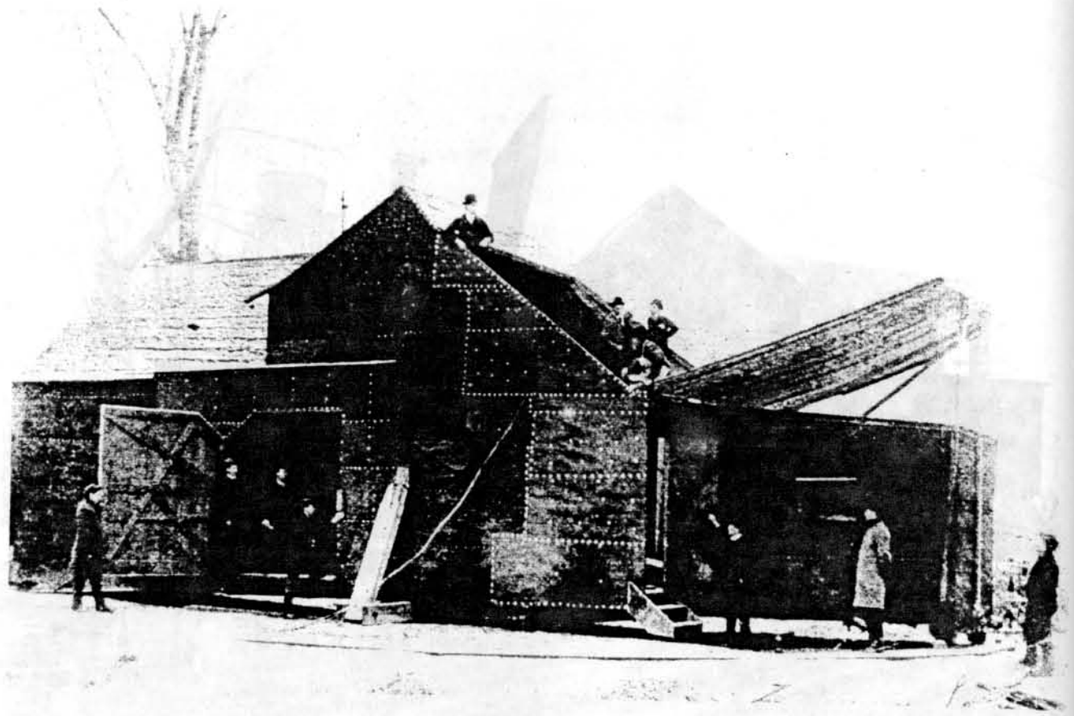
The Photographic Building (No Building Number) - Situated south of the Metallurgical Building (Building No. 4), this small glass roofed building was erected sometime in 1889 to enable Dickson, one of Edison's chief employees, to take photographs used in his motion picture experiments.[87]



[A(B)] Figure 1.10 View east of the Edison Laboratories. The building located within the white fence was the Gate House (Bldg. No. 9)[Source: Album #64, E.N.H.S. Archives]



[A6] Figure 1.11. View southwest of the Black Maria.[Source: E.N.H.S. Archives]



[A7] Figure 1.12. View northeast of the Black Maria.[Source: E.N.H.S. Archives]

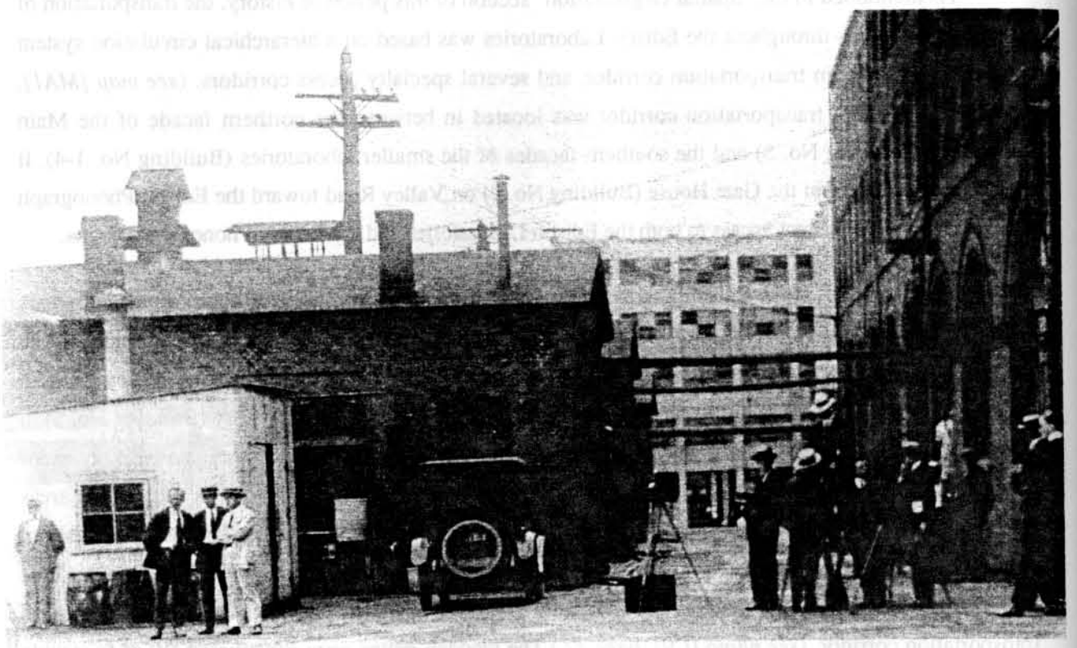
The Black Maria Film Studio (No Building Number) - This structure was built to take pictures for the kinetescope in 1893.[88] (*See photo [A6] & [A7], pages 41 & 42,*) Although described as a "revolving photographic building," it became famous under the nickname coined for it at the lab--the Black Maria. The building was approximately 40' long and 10' wide. Made of wood and covered with black tar paper, it moved on a circular track to follow the movement of the sun. Part of its roof could be opened to let in natural light.[89] This structure was considered the first building constructed as a motion picture studio in history.

Unidentified Structures - During this period there were two structures that were erected within the Edison Laboratories site whose building names and uses were not documented. One of these structures was documented on a map as "Wax M,F,Y,"[90], (manufactory) and it was located directly east of the Power House (Building No. 6). (*See photo [A(B)], page 40.*) The other unidentified structure was a shed that was located east of the Metallurgical Building (Building No. 6). (*See photo [A4], page 44.*) The use and name of this shed also were not documented.

Mechanical Systems:

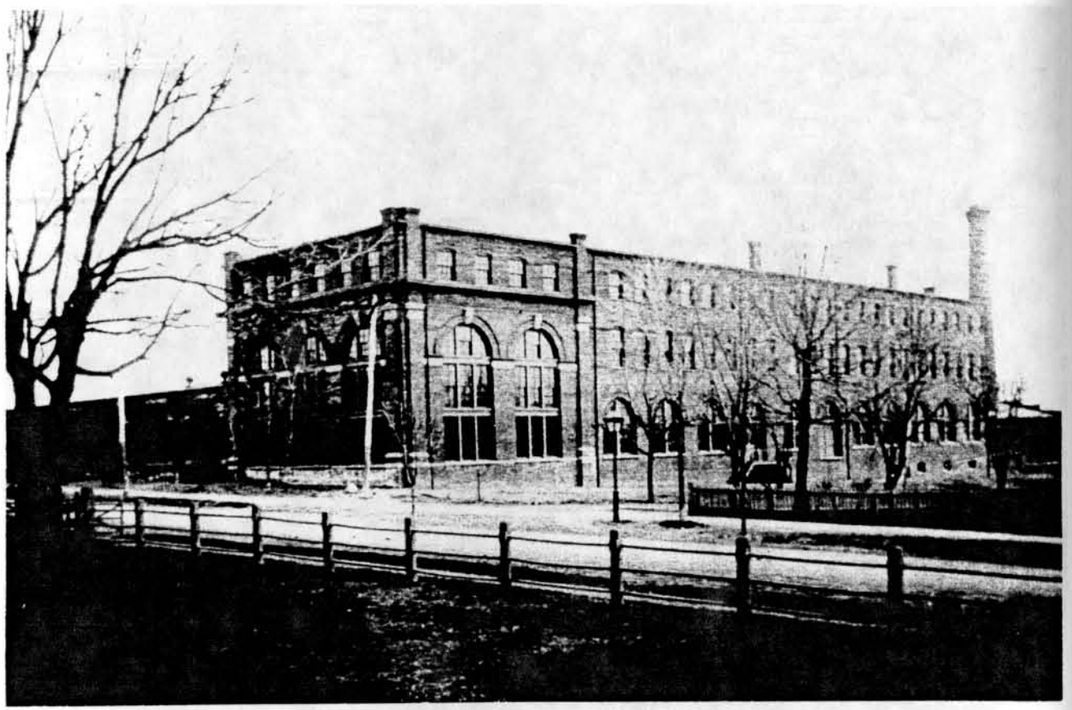
One of the mechanical systems established at the Edison Laboratories was the site's drainage system. The southeast slope that existed through out most of the Edison Laboratories site created a natural sheet flow of water run off that ran almost parallel with the smaller laboratories (Building No. 1-4), toward the Main Laboratory (Building No. 5). The slight grade from the southern foundations of the smaller laboratories (Building No. 1-4) created a drainage swale that captured the water run off and carried it east, toward the Edison Phonograph Works. The same type of drainage system occurred along the northern foundations of the Main Laboratory (Building No. 5) and the Power House (Building No. 6). The water runoff from this system was also carried east, toward the Edison Phonograph Works.

Utilities for the Edison Laboratories were installed underground. Gas was piped in by a series of 2" gas lines from the Orange Gas Light Company and the Citizens Gas Light Company.[91] The water was supplied by the City of Orange. Some of the water was pumped to a water tower that was erected between 1888 and 1889 on top of the Main Laboratory (Building No. 5). (*See photo [A6], page 41.*) Installation of an underground electric lighting system was completed in December 1887.



[C5] Figure 1.14. View east from within the Edison Laboratories' courtyard. Notice the ramps located in front of each of the smaller laboratories (Bldg. No.'s 2-4).[Source: Album #10, E.N.H.S. Archives]

[C9] Figure 1.15. View of the southern facade of the Chemical Laboratory (Bldg. No. 2). Notice the wood ramp that leads into the main entrance of the building.[Source: Album #42, E.N.H.S. Archives]



[A3] Figure 1.16. View northeast of the Edison Laboratories. Notice the stairway located on the southern facade of the Main Laboratory (Bldg. No. 5).[Source: Neg. No. 10.381/ 8, E.N.H.S. Archives]

step was about $1^1/2$'x6' and was about 6" in height. In addition to this main entrance, another entrance was located on the southern facade of the Main Laboratory. (*see photo [A3], page 48.*) A door and frame was positioned within one of the large arched windows along the southern facade of the Main Laboratory, near the stock room.[92]cThe first floor elevation of the Main Laboratory was a little more than 3' above grade along its southern facade. As a result, a series of stairs was erected. Protruding from the first floor entrance stairs were needed to enter the building.

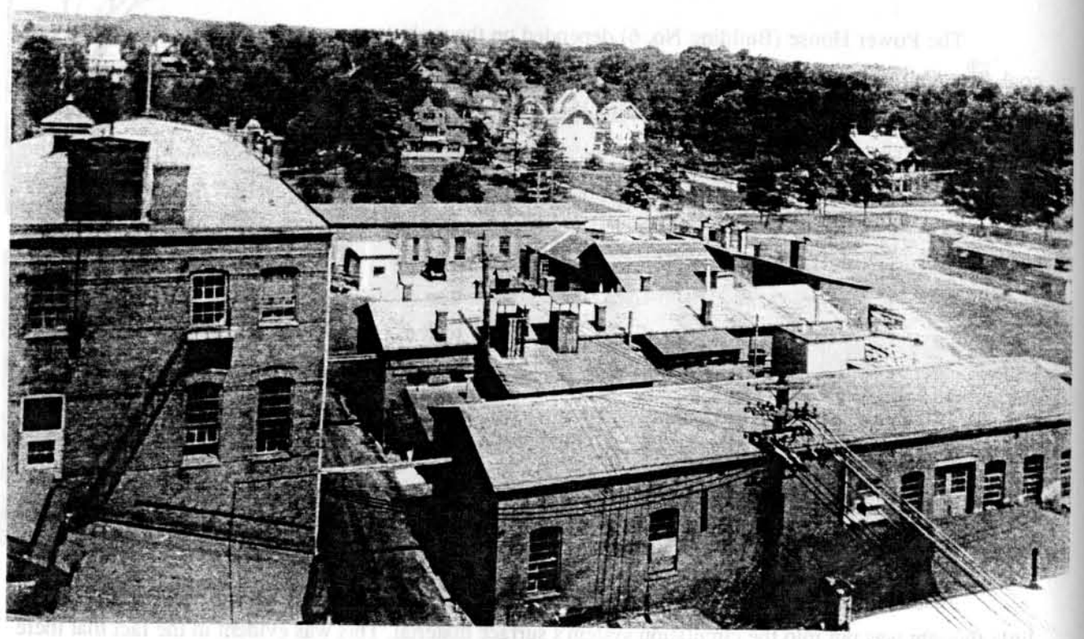
The Power House (Building No. 6) depended on the main transportation corridor for delivery of coal. The coal was burned to heat the water within the Edison Laboratories' boilers. This whole system was housed within the Power House 50' by 50' frame and as a result, left little to no room for coal storage. Thus, the coal that was delivered was stored directly across from the Power House, in between the Metallurgical Building and the Chemical Storage and Pattern Shop (Building No. 3 & 4, respectively). (*see photo [B13], page 50.*)

Some deliveries to the Edison Laboratories were required to be made to areas in between the smaller laboratories (Building No. 1-4). To gain access to these areas from the main transportation corridor, specialty access corridors were created. These corridors extended from the main transportation corridor in a northeast-southwest fashion and were defined by the alleys between the smaller laboratories (Building No. 1-4). In addition to providing access to special loading areas, the specialty access corridors provided Edison and his staff access to some of the smaller laboratories' (Building No. 1-4) other entrances.

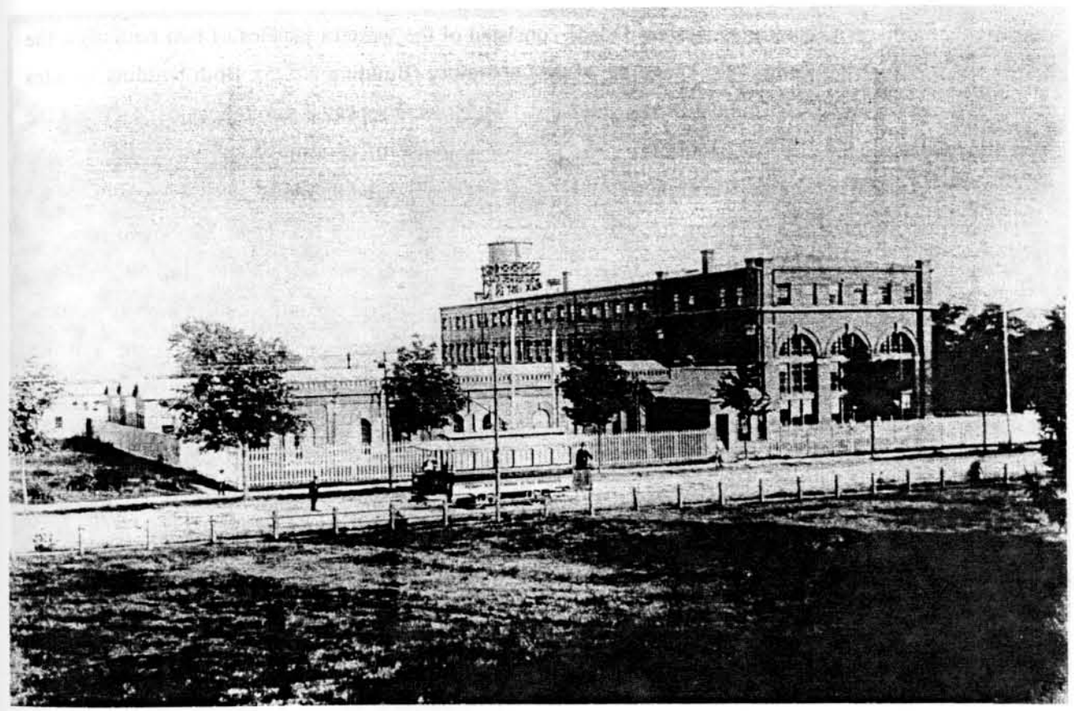
Although much thought went into the planning of the Edison Laboratories circulation system, little thought was put into the circulation system's surface material. This was evident in the fact that there was no surface material, except for the grass that existed along the corridors. After several years, the grass eroded away and the corridors resembled wide dirt paths.

Views/ Vistas:

The most prominent views of the Edison Laboratories were of it western facade, along Valley Road. Throughout the period, many reproduced photographs and renderings of the Edison Laboratories (in journals, letters, newspapers, etc.) were taken from across Valley Road, and as a result the western



[B13] Figure 1.17. (1912) View Northwest of the Edison Laboratories. Notice the coal stored in between the Chemical Storage and Pattern Shop (Building No. 3) and Metallurgical Building (Building No. 4).[Source: Album #10, E.N.H.S. Archives]



[A5] Figure 1.18. View east of the Edison Laboratories. Notice the repeated arched forms along the western facades of the Physics Laboratory (Building No. 1) and the Main Laboratory (Building No. 5).[Source: E.N.H.S. Archives]

facade of Edison Laboratories. became well documented and well known. "The laboratory presented a dignified face to the world passing on Main Street (Valley Road)."[93] (*See photo [A5], page 51.*)

The Edison Laboratories western facade consisted of the western facades of two buildings, the Physics Laboratory (Building No. 1) and the Main Laboratory (Building No. 5). Both building facades contained a series of architectural patterns and forms, which were repeated throughout each, giving the western facade of the Edison Laboratories, as a whole, a sense of continuity and unity. One of the repeated forms was of the library's impressive arched windows, located on the western wing of the Main Laboratory (Building No. 5). Along the Physics Laboratory's (Building No. 1) facade was a series of arched windows that were at a smaller scale than the library's. The arched shutters that covered the windows along the western facade of the Physics Laboratory further accentuated the arched window pattern, especially when the shutters were open. The repeated arched forms linked the Physics Laboratory's and the Main Laboratory's facades visually, as well as, physically. In between both facades was a brick archway that served as the entrance to the Edison Laboratories' courtyard.(*see photo [A5], page 51.*) (Because of its ornate appearance, this archway became the backdrop for many of the photographs that were taken within the Edison Laboratories.)

In 1890, the view of the Edison Laboratories from Valley became partially obscured because of a "small, shingle style frame structure"[94] that was built between the fence and building one. This building was the Gate House (Building No. 9) and as mentioned earlier, in the "Circulation" section of this period, it served as the main entrance to the Edison Laboratories.

Furnishings & Objects:

The picket fence that surrounded the Edison Laboratories site was installed in September of 1888, by Williams & Woodruff, a local woodworking company.[95] (*see photo [C4], page 53.*) The fence was constructed out of wood slats that were about 2"x6" spaced every 9". The smoothly cut slats were about 6'-6 1/2' in height. and the tops of each slat came to a point. The roughly cut posts that supported the fence were located behind the fence and were thus, hidden from view along Valley Road. At the main entrance of the Edison Laboratories the fence contained two points of entry. Adjacent to the Gate House (Building No. 9) was the larger point of entry, which consisted of two gates that swung toward the Edison Laboratories site. This access point was the main entrance and exit for deliveries and visitors of the site that came in large numbered groups.[96] Next to the two gates was a third, narrower gate. This second

[C4] Figure 1.19 "Capt. Jack Crawford bursting forth into [unidentifiable]." View of the interior corner of Lakeside Avenue and Valley Road.[Source: E.N.H.S. Archives]

point of entry was used by visitors of the site in addition to Edison' s staff. No other site furnishings or objects were documented as existing during this period.

SUMMARY:

Shortly after Edison had purchased his home, Glenmont, in Llewellyn Park (West Orange) he had decided to build the Edison Laboratories less than 1,000' from the new home. The site chosen for the Edison Laboratories was an open field that was nestled in the valley 350' below Glenmont.

The Main Laboratory (Building No. 5) and the Power House (Building No. 6) were the first buildings to be erected. By September 1887, four smaller laboratories (Building No. 1-4) were erected and several months later the Edison Laboratories opened for business. All of the buildings within the Edison Laboratories were spatially arranged according to a hierarchical circulation system that was based on two components; the main transportation corridor, and several specialty access corridors. The These corridors made it possible for goods and materials, as well as pedestrians, to circulate freely and efficiently throughout the site. The courtyard created within the Edison Laboratories falls into the specialty access corridor category due to the access it provided Edison and his workers to open testing area. Utility lines were installed underground, while storm water drainage was achieved by a man made swale created along the foundations of the smaller laboratories (Building No. 1-4). Two years after the Edison Laboratories was completed a Gate House was constructed directly to the west of the Physics Laboratory (Building No. 1). Although this structure partially obscured the most prominent view of the Edison Laboratories from Valley Road, it was deemed necessary in order to secure the site from unauthorized visitors.

The work that was performed at the site during this period focused primarily on the phonograph and on several electricity experiments. However, after the financial setbacks of the depression and the failure of the ore milling project, the experiments conducted at the site were cutback. During the cutbacks Edison and his staff had the time necessary to plan the Edison Laboratories future in the twentieth century.

Thomas Alva Edison Stewardship: 1900-1914

THE WEST ORANGE PLANT

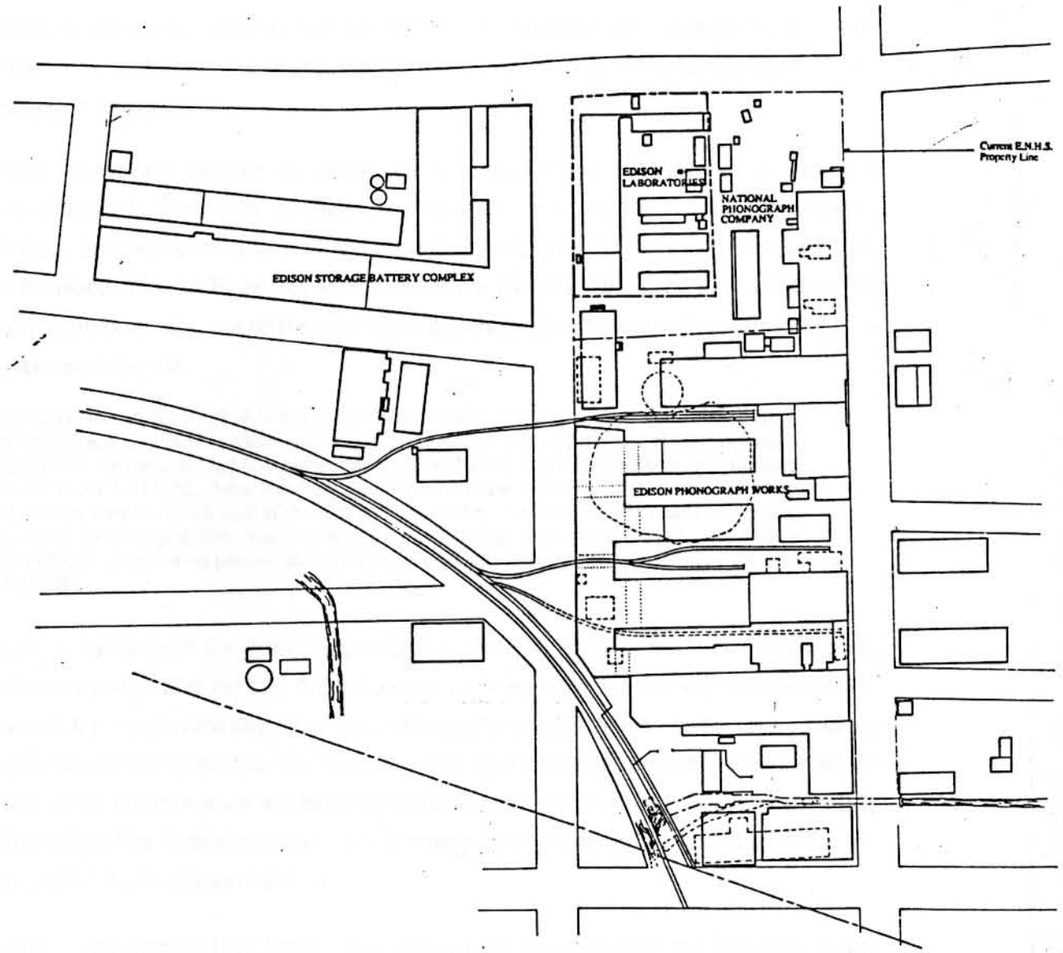
This period marked the resurgence of the West Orange plant after the Great Depression of the nineteenth century. The phonograph business finally began to meet Edison's expectations and the yearly income of over a million dollars that came from the phonograph supported a massive program of expansion at the West Orange plant.[97]

The expansion of the West Orange plant was supported through Edison and two of his companies; the Edison Phonograph Works and the National Phonograph Company. The National Phonograph Company was created toward the end of the nineteenth century to handle the non-manufacturing aspects of the Edison Phonograph Works. On June 27, 1899, the National Phonograph Company purchased one of the lots north of the Edison Laboratories from Fred G. Devonald and his wife.[98] This marked the beginning of a series of land acquisitions that were made during the early 1900s. Between 1899 and 1908, approximately forty-three lots were purchased by the Edison Phonograph Works and National Phonograph Company. The majority of the agreements were "...in consideration of one dollar and other valuable considerations...." As a result, the overall price for the additional twelve acres (approximately) was under two thousand dollars.

As the properties were purchased Edison went on a building spree that added many new buildings to the West Orange plant, such as: an administration building (Building No. 25), a new building to make records (Building No. 24), enlargements to the Edison Phonograph Works, and a completely new set of storage battery factories (Building No. 130-140) across Lakeside Avenue from the Edison Laboratories.[99] *(See map [MB1], page 56.)*

While the exterior fabric of the six main laboratory buildings within the Edison Laboratories (Building No. 1-6) was not significantly changed, there was a continual program of alterations within these buildings. The rise of power of Miller Reese Hutchison (one of the Edison main employees) led to several structural changes to improve the efficiency of the Edison Laboratories.[100]

The Edison Laboratories site also changed to accommodate two major new product lines: the diamond disc and the storage battery. These two experimental projects were the most arduous and



Map [MB1]

CULTURAL LANDSCAPE REPORT:EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1600-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: THOMAS ALVA EDISON STEWARDSHIP:1900-1914
ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER
—

SHEET NUMBER
— OF —

SCALE: 1" = 100' - 0" (Approximately)
0 100 200 400 Feet
0 50 100 Meters

expensive mounted at this or any other Edison laboratory. The experimental expenses for both cost millions of dollars. A great deal of new equipment was purchased or made in the Edison Laboratories during the development programs.[101]

Over time the growth became uncontrollable and needed the oversight of an efficient administration to allocate the companies' resources. In response to this need the Thomas Alva Edison, Incorporated.(T.A.E., Inc.) was created in 1911 and organized most of the Edison businesses under one centralized administration. The T.A.E. Inc. revamped most of the Edison facilities and staff, and the West Orange plant was again becoming one of the nations leading industries. This growth continued until a major setback occurred at the site.

> On Wednesday, December 9, 1914, when the entire plant was in operation, the superintendent of the Film Inspection Department and one of the staff engineers were in the raw stock inspection room (dark room) of the iron-clad film inspection building No. 41, working on a new film printing machine. At about 5:17 P.M., these men heard a sputtering noise and the staff engineer, glancing under a bench against the south wall of the dark room, saw that one of the fifty tin cans, containing short pieces of undeveloped film, was turning dark as tin usually does when heated. ...Both men rushed out of the room and on passing through the door heard a dull explosion accompanied by a bright flash.102

This flash led to the great fire that destroyed nearly all the buildings at the West Orange plant. There was no well defined path of the fire. From the point of origin it spread in every direction where combustible material lay. By the next day, 15 of the 22 Edison Phonograph Works' buildings were either severely damaged or destroyed by the fire. The fire burned throughout the night and smoldered for weeks. The paint on most of the nearby houses was blistered and several of them had ignited, but were quickly extinguished. The Edison Fire Department and fire departments from nearby towns battled the blaze and were credited for preserving the Edison Laboratories .

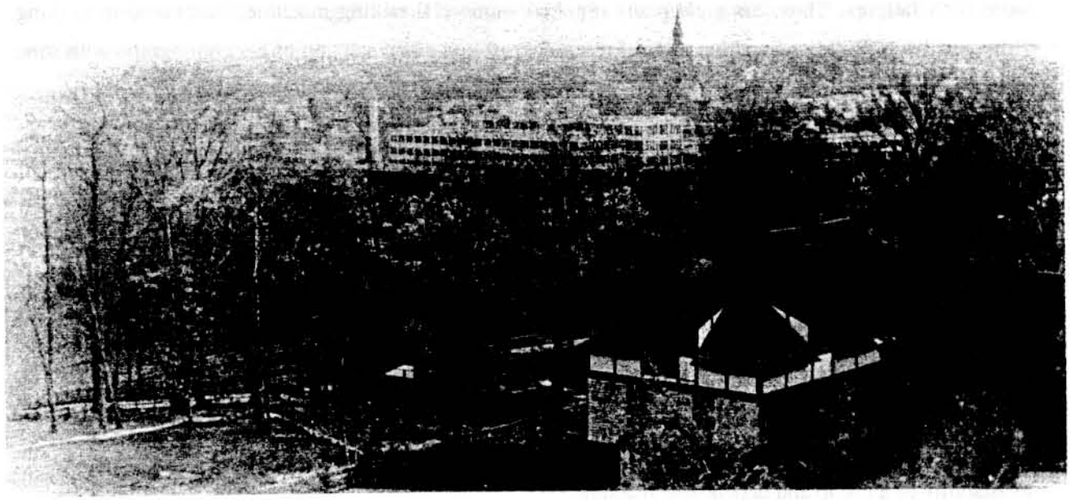
This period begins with the 1900 development of the battery storage project and ends with the fire that nearly destroyed the entire West Orange plant in 1914. The expansion of the West Orange plant during this period was so significant that the plant and the immediate surrounding area, became known as the "Edison District". In general terms the District was bounded by several local streets: Washington Street on the north, Park Avenue on the south, Valley Road on the west, and Watchung Avenue and the Orange city line on the east. The West Orange plant was noted as being the largest industrial establishment in the Oranges.[103]

Environmental Context:

Natural - The development and growth of residential areas during this period altered the natural landscape of West Orange. Although several estates were developed in the First Watchung Mountain's forested southeast slope, the prime area of development was the eastern valley floor. Since the steep southeast slope of the First Watchung Mountain was too costly to develop, West Orange's newly arriving immigrants located in the valley. As a result the open fields and farm lots that were located between the existing residential lots along Lakeside Avenue and Alden Street were developed creating a dense neighborhood fabric. (*See photo [B26], page 59*)

Cultural - At the beginning of the twentieth century, West Orange was incorporated as a town (February 1900) with a fire department and running water. Shortly thereafter, it instituted a free mail delivery system from the Orange post office (1901), garbage collection (1902), and a sewer system (1904). In additon, West Orange' s population grew rapidly during the early twentieth century. According to the 1905 and 1915 New Jersey state census reports the population and number of dwellings in West Orange increased during the ten year period by approximately seventy-three percent (73%). Since this residential growth occurred within the valley, near the rapidly expanding West Orange plant, problems eventually arose. In addition to producing many types of equipment and supplies, the West Orange plant produced several types of pollutants. Coal dust and soot were spewed out of the huge stacks of the powerhouses, while fumes were escaping from the manufacturing facilities. The growing residential community began complaining about the expansive industry. The newly formed T.A.E., Inc. began to address legal complaints about the pollution they were producing. Although complaints were not foreign to the Edison Industries, the West Orange plant received more than some of the other plants.

The legal complaints did not threaten the inventor or his industries. Edison' s thoughts about the problems became clear in 1913 after residents complained about the smoke pollution generated by the plant. He wrote a note that stated, "My impression is that we should deny that there are any undue smoke or odors emitted from our factories." This position was generally maintained through out the period and as a result, very little action was taken to correct the problems. Edison's complacent attitude generated mixed feelings from the people of West Orange; "people liked Edison the inventor, but they hated Edison the industrialist."



[B26] Figure 1.20. "View southeast from 'Colonia', " (1914) a residential dwelling located on the southeast slope of the First Watchung Mountain. Notice the dense residential settlement within the valley. [Source: Album #10, E.N.H.S. Archives]

In spite of the pollution, the Edison complex had positive effects within the town of West Orange. Toward the end of the period, the Edison businesses were employing more than six thousand people, most of which were residents of the town. The increasing population and residential development were attributed in part to the growth of the West Orange plant.

Business - By 1896 Edison's most important business venture, the cylinder phonograph, had come to a dead halt. The 1880 idea of a business phonograph and the 1890 idea of an entertainment phonograph were both failures. Thus, his great plans for the commercial talking machine had come to nothing. However, by 1896 Edison and his team of researchers found a new version of his phonograph with some commercial potential and by the turn of the century they had put this line into production.[104]

Edison now had the opportunity to realize his dream of a great factory complex in the Orange Valley and to test his concept of the laboratory (Edison Laboratories) perfecting the system of mass production. The phonograph was a complex machine that posed many problems in large scale production. In 1900 the first shop orders were executed to design and build automatic machines to make parts of the new Home phonograph.[105]

Though mass produced talking machines could not revive the phonograph business alone, the customers still needed a supply of records. The boom in talking machines that began just after the turn of the century was created and sustained by cheap and plentiful cylinder records rather than by the availability of a cheap and dependable machine.[106]

The development of a technology to duplicate prerecorded cylinders in the Chemical Laboratory and the Main Laboratory (Building No. 2 and 5, respectively) of the Edison Laboratories was therefore of central importance to the Edison enterprise. (It was also a critical factor in the revival of Edison's reputation as the great inventor.) It was of great importance to the talking machine industry as a whole and the introduction of this process influenced the international development of recorded sound technology. As late as the 1970's record manufacturers were still employing techniques that were thought out and perfected in the Edison Laboratories . [107]

Landscape Site/ Setting:

The physical growth of the West Orange plant can be categorized into three phases of land acquisitions that were necessary for the expansion. The first phase occurred between 1899 and 1903. The

phase consisted of the purchase of ten out of the thirteen remaining lots that existed within the same block as the Edison Laboratories and Edison Phonograph Works. (*See map [MB7], page 62*) The acquisitions allowed the complex to expand northwesterly and occupy approximately nine and a half acres within the ten acre (approximate) block.

Two of the lots were bought by the Edison Phonograph Works while the other eight were purchased by the National Phonograph Company. The lots purchased by the Edison Phonograph Works were located next to the existing Edison Phonograph Works site and permitted the company to "square off" its northwest property line. The new property line was simply a northeast extension of the original property line that ran perpendicular to Lakeside Avenue. The Edison Phonograph Works now occupied the entire eastern half of the block, while the western half was occupied by the Edison Laboratories and the National Phonograph Company. The National Phonograph Company lots ran perpendicularly along the northeast property line of the Edison Laboratories and fronted Alden Street. The close business relationship between the Edison Phonograph Works and the National Phonograph Company was perhaps the purpose of an additional land purchase that marked the end of the first phase. On September 1, 1903, Thomas Edison sold one of the original nine lots to the National PhonographCompany. The lot was located east of the Power House (Building No. 6) and permitted the National Phonograph Company to front the entire northwest border of the Edison Phonograph Works.[108]

FIRST LAND ACQUISITION PHASE

SECOND LAND ACQUISITION PHASE

THIRD LAND ACQUISITION PHASE

Map [MC7]

CULTURAL LANDSCAPE REPORT:EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1600-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

LAND ACQUISITIONS: THOMAS ALVA EDISON STEWARDSHIP:1900-1914

ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER
—

SHEET NUMBER
— OF —

The second phase of land acquisitions began in mid-1904 and ended early 1905. During this phase, thirteen properties were acquired along the northern side of Alden Street. The properties formed a large tract of land that ran easterly from Valley Road, across Columbia and Liberty streets and terminated halfway between Liberty Street and Watchung Avenue. The two streets ran perpendicular to Alden Street and divided the tract into three smaller tracts. The tracts extended almost the entire northern boundary created in the first phase approximately one hundred fifty feet further north.[109] The extension allowed the West Orange plant to spread northeasterly across three (approximately) additional acres.

The third land acquisition phase lasted from mid-1905 to 1908. Several different expansions occurred during this period. The tract along Alden Street and Valley Road was expanded upon by various land acquisitions further north. These acquisitions extended the eastern part of the tract from Alden Street to Babcock Place, a small cul-de-sac that existed perpendicular to Valley Road. The same tract was also extended along Columbia Street an additional four hundred feet (approximately).[110] The National Phonograph Company also extended its property within the block created in phase one. On April 19, 1905, Thomas Edison sold another one of the parcels he purchased in 1886.[111] This parcel was just east of the Power House (Building No. 6) and extended the lot purchased by the National Phonograph Company from Edison earlier (in phase one) further west. The remaining three lots within the same block were also bought during this period and allowed the West Orange plant to now occupy the entire block between Valley Road, Lakeside Avenue and Alden Street.

The most significant land purchases made during this third land acquisition phase were the properties located southwest of the site. The largest parcel was directly across from the laboratories along the southwest side of Lakeside Avenue. The parcel occupied more than half the block created by Lakeside Avenue, Ashland Avenue, Charles Street and Valley Road. The tract was in the shape of an "L" and its corner was the intersection of Lakeside Avenue and Ashland Avenue, which ran perpendicular to Lakeside. The longer section extended down the entire length of Ashland Avenue between Lakeside and Charles Street, while the shorter section faced the long facade of buildings five and six. The size of the parcel was (approximately) a little over two acres and extended the western end of the West Orange site about six hundred and thirty-five feet south.[112] The significance of the purchase of this parcel was that it the site of the Edison Storage Battery complex, and one of the most densely built up parcels at the West

Orange plant. The National Phonograph Company purchased the site from the Edison Manufacturing Company, another Edison business venture, in 1905. [113]

Some other properties that were purchased during this third land acquisition phase were located behind the residential dwellings that fronted Lakeside Avenue. Two of the properties ran parallel with Lakeside Avenue and extended from Ashland Avenue east to the Erie railroad tracks. A third parcel ran parallel with Ashland Avenue and connected the other two to Lakeside Avenue. A smaller, triangular parcel was bought and bordered two of the parcels. Another small property was purchased further down the railroad at its junction with Lakeside Avenue and Standish Avenue, which ran perpendicular to Lakeside. These five parcels primarily served as locations for several garages and storage facilities.

The final properties purchased during the third land acquisition phase formed a larger tract of land that fronted Standish Avenue to the west and Watchung Avenue to the east. Part of the tract also fronted Lakeside Avenue near the intersection with Standish Avenue. Like the parcels located to the west, this tract was located within a residential area.

The land acquisitions of this second period of history included the purchase of vacant lots, since there was residential growth occurring near the site, it was common for Edison to purchase lots with residential dwellings and rent out the houses until the land was needed for an expanding or new facility.

Although there were future land purchases, they never amounted to the physical expansion created by the land acquisitions that occurred within this period of history. By the end of the period, the West Orange plant had almost tripled in size and was approximately ten times larger than it was in 1887.[114]

Response to Natural Features:

Wigwam Brook, one of First Watchung Mountain's many streams that eventually drained into the Passaic River, ran through several of the newly acquired properties. (*See map [MB1], page 56*) The "Ramble," located within Llewellyn Park, was the origin for Wigwam Brook. After Wigwam Brook passed by Glenmont it then meandered along the southeast slope of First Watchung Mountain and underneath Valley Road. The brook entered the property on Standish Avenue and ran southeast a little more than one hundred and fifty feet. The brook then changed direction and exited the northeast side of the property along Lakeside Avenue. The brook ran under Lakeside Avenue and into a channel that ran

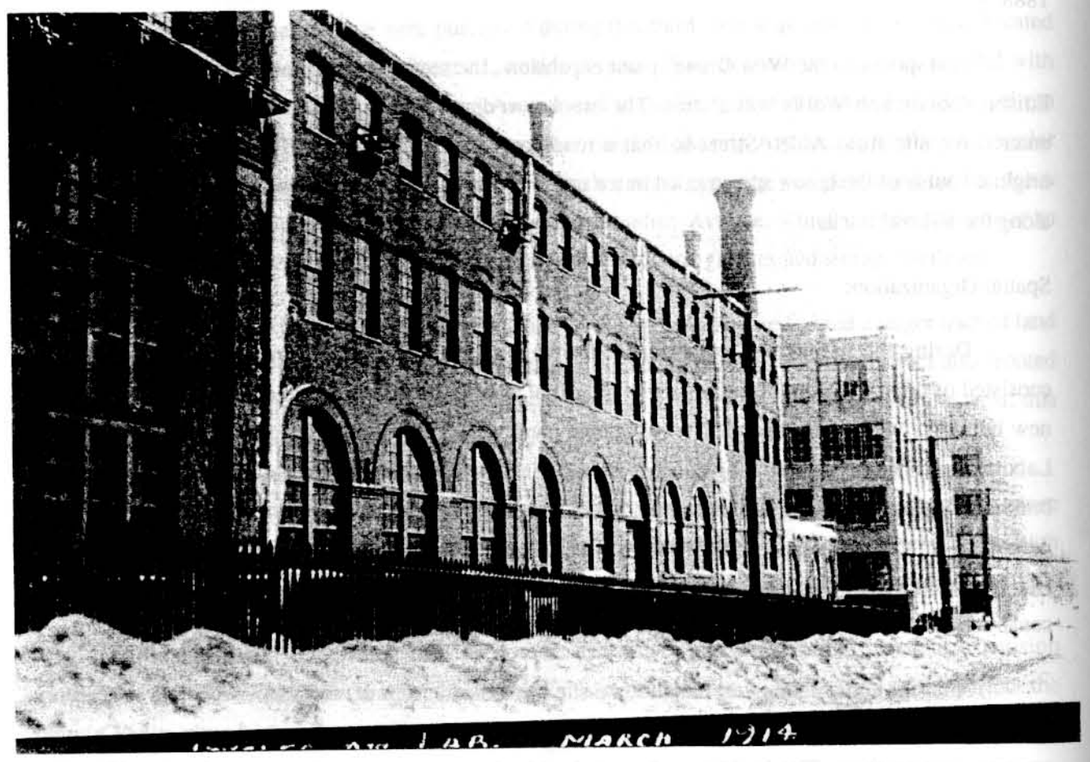
along the railroad tracks that bordered the southwest end of the Edison Phonograph Works. This channel also collected the water from the brook that ran across the Edison Phonograph Works site purchased in 1888. [115]

In response to the West Orange plant expansion , the section of the brook that existed within the Edison Phonograph Works was altered. The brook was diverted through an underground channel as it entered the site from Alden Street so that a road could be established.[116] The channel followed the original course of the brook and emptied into a reservoir area that controlled the outflow into the channel along the railroad tracks.

Spatial Organization:

During the period, the expansion of the West Orange plant transformed it from a plant that consisted of three individual facilities to the industrial complex that Edison had dreamed of. Many of the new buildings within the expanded West Orange plant were laid out in a manner similar to the Edison Laboratories. The overall building concept for the West Orange plant was to locate the larger and taller buildings lengthwise along the perimeter, while the smaller buildings within the block, were located perpendicular to the perimeter buildings. This rectilinear layout allowed the maximum utilization of the site. By placing buildings on angles, precious space would be wasted and would thus either prevent the construction of a new facility or require the purchase of additional land.

After the construction was finished, the site resembled a (type of) fortress. Large, five to six-story buildings were erected along Alden Street, Ashland and Lakeside Avenues and were all of similar concrete construction. The buildings along Lakeside Avenue were so close to each other that they resembled one large building from Watchung Avenue to the east end of the Powerhouse. The only breaks in the facade were access points for vehicular and railroad traffic. (*See photo [B24], page 66*) The same was true of the facade along Ashland Avenue, except that the two buildings were attached and became one building. The building was in an "L" formation with the long section located on Ashland Avenue from Lakeside Avenue to Charles Street. The building's shorter section was located on Lakeside Avenue from Ashland Avenue to Valley Road. Located on the western side of the building were several smaller structures that ran parallel with the building and created a type of broken "L" formation.



[B24] Figure 1.21. "Icicles on Main Lab March 1914." (Building No. 5). View east from Lakeside Avenue. Notice the few breaks within the facades of the West Orange plant. [Source: Album #10, E.N.H.S. Archives]

The arrangement of the buildings on Lakeside Avenue provided controlled access points and prevented views into the site. Residents across Lakeside Avenue could only see the large facades of the Edison Phonograph Works Phonograph Assembly Buildings (Building No. 11-13-15) that were erected across from them. The same was true of the building along Ashland Avenue. Not only did the large buildings form a fortress around the site, but they also partially surrounded the residential neighborhood. (*See photo [B27], page 69*) The large concrete Storage Battery Building (Building No. 130) partially isolated the small residential community located between Ashland and Standish Avenues by restricting the residents' visibility (access) to and from Valley Road.

THE EDISON LABORATORIES:

The Edison Laboratories began the twentieth century on the basis of two new products: the commercial phonograph and its pre-recorded cylinders and the alkaline storage battery. The Edison Laboratories, which had been built to advance electrical technology, now had new tasks and a different outlook. Instead of supplying magnetic ore separators to industry and carrying out contract research for the electrical utility industry, Thomas Edison had attracted a large consumer market as the final user of his many inventions.[117]

In addition to these two key experimental projects were several other products developed during this period that were important in Edison's career. The x-ray machine was being "perfected" at the West Orange plant as the century began. It failed as a commercial product and proved how dangerous new technologies can be. The motion picture had become a highly profitable business for the Edison enterprise by 1900. Edison looked forward to developing dramatic new motion picture products in the twentieth century, including his long standing commitment to bring synchronized sound to moving pictures. [118]

These (many) new products brought about a period of intense activity in the Edison Laboratories. In 1899 there were 111 names on the Edison Laboratories payroll and this probably represented the largest number of employees at the Edison Laboratories during the nineteenth century. In 1910, there were over 100 workers in the Edison Laboratories and by August 1912 just over 200, including 25 experimenters, 90 machinists, and 12 draftsmen. Every experimental room on the Edison Laboratories site was occupied and more were being created in the new buildings. This period marks the high water mark of experimental activity in the Edison Laboratories.[119]

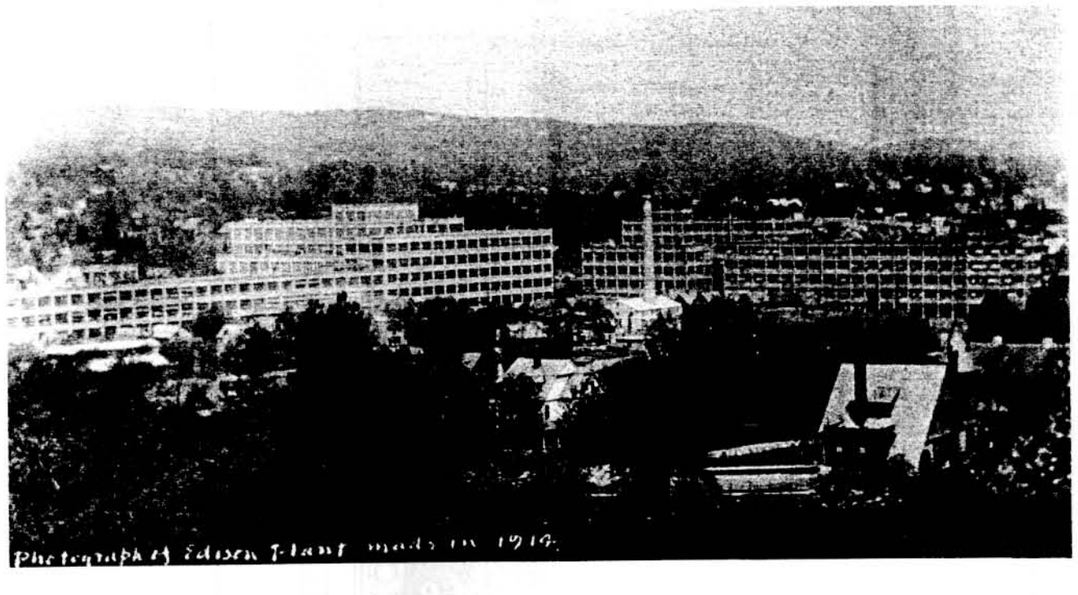
Landscape Site/ Setting:

During this period's expansion of the West Orange plant, the Edison Laboratories became a relatively dense development. The density was a result of temporary buildings that were erected on the site; such as the Garage (Building No. 10), the Experimental Studio/ Garage (Building No. 11) and the lean-tos attached to the smaller laboratories (Building No. 1-4). (*See map [MB1], page 70*) These temporary buildings were usually constructed as simple wooden sheds and were considered temporary because it was not uncommon for Edison and his staff to take them down after a project was completed or when a larger experimental room was needed. When a building was removed, the wood that was used in its construction was salvaged and stored in one of the scrap piles that existed within the West Orange plant to be used again at a later time. During this expansion, the courtyard was retained its spatial integrity and was heavily used for experimentation, especially with respect to the 99storage battery project.

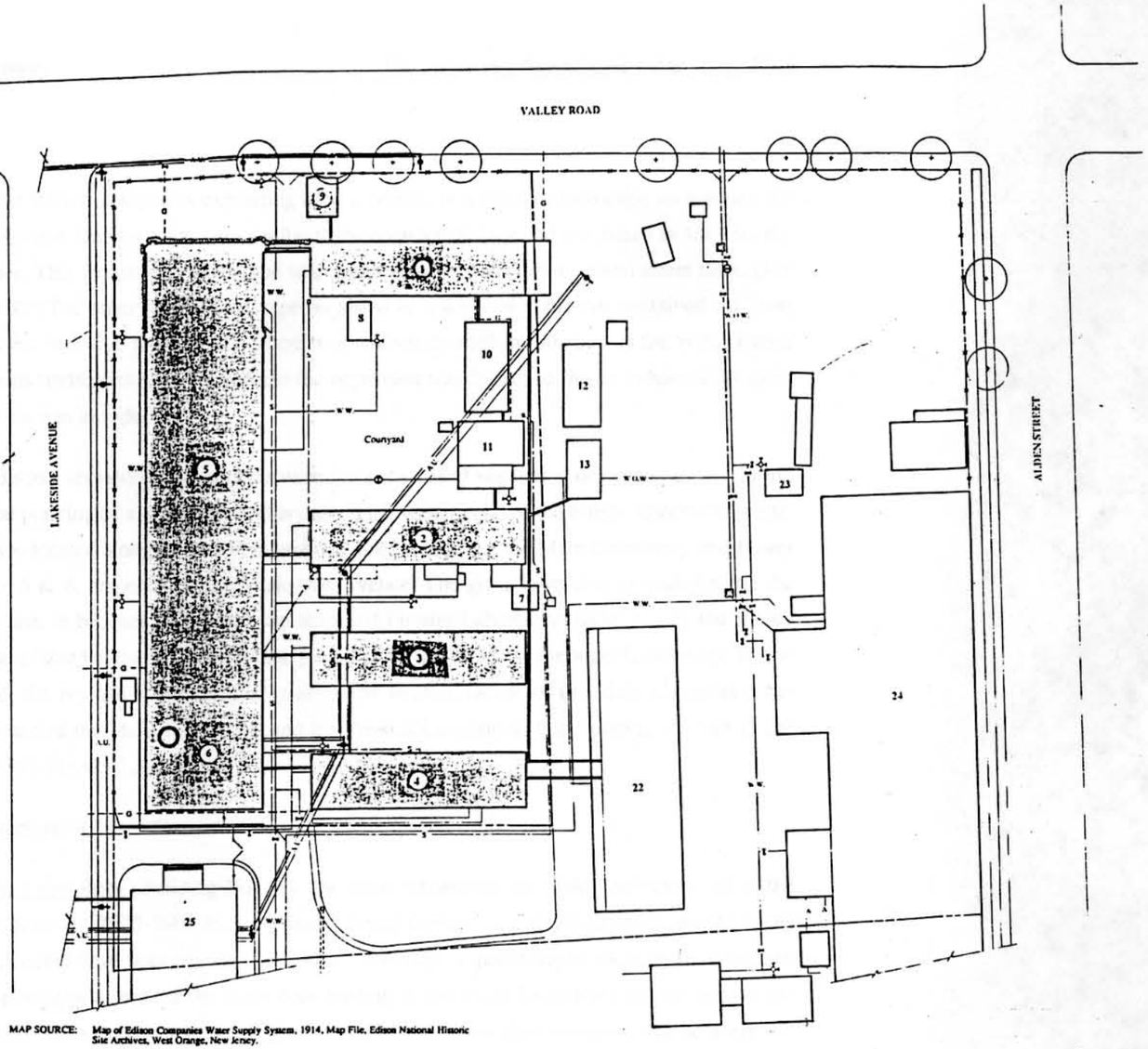
The Edison Laboratories' dense development was different from the other buildings that were being constructed at the West Orange plant. As the West Orange plant expanded around the Edison Laboratories, the new facilities were being housed in taller and longer buildings than those of the Edison Laboratories. For instance, at the beginning of the twentieth century the Edison Laboratories site was adjoined to the north by a newly founded company, the National Phonograph Company. The National Phonograph Company's building was erected ca. 1900. This new facility was located in a three story building that was located directly north of the Physics Laboratory and the Chemical Laboratory (Building No. 1-2, respectively) and ran parallel with the Main Laboratory (Building No. 5). By the end of the period, the National Phonograph Company's additional buildings, as well as the Edison Phonograph Works' and Storage Battery Company's newly constructed buildings, began to dwarf the Edison Laboratories site. (*See photo [B27], page 69*)

Landform:

The broad slope that typified the original West Orange site was also characteristic of the lands bought during this period for the site's expansion. The slope was roughly three to five percent toward the southeast and was constant throughout the majority of the West Orange plant site. This even landscape made it easy for the expansion of the site's facilities.



[B27] Figure 1.22. "Photograph of Edison Plant, made in 1914." View northwest of First Watchung Mountain and West Orange plant. Just left of the smokestack in the foreground, in between the large concrete structures is the Edison Laboratories. [Source: E.N.H.S. Archives]



MAP SOURCE: Map of Edison Companies Water Supply System, 1914, Map File, Edison National Historic Site Archives, West Orange, New Jersey.

BUILDING KEY

Building No.	Building Name	Building Construction
1	PHYSICS LABORATORY	1 Story Brick Building; *Wood & Iron Lean-to constructed this period*
2	CHEMICAL LABORATORY	1 Story Brick Building; *Wood & Iron Lean-to constructed this period*
3	CHEMICAL STORAGE & PATTERN SHOP	1 Story Brick Building
4	METALLURGICAL BUILDING	1 Story Brick Building
5	MAIN LABORATORY	3 Story Brick Building
6	POWER HOUSE	1 Story Brick Building
7	BLACKSMITH SHOP	1 Story Wood Building
8	SMALL STORAGE VAULT	1 Story Concrete Building
9	GATE HOUSE	1 Story Wood Building
10	GARAGE	1 Story Wood Building
11	GARAGE/ EXPERIMENTAL STUDIO	2 Story Wood Building
12	PATTERN STORAGE SHOP	1 Story Wood Building
13	EXPERIMENTAL STUDIO	1 Story Wood Building
22	GOLD PLATING BUILDING	2 Story Wood Frame Building, covered with Sheet Iron

SYMBOL KEY

Symbol	General	Symbol	Furnishings	Symbol	Mechanical Systems	Symbol	Mechanical Systems	Symbol	Mechanical Systems	Symbol	Buildings	Symbol	Vegetation
	FENCE & PROPERTY LINE		WOOD FENCE		UTILITY POLE		FIRE HYDRANT		STEAM LINE		BUILDING ERECTED DURING THIS PERIOD		DECIDUOUS TREE
	E.N.H.S. PROPERTY LINE (1992)		GATE		MANHOLE	AU	AERIAL UTILITY LINE	WW	WELL WATER LINE		BUILDING ERECTED DURING PREVIOUS PERIOD		IVY
	EDISON LABORATORIES PROPERTY LINE				ABOVE GROUND WATER VALVE	WOW	WEST ORANGE WATER LINE	S	SEWER LINE		BUILDING REMOVED DURING THIS PERIOD		
					UNDERGROUND WATER VALVE	G	GAS LINE	A	AIR LINE				

Map [MB1]

CULTURAL LANDSCAPE REPORT: EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1600-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: EDISON LABORATORIES: THOMAS ALVA EDISON STEWARDSHIP: 1900-1914

ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER
—
SHEET NUMBER
— OF —

SCALE: 1" = 30' - 0" (Approximately)
0 30 60 120 Feet
0 10 20 60 Meters

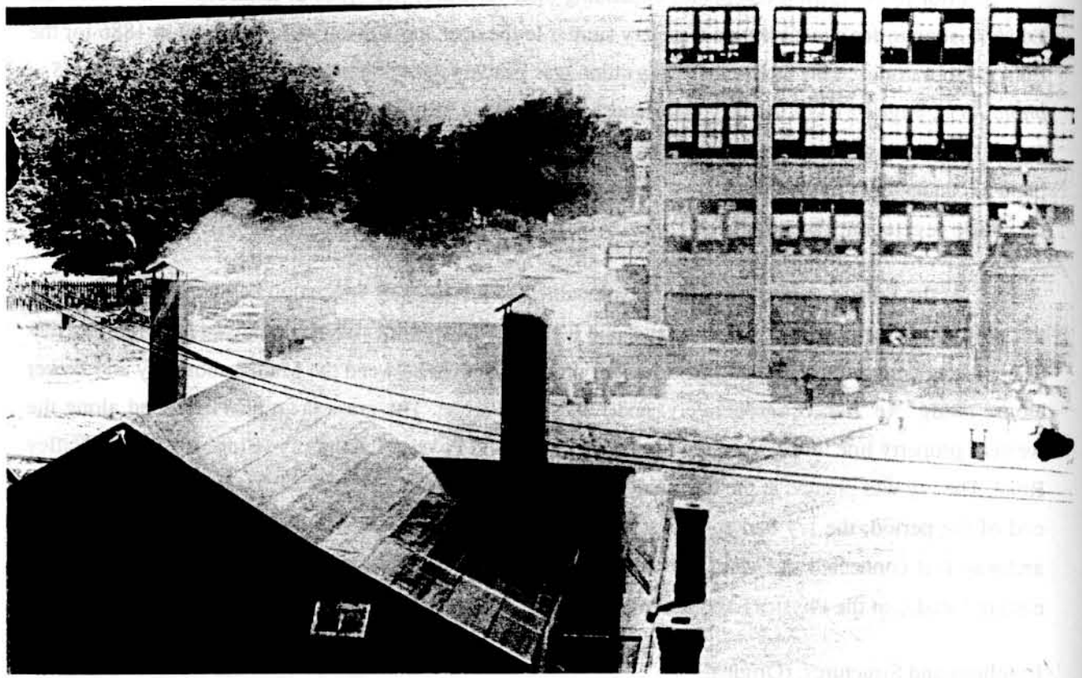
Vegetation:

Prior to the Edison companies expanding their facilities, two types of landscape surrounded the Edison Laboratories site. One type was very similar to the open lots Edison had purchased in 1886 for the Edison laboratories. This landscape's vegetation was primary successional with several street trees. (*See photo [B3], page 72*) The other type of landscape consisted of residential yards that contained cut grass and various trees that bordered the property. There is no known detailed information as the West Orange plant expanded both landscapes were cleared and the vegetation was destroyed. As an industrial complex very little vegetation was introduced.

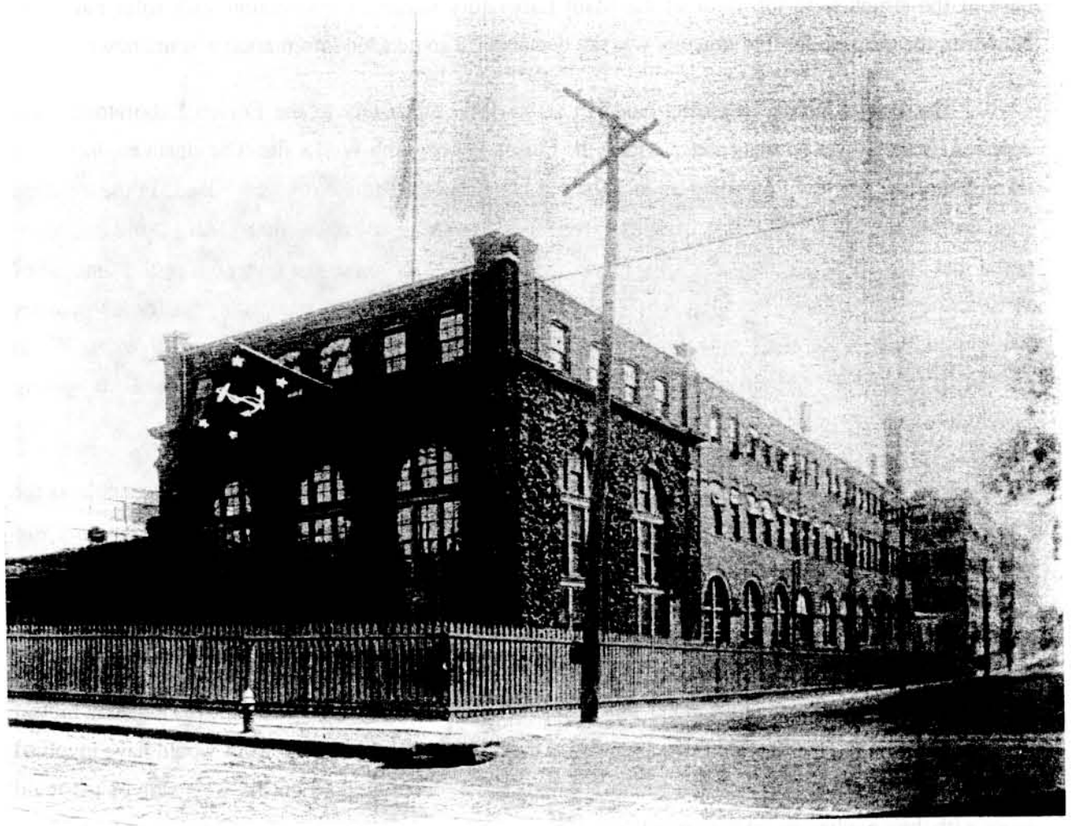
At the Edison Laboratories the only documented instances of vegetation being introduced during this period was the planting of a grass lawn and ivy along the western end of the Edison Laboratories site. The grass lawn was located along the southern property line, in between the Main Laboratory and Power House (Bldg. No. 5 & 6, respectively) and Lakeside Avenue. The grass lawn also extended along the western property line, in between the Main Laboratory and Physics Laboratory (Bldg. No. 1) and Valley Road. The ivy was planted at the beginning of the period along the facade of the Main Laboratory. By the end of the period, the ivy had spread profusely along the western facade of the Main Laboratory, the archway that connected the Main Laboratory and the Physics Laboratory, the southern and part of the eastern facades of the Physics Laboratory.(*See photo [B28], page 73*).

Buildings and Structures: (Original)

The Main Laboratory (Building No. 5) - The main entrance to the Main Laboratory led to the doorway of the library. In 1903-1904 M.A. Rosanoff found Edison "in a small reception room" in the library. This room could have been on either side of the doorway. In photographs taken in 1912 one can see through the passageway behind the main door leading to the Main Laboratory all the way to the window that looked onto Lakeside Avenue. Pictures taken in 1915 show that a vestibule has been erected in this passageway with a doorway leading to the doorway of the library. The vestibule appears to be made out of wood panels and does not reach to the ceiling. People entering the building and going to the storeroom and machine shop filter left of the vestibule. The purpose of this structural change is to provide a waiting room for visitors to Edison in the library and to separate these visitors from laboratory staff making their way to the machine shops and storeroom.[120] During this period the Lakeside Avenue entrance to the Main Laboratory was boarded across and the stairway removed. (*See photo[B6], page 75*)



[B3] Figure 1.23. "Tetrol' plant on fire, June 9, 1911, Edison Laboratory." View north from above courtyard. The successional vegetation located on the left side of the photo well represents the type of vegetation that existed at the site before the expansion of the West Orange plant. [Source: Album #10, E.N.H.S. Archives]



[B28] Figure 1.24. (1914) Secretary of Navy Flag flying from the Main Laboratory (Building No. 5). Notice the ivy growing along then Main Laboratory's facade. [Source: E.N.H.S. Archives]

Also during this period, a small structure was erected on the roof of the Main Laboratory. (*See photo [B13], page 78*) The black tar paper that covered the building and the pipe that extended from the base of the structure to top floor of the Main Laboratory suggest a connection with solar radiation. However, the purpose for this structure was not documented so detailed information was unknown.

The Power House (Building No. 6) - After 1900 electricity to the Edison Laboratories was supplied by the power houses erected within the Edison Phonograph Works site. The steam engines were taken out of the original Power House in 1910 and two large electric motors were placed in the machine shop (within the Main Laboratory (Building No. 5)) to power the overhead shafts. An Edison employee noted that "the old steam engine" in the machine shop was stopped but not taken out in the summer of 1910 and electric motors installed. The boilers continued to supply steam to the smaller laboratories (Building No. 1-4) for some time until steam was piped in from the Edison Phonograph Works.[121] In 1914 the engine room was full of Edison's fleet of automobiles and equipment for tests on Ford lighting systems.[122]

The Physics Laboratory (Building No. 1) - With the decline of electrical experiments at the Physics Laboratory, most of the measuring equipment was no longer used and much of this building was converted to storage. Offices for experimenters were established in the front part of the building, which was divided off from the main room. The large space in the middle of the building was left open until some time after 1906 when offices were created along the east side of the main room.[123]

Around 1912 Newman Holland, an employee of the Edison Laboratories, and his assistant moved into this building to continue their development of the dictating machine. This work would have involved electrical testing equipment and telephone apparatus. They were worked on the west side of the main room with their equipment on their pier tables.[124]

In 1911 a dark room was installed in this building along with facilities to make and print motion pictures. This was either in the front room on the west side or in one of the experimental rooms along the east side of the main room. Next to it was a room occupied by Dr. Greene, an Edison employee, for

[B6] Figure 1.25. (1911) View of the Main Laboratory (Building No. 5) from Lakeside Avenue. The entrance into the Main Laboratory from Lakeside was located within the sixth arched window from the Main Laboratory's left corner(including the two large arched windows). [Source: E.N.H.S. Archives]

photographic experiments from 1910 to 1914. After 1914 it was still referred to as "Greene's old room," and these offices were collectively known as the photographic department. This department was enlarged in 1914 to handle the overflow of photographic work from the rooms on the third floor of the Main Laboratory (Building No. 5). [125]

The beginning of the Edison educational films project, under the direction of Walter Dinwiddie, brought more changes to the Physics Laboratory as more space was devoted to photographic work and filming. In 1912 an "electrical repair room," which was probably in this building, was dismantled to make way for educational films. It could have been the space at the south end of the main room.[126]

The Chemical Laboratory (Building No. 2) - During this period two large machines were brought into the Chemical Laboratory as part of the disc record project. The first was a condensing distilling machine used to make up the phenol resins used to make the disc blanks. It was a pressure container in which a vacuum pump was placed nearby. The container was sheathed in a steam jacket to heat the mixture and steam pipes were attached. At the bottom of the container was a valve to draw off the hot liquid and a manhole cover attached by large bolts was at the top. The various elements of the mixture were pumped in and then condensed under pressure and at high heat. This created the thick resin, called condensite, which when cooled could be made into record blanks.[127]

This machine would have been made up by the Edison Laboratories staff from plans drawn up by experimenters and copied from existing distilling machines and heated mixers. The condensite project was carried out in great secrecy for just a few miles away from the West Orange plant Leo Baekeland was carrying out experiments with the same phenol resins. Baekeland was in the lead in developing these early plastics and had a strong patent position. In 1910 and 1911, Edison was negotiating with him to license his patents while simultaneously attempting to circumvent these patents and set up his own production operation. Secrecy was therefore essential. No publicity was given to this project or to this machine. The mixtures concocted by Aylsworth were also kept secret at this time, for fear that they might give Baekeland an idea of what the Edison Laboratories was up to.[128]

A Robertson disc press was set up opposite the condensite mixer to press master records onto blanks and make copies. The practice of the Edison Laboratories was to set up and test equipment before it was installed in the factories. The installation of the Robertson disc press in the Chemical Laboratory

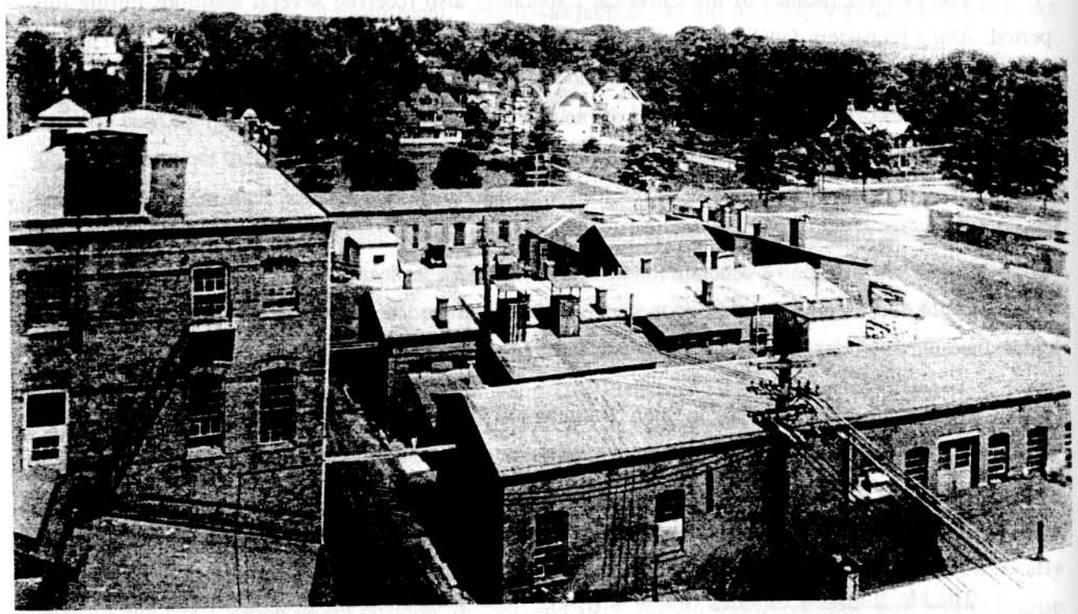
would thus have preceded the equipment of Building No. 24--the factory devoted to mass production of disc records. This would give a rough date of 1910 or 1911 as the time of its installation.[129]

The storage battery project also brought large machines into the Chemistry Laboratory for development and testing. It is more likely that the large drums used in the electro-plating of nickel were first set up in this lab.

The exterior facades of the Chemical Laboratory also received several additions during this period. Along its eastern facade a wooden lean-to was constructed. (*See photo [B13], page 78*)The one story structure was approximately 15' wide and its 65' long frame began approximately 4' from the Chemical Laboratory's southern facade. At the southwest corner of the lean-to an air tank was installed adjacent to the southeast corner of the Chemical Laboratory. The construction date of the leant-to and its use were not documented. Just north of the lean-to an additional, yet smaller, lean-to was constructed along the eastern facade of the Chemical Laboratory. This smaller lean-to was also constructed out of wood and was erected upon a concrete foundation.[130] The smaller lean-to's date of construction and use were also not documented. In addition to the construction of the lean-tos, apparatus to distill water was erected around 1910 on the west side of the Chemical Laboratory by the front door.[131]

Chemical Storage and Pattern Shop (Building No. 3) - This building changed the least during this period. A comparison of the chemical orders of the nineteenth century with an inventory of 1914 found little disparity. As other parts of the Edison Laboratories were used for the storage of chemicals it could well be that this space was also used for the storage of materials other than chemicals.

The Metallurgical Building (Building No. 4) - With the demise of the ore milling venture part of this building was left empty. The interior of this building was changed from ore milling to record experiments at the end of the nineteenth century. The small rooms in the back of this building were turned into a recording studio and an experimental area for recording and duplication. This was a "recording laboratory" and the development of the Gold Moulded Cylinder and the Edison Amberol longer playing cylinders took place here. Several musicians and singers were recorded in this building and there are some rare photographs of Edison recording technicians at work here.[132]



[B13] Figure 1.26. (1912) View northwest of the Edison Laboratories. The lean-to's constructed onto the Chemical Laboratory (Building No. 2) were added during the Edison Laboratories second period of history. [Source: Album #10, E.N.H.S. Archives]

The rest of the Metallurgical Building was taken up with equipment to manufacture and duplicate cylinder records. This was known as the Edison Laboratories' "record plant." The Historic Structure Report stated that experiments on the Edison disc record began here in 1910. At this time filming on the Edison Educational Film project was being carried out in this building.[133]

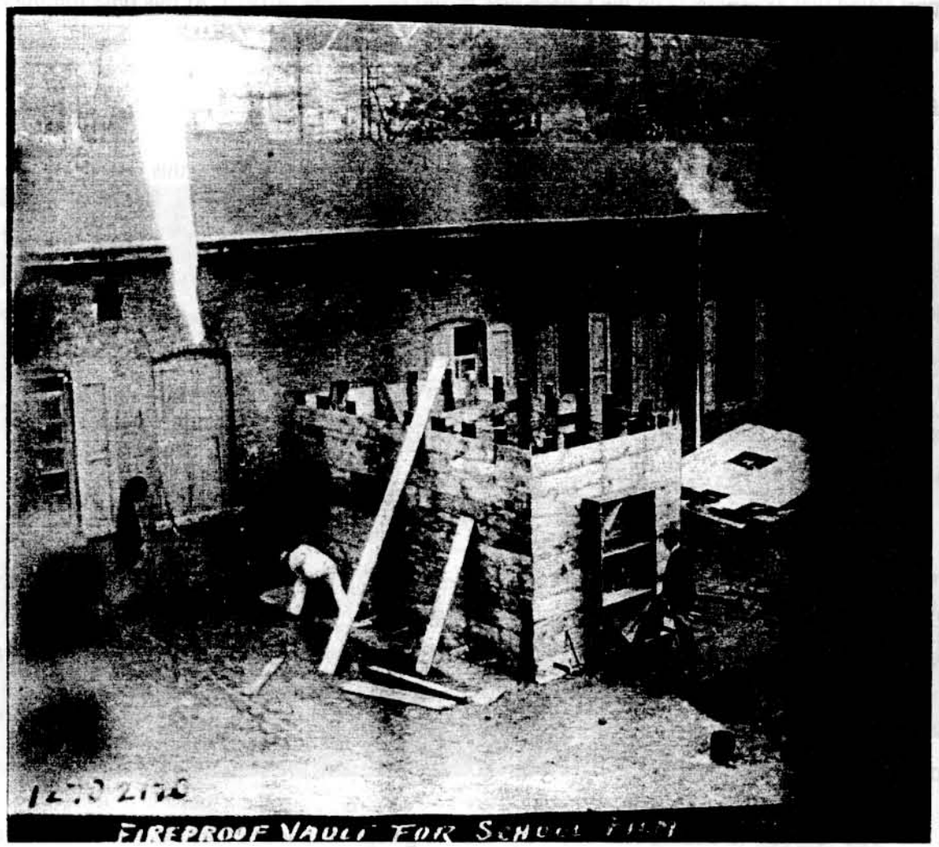
Building & Structures: (Added during the period)

Several new buildings were added to the Edison Laboratories site during this period:

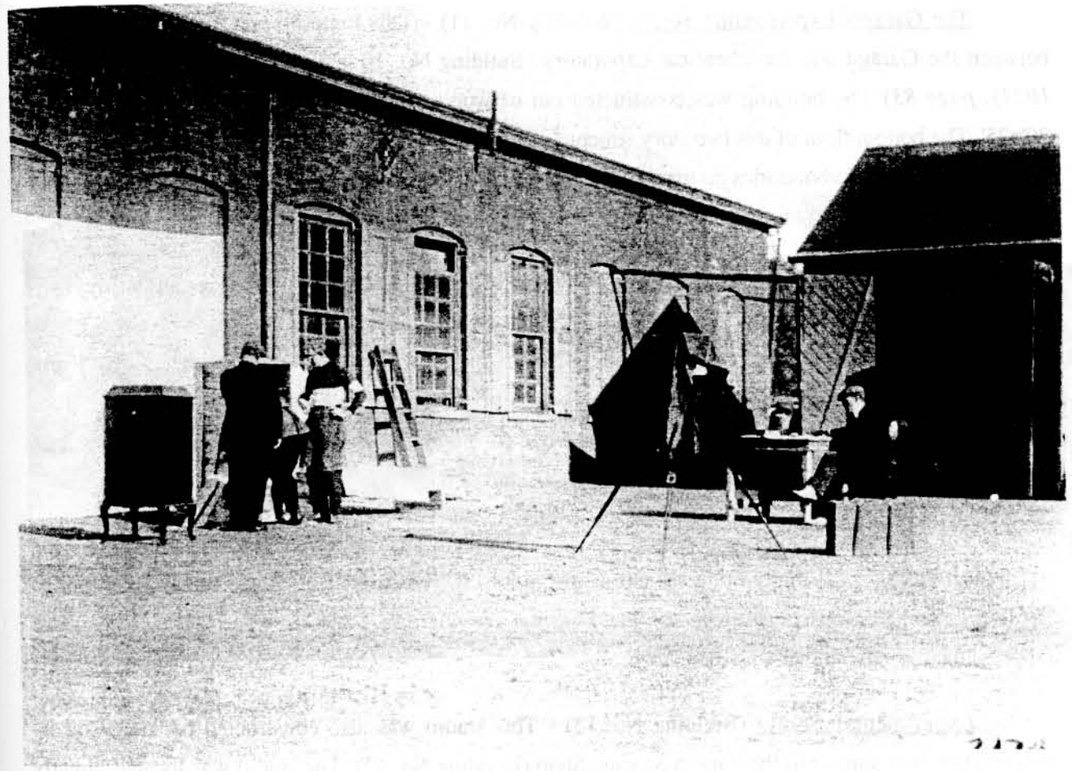
The Blacksmith's Shop (Building No. 7) - This free-standing building behind the Chemical Laboratory (Building No. 2) was erected sometime between 1896 to 1900. The shop order to construct the building dates from 1896, but the expenses were not recoreded in the Edison Laboratories accounts until 1900. The shop was constructed out of wood and had an aspalt roof. After a government inspection in 1909 the roof was cut away to make a 2" gap around the flue. In 1911 a fire destroyed the shop and it was rebuilt in August of that year. The reconstructed building was square and was situated much closer to the Chemical Laboratory.[134]

The Small Storage Vault (Building No. 8) - In 1912 a small concrete structure was erected within the courtyard, approximately 2' east of the Physics Laboratory (Building No. 1). (*See photo [B17], page 80*) This building was constructed out of poured concrete formed by wooden planks. (The planks originated from a wooden building that was previously torn down.) This one-story reinforced concrete structure covered approximately 198 square feet and had only one opening, an entrance with a steel door. [135] The vault was constructed as a fireproof building to hold film stock for the Edison Educational Films project.

The Garage (Building No. 10) - By 1911 a garage was located at the northern end of the courtyard, directly east of the Physics Laboratory (Building No. 1). (*See photo [B14], page 81*) This one-story building's 40'x20' frame ran perpendicular to the northeastern end of the Physics Laboratory. Along its southern facade were four large doors that led to its four bays. The exterior wood patterns for the doors differed from the planks used throughout the rest of the structure. The wooden planks used for the construction of the garage were perpendicular to the ground while the ones used for each of the four doors were laid out at an angle. The garage was used to store the automobiles that Edison had collected



[B17] Figure 1.27. "Fireproof Vault For School Film, 1912." View northwest of the Small Storage Vault (Building No. 8) and the Physics Laboratory (Building No. 1). Notice the wood pile to the right that contains the facade of a previous wood structure. [Source: Album #10, E.N.H.S. Archives]



[B14] Figure 1.28. (1912) Packaging of Phonograph in Courtyard. View north from within the courtyard. The Garage (Building No. 10) was the building to the right of the Physics Laboratory (Building No. 1) and was connected by an overhead steam line. [Source: Album #10, E.N.H.S. Archives]

throughout the period to test the Edison storage battery. It was Edison's hope to produce a battery that could power automobiles and that the electric car would become a successful invention.

The Garage/ Experimental Studio (Building No. 11) - This building was erected by 1911 in between the Garage and the Chemical Laboratory (Building No. 10 and 2, respectively). (*See photo [B21], page 83*) The building was constructed out of wood and its dimensions were approximately 20'x25'. The bottom floor of this two story structure contained a bay for storing 1-2 automobiles and faced out into the Edison Laboratories courtyard. Since the structure was erected slightly above grade, a small ramp led to the bay's entrance door. An experimental room was located on the second floor.

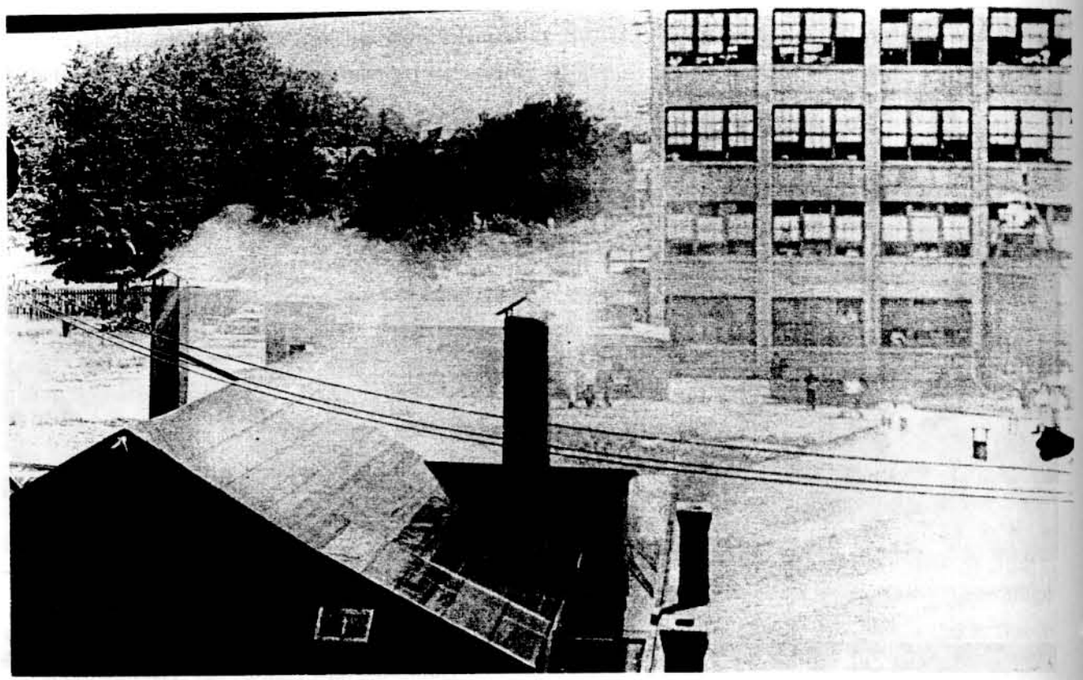
In June 1911 a lean-to that had been added to the northern end of this building caught fire. (*See photo [B3], page 84*) The caption underneath the photo of this fire stated "'Tetrol' Plant on fire." It was not clearly documented whether all of Building No. 11 or just the lean-to was considered the "Tetrol Plant." In 1913, this building was used as the "burning building" in an Edison Laboratories fire drill. Located directly south of Building No. 11 was a wood shed and was approximately 8'x12'. The entrance into the shed contained two doors that swung into the courtyard.

The Pattern Storage Shop (Building No. 12) - This shop was constructed by 1911 of wood for the purpose of storage and the melting of wax composition. It was located directly north of the Garage (Building No. 10) (on the property of the National Phonograph Company) and its 18'x37' frame (approximately) ran parallel with the Garage.

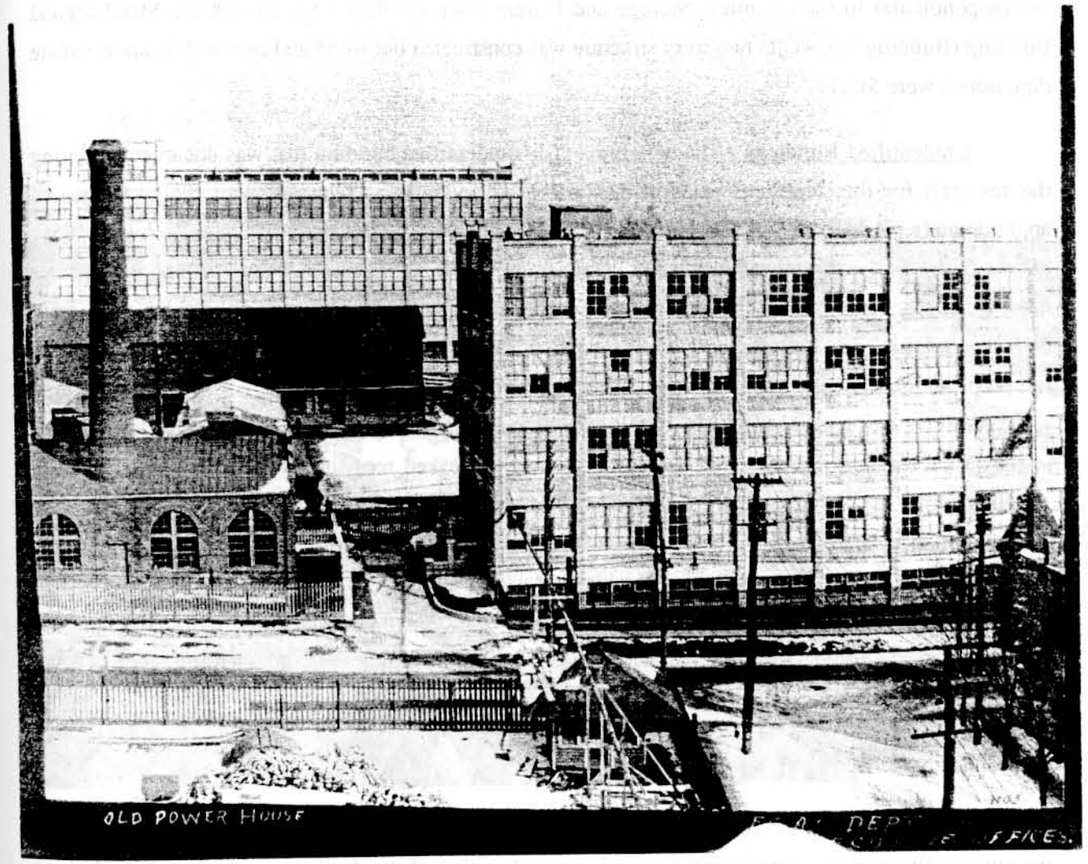
Experimental Studio (Building No. 13) - This studio was also constructed by 1912 and its construction was similar to the Pattern Storage Shop (Building No. 12). The studio was located directly east of the Pattern Storage Shop and north of the Garage/ Experimental Studio (Building No. 11). The purpose for this studio was not clearly documented except for it being labeled as "Experimental"[136] on a 1917 map. However, it was possible that this studio replaced the lean-to that was attached to the northern end of Building No. 11, which burned down in 1911.

The Gold Plating Building (Building No. 22) - This building was considered a National Phonograph Company building since it was located on its property, north of the Edison Laboratories site. (*See photo [B5], page 85*)

[B21] Figure 1.29. "Two Streams in Action," fire drill in 1913. View northeast from within the courtyard. The building that is being hosed down is the Garage/ Experimental Studio (Building No. 11). The ramp way into the building was hidden from view by the wooden shed. [Source: Album #10, E.N.H.S. Archives]



[B3] Figure 1.30. "Tetrol' Plant on Fire, June 9, 1911, Edison Laboratory." View north from above the courtyard. Notice the smaller lean-to that was attached to the northern end of the Garage/ Experimental Studio (Building No. 11). [Source: Album #10, E.N.H.S. Archives]



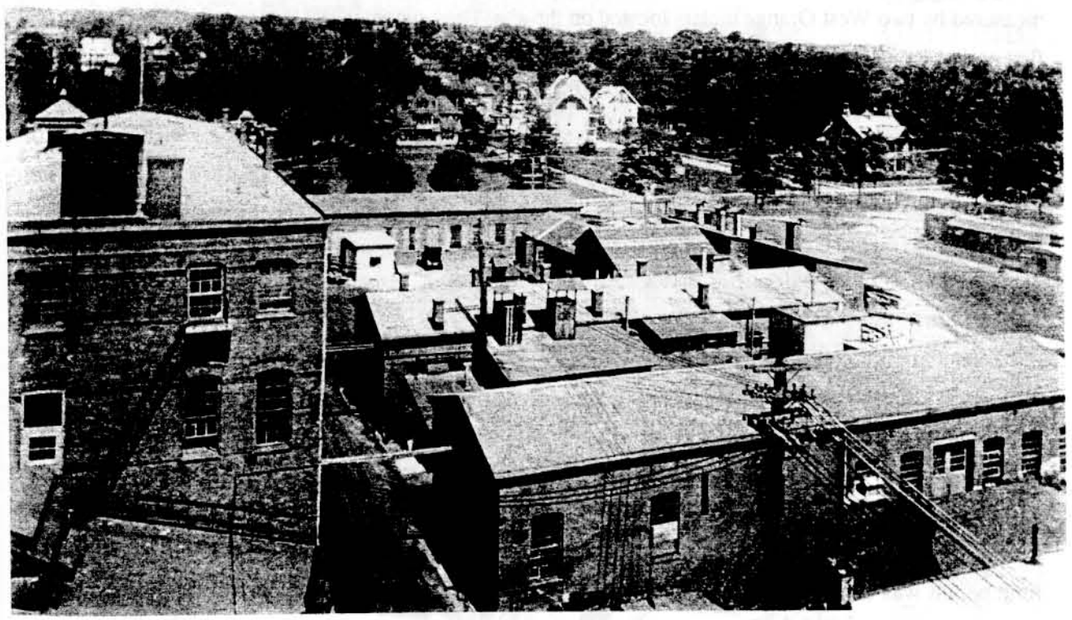
[B5] Figure 1.31. (1911) Northeast View of the West Orange plant entrance from Lakeside Avenue. The Gold Plating Building (Building No. 22) was the long rectangular building behind (north of) the Metallurgical Building (Building No. 4). [Source: Album #10, E.N.H.S. Archives]

However, because of its close proximity to the Edison Laboratories it would be appropriate to discuss its construction and location . The "Gold Plating"[137] Building was located directly north of and ran perpendicular to the Chemical Storage and Pattern Shop (Building No. 3) and the Metallurgical Building (Building No. 4). Its two story structure was constructed out wood and iron and its approximate dimensions were 51'x127'.[138]

Unidentified Buildings - The only previously unidentified building that was documented during the research for this report as existing during this period was a "Glass House" that was located approximately 60' north of the Physics Laboratory (Building No. 1) and 30' east of Lakeside Avenue. (*See photo [B13], page 87)* Its exact east-west layout suggests that its use was directly related to the sun's movement. The building was constructed of wood and glass, with glass being the more prominent building material. The western and eastern facades of the "Glass House" consisted of wood planks that ran perpendicular to the ground surface. These wood planks were cut so that a "V" shape was formed within both the east and west facades. Within the "V" were a series of glass panels that were laid parallel to the "V" formation and extended upward to define the peaked roof line of the "Glass House." The resulting forms for both the eastern and western facades resembled a glass diamond set on its edge that was supported by a wooden "V" brace. The northern and southern facades were much less complicated. They were each divided into two halves by a horizontal line. This line was defined by the bottom edges of the glass panels that existed along the upper half of both the northern and southern facades. The roof was entirely encased with glass panels. The documentation of this buildings use, number and name was not documented.

Mechanical Systems:

The expansion of the Edison Laboratories created the need to make improvements to and expand the site's utility systems. One improvement was the alteration of the drainage swale that existed along (several of) the smaller laboratories southern foundations (Building No. 2-4). The swale was lined with a brick similar to a "running bond" pattern, except there was more space in between the swale's bricks. (*See photo [B13], page 87*) The brick pattern was laid parallel to the water flow and thus the amount of debris collected within the swale was diminished. In addition to this improvement the drainage system was extended further west through a 3" storm water line that ran under the courtyard and was connected to a catch basin that was located at the Physics Laboratory's (Building No. 1) southeast corner. (*See photo*



[B13] Figure 1.32. (1912) View Northwest of the Edison Laboratories. Notice the Glass House structure located right of the center of the photograph, north of the Physics Laboratory (Building No. 1). The building's exact east-west layout suggests that its use was directly related to the sun's movement. Also notice the brick-lined drainage swale.[Source: Album #10, E.N.H.S. Archives]

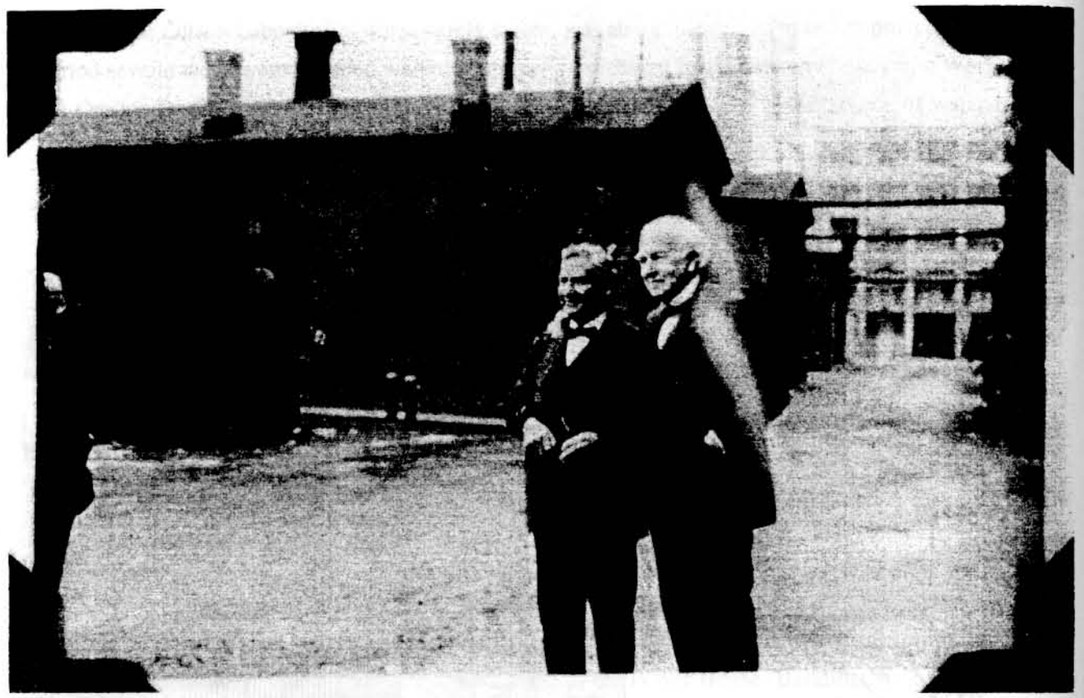
[B9], page 93) This basin collected the water runoff that accumulate along thesouthern foundation of the Physics Laboratory and prevent any overflow of water from entering the courtyard.

The Edison Laboratories water supply system was also expanded upon and improved. During this period several wells were installed within the property purchased by the Edison Phonograph Works from the Orange Distilled Water Ice Company property. These wells became a new source of water for the Edison Laboratories, in addition to the water supplied by West Orange. The West Orange water was measured by two West Orange meters located on the site. The original meter that was installed during the first period was located in the Main Laboratory (Building No. 5). The second meter was installed adjacent to the northern facade of the National Phonograph Company's Record Storage Building (Building No. 21), which fronted Alden Street. The water was distributed throughout the site through a series of underground pipes that ranged in size from two to eight inches.[139] Also during this period a water tower that was located on the roof of the Main Laboratory was removed. (*See photo [B6], page 89*)

Another utility system within the Edison Laboratories that was expanded was the site's electrical system. Since the West Orange plant was producing its own electrical supply a distribution system independent of the West Orange system was established. Three utility poles were installed by 1911 within the Edison Laboratories site to help distribute the sites overhead electrical and telephone wires (*see photo [B13], page 87*) One utility pole was located approximately 10' west of the Pattern Shop (Building No. 12) and 20' north of the Garage (Building No. 10). Another pole was located approximately 2' east of the Chemical Laboratory (Building No. 2) and 36' north of the Power House (Building No. 6). (Because of the location of this second pole, the large leant-to that was added to the Chemical Laboratory during this time period was constructed around this pole.) The third pole was located approximately 4' west of the Metallurgical Building (Building No. 4) and approximately 36' north of the Power House (Building No. 6). This third pole served as the central distribution pole for the overhead wires that passed through the Edison Laboratories site. (*See map [MB1], page 70*)

In addition to the overhead power lines, overhead steam lines were also installed during this period. (*See photo [C14], page 90*) These lines carried steam approximately 10' above ground level to and from each of the buildings within the Edison Laboratories. (*See map [MB1], page 70*) The more obvious steam lines were the ones that were connected to the smaller laboratories (Building No. 1-4). Each of the smaller laboratories contained a steam line above its entrance that extended

[B6] Figure 1.33. (1911) View of the Main Laboratory (Building No. 5) from Lakeside Avenue. The water, which was located on top of the Main Laboratory's east end, was removed during the Edison Laboratories second period of history. [Source: Album #10, E.N.H.S. Archives]



[C14] Figure 1.34. "Thomas Edison on his 80th Birthday." View east from west end of courtyard. Notice the overhead steam lines that were connected from the smaller laboratories (Building No.'s 1-4) and the Main Laboratory (Building No. 5) [Source: Album #16, E.N.H.S. Archives]

perpendicularly to Main Laboratory (Building No. 5). As a result these steam lines defined a horizontal plane directly above the main transportation corridor that existed in between the Main Laboratory and the smaller laboratories.

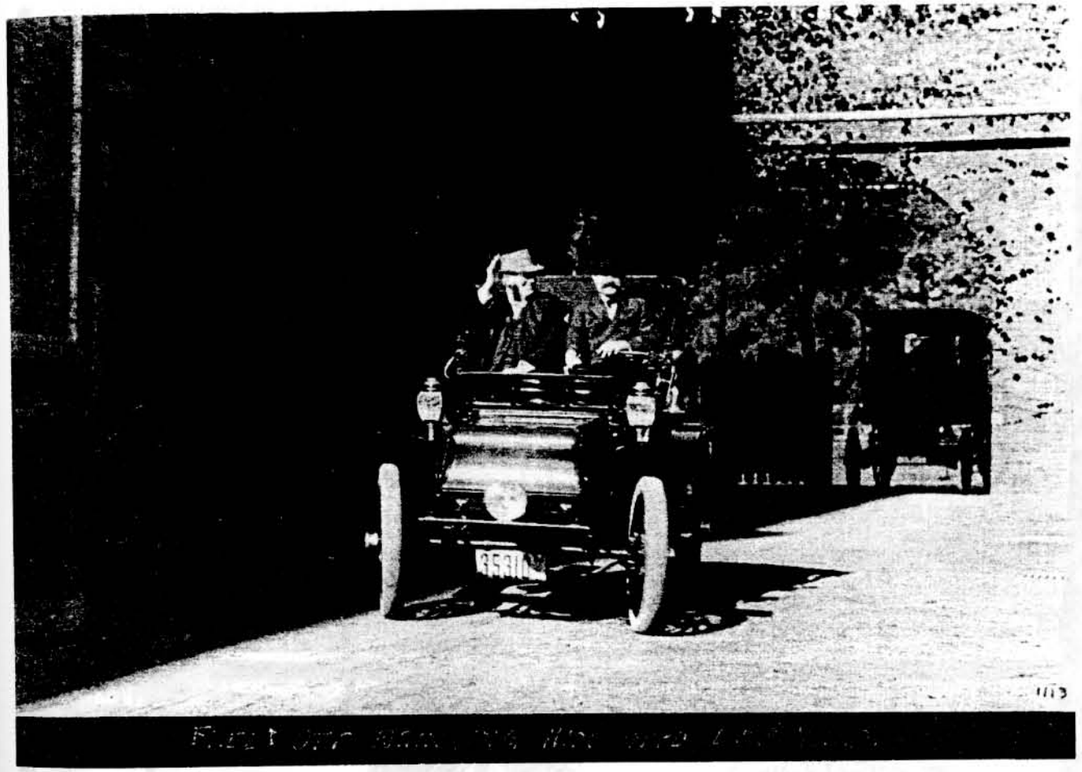
Circulation:

The expansion of the Edison Laboratories created greater number of deliveries to the site and thus a greater volume of vehicular traffic. This increased volume resulted in the transformation of the soft dirt surfaces of the main transportation corridor and the courtyard to a hard, less permeable surface that resembled a paved surface. (*See photo [C2], page 92*) The stress on the courtyard's ground surface was also further affected by Edison's experimentation in developing a battery that would power the automobile. The majority of these tests took place within the courtyard because of the amount of open space that was needed. The automobiles that were used for these tests were either parked inside the Garage (Building No. 10) or within the courtyard itself, perpendicular to the Physics Laboratory (Building No. 1). Also parked within the courtyard was the wagon that carried the Edison Laboratories fire equipment. In 1913, Edison and his staff conducted a series of fire drills that took place within the courtyard.

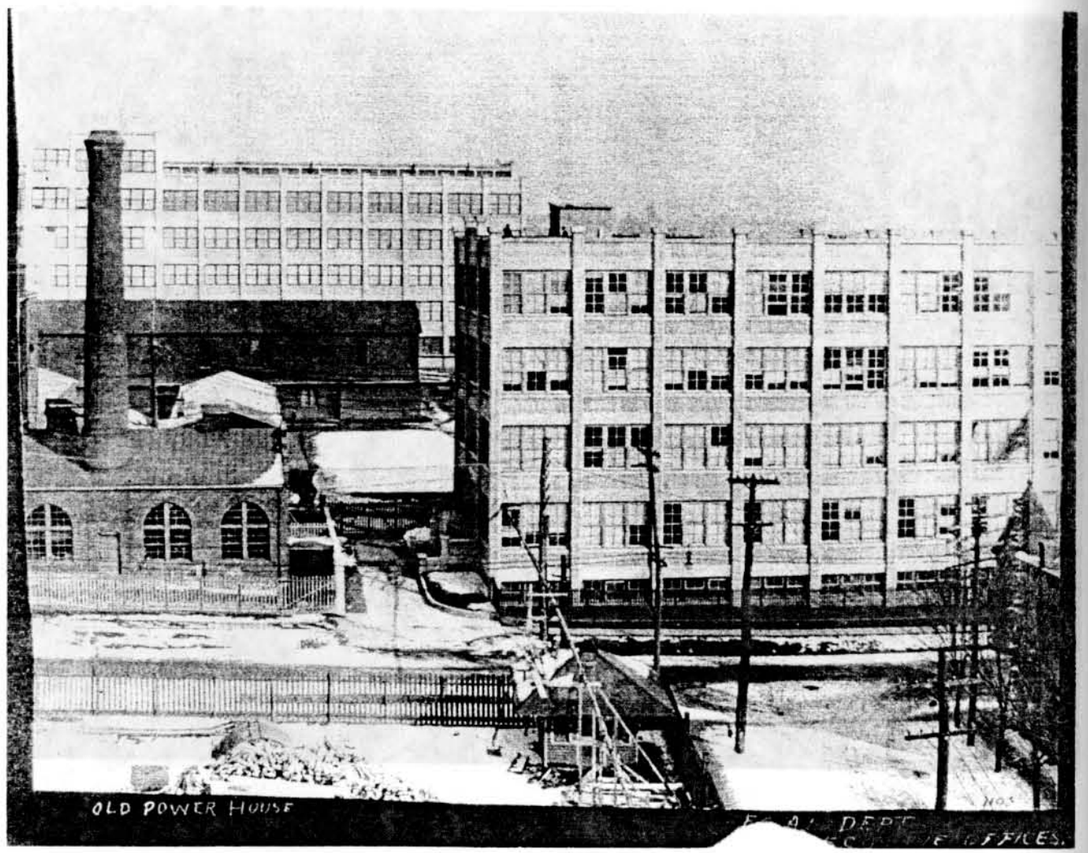
The expansion of the Edison Laboratories also brought about an increase in the volume of pedestrian traffic within the Edison Laboratories site. Part of the increase was the result of the additional employees that were hired during this period. By 1912, the Edison Laboratories was employing 100 more workers than it did at the beginning of the twentieth century. During this period, bicycling became an increasingly favorable mode of transportation for the Edison employees. However, since there were no designated areas to leave their bicycles, the employees would usually lean them against one of the laboratory buildings. (*See photo [B9], page 93*)

Besides the increase in employees within the Edison Laboratories, there was an increase in the number of visitors. This was especially true for the number of musicians and singers that came to the Edison Laboratories to be recorded for the phonograph project. To accommodate these visitors a concrete (side)walk was constructed along the eastern facade of the Metallurgical Building (Building No. 4). (*See photo [B5], page 94*) The (side)walk extended from the main transportation corridor to an entrance that led into the northern end of the Metallurgical Building. Many other visitors came to the Edison Laboratories site. They came as individuals or in groups, as an example the electrical class of the U.S.

[C2] Figure 1.35. "Edison Battery Salesmen," the Main Laboratory (Building No. 5) in background. (1915) The surface of the courtyard during the Edison Laboratories second period had eroded to a hard, semi-permeable surface. [Source: Album #10, E.N.H.S. Archives]



[B9] Figure 1.36. "Fred Ott Bringing Him (Edison) into Lab Yard." (1911)View west from within courtyard. The catch basin, located to the right of the photo, was installed during the Edison Laboratories ' second period of history. The bicycle leaning against the Main Laboratory (Building No. 5) was typical during the site's history. [Source: Album #10, E.N.H.S. Archives]



[B5] Figure 1.37. (1911) Northeast View of the West Orange plant entrance from Lakeside Avenue. [Source: Album #10, E.N.H.S. Archives]

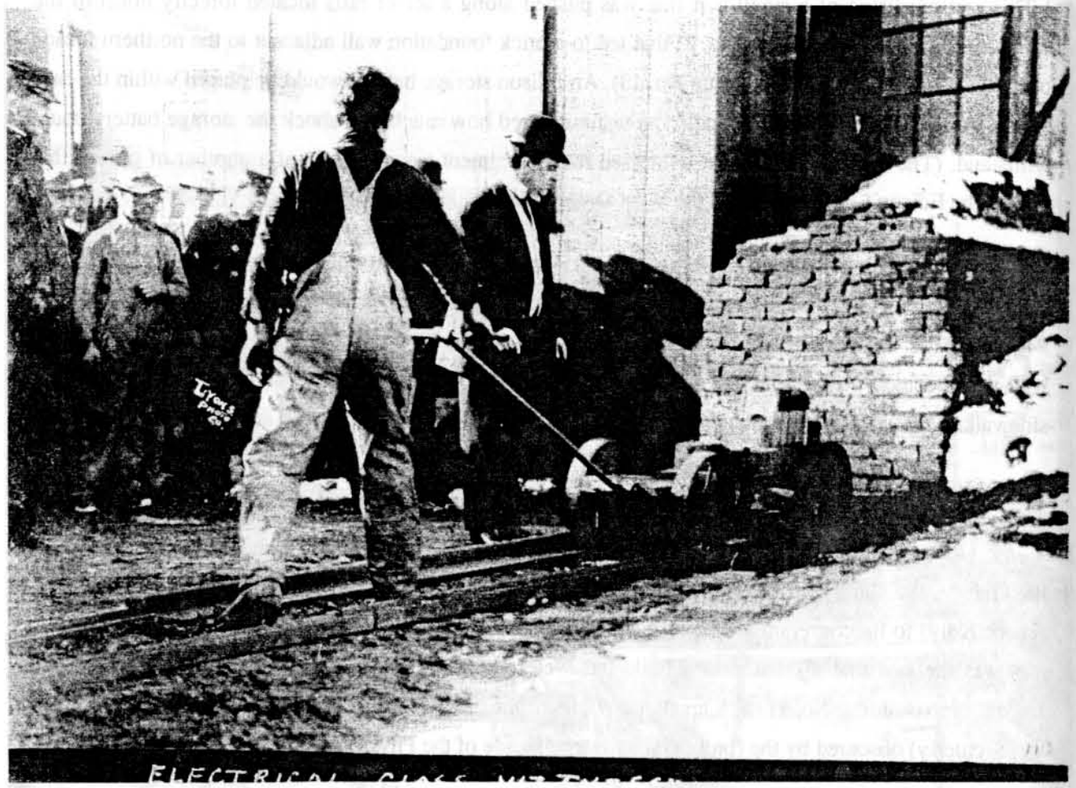
Navy. After arriving by train, they were given a tour of the West Orange plant and witnessed several experiments. One of the experiments they witnessed was the "Bumping Test." (*See photo [B10], page 96*) This test consisted of a small cart that was pushed along a set of rails located directly north of the Chemical Laboratory (Building No. 2) that led to a brick foundation wall adjacent to the northern facade of the Experimental Studio (Building No. 13). An Edison storage battery would be placed within the cart, which would be pushed into the wall. The test measured how much of a shock the storage battery could withstand. (The electrical class that witnessed this experiment was only one of a number of groups that visited the Edison Laboratories and the West Orange plant)

As a result of the West Orange plant's expansion, an additional entrance into the plant was established along Lakeside Avenue, just east of the Power House (Building No. 6). (*See photo [B5], page 94*) Along the western edge of the new entrance, approximately 8' east of the Power House, a concrete wall was erected.[140] The wall extended perpendicularly from the northern edge of the Lakeside Avenue sidewalk to the West Orange plant's main transportation corridor.

Views/ Vistas:

Although the Edison Laboratories did expand its facilities during this period with the addition of the Garage, the Garage/ Experimental Studio and the Small Storage Vault (Building No. 10, 11, and 8, respectively) to its courtyard, this expansion was unnoticeable from Valley Road. The main reason for this was the fact that all of the new buildings were erected at a height similar to that of the Physics Laboratory (Building No. 1)--as a result, the views of the new buildings and structures from Valley Road were (chiefly) obscured by the (prominent) western facade of the Physics Laboratory.

The expansion of the West Orange plant as a whole, on the other hand, had an extreme impact on the views of the Edison Laboratories. The new 5 to 6-story buildings that were erected within the West Orange plant encased the Edison Laboratories on the north, south and east. As a result, the Edison Laboratories became dwarfed in the views of the West Orange plant by the larger structures . In addition, views of the Edison Laboratories as an isolated facility were no longer possible because the larger surrounding buildings became major background focal points.



[B10] Figure 1.38. "Electrical Class Witnessing 'Bumping Test'." (1911) View Southwest toward the Experimental Studio (Building No. 13). [Source: Album #10, E.N.H.S. Archives]

Furnishings & Objects:

As the experimental activity within the Edison Laboratories increased during this period, the external space that surrounded each of the laboratory buildings (Building No. 1-13) increasingly became filled with materials and objects. The increase in the number and types of projects being developed at the Edison Laboratories were, at times, more than the individual laboratory buildings could accommodate. As a result, miscellaneous objects were stored outside of the laboratory buildings. (*See photo [B21], page 98*) These objects included: defunct storage batteries; prototypes used for testing projects, such as the two semaphores that were located in front of the Garage/ Experimental Studio (Building No. 11); wooden crates; and other various objects and surplus material. Because the main transportation corridor needed to be clear, these objects were usually stored in the courtyard and in between the smaller laboratories (Building No. 1-4). The placement of these objects outside of the laboratory buildings gave the Edison Laboratories the "cluttered" appearance of a true industrial facility.

SUMMARY:

The change in Edison's focus from the late 1890's Ore Milling project to the phonograph project and the battery storage project proved to be a lucrative decision for Edison and his staff. This redirected focus paved the way for the West Orange plant's most significant period of history; especially in terms of internal and external growth. During this period, the West Orange plant witnessed an expansion that was never to be repeated.

The West Orange's plant expansion invloved the acquisition of over forty three properties by 1908 in a series of three phases. As the land was acquired, Edison went on a building spree that added over sixty new buildings (not including those that were erected and then replaced by another building during this period) to the West Orange plant. The larger structures, such as Building No. 11-13-15, 24, and 130, were constructed out of cement produced by Edison's Portland Cement Company. In addition to the construction of new buildings, the West Orange plant's utility system was expanded upon. This included the construction of a new Power House and Boiler House (Building No. 1 and 3, respectively) for the West Orange plant.

The activity at the West Orange plant during this period was so intense during this period that it reached beyond the boundaries of the West Orange plant. To operate the expanded West Orange plant, Edison increased the plant's workforce. The increaesd number of people working at West Orange plant

[B21] Figure 1.39. "Two Streams in Action," fire drill in 1913. View northeast from within the courtyard. The miscellaneous objects stored outside of the laboratory buildings was typical during the Edison Laboratories' second period of history. [Source: Album #10, E.N.H.S. Archives]

indirectly affected the growing population of West Orange since a (moderate) number of them chose to reside in West Orange. To help address the needs of West Orange's growing population several utilities were installed within the town, such as running water, sewage disposal and fire protection. Although "Edison did not have a direct effect on any of these services ... it is more than a matter of coincidence that his industrial complex climaxed, during the same period as West Orange's 'modernization.'"[141]

The expansion of the West Orange plant established several historical records: the sixty buildings and structures that were constructed within the West Orange plant during this period was the largest construction project ever undertaken by Edison and his staff ; the experimental activity within the Edison Laboratories reached a high intensity level that steadily declined after this period; and near the end of this period of history, the West Orange plant had tripled in size and was ten times as large as the original Edison Laboratories.

During this expansion the Edison Laboratories and its landscape was only altered in terms of their context. At the beginning of the period, the Edison Laboratories landscape had the appearance of an industrial empire due to the large three story Main Laboratory and the along facade along Valley Road. By the end of the period, this appearance had changed due to the surrounding buildings that were erected and were larger and similar in building materials. This alteration gave the Edison Laboratories a more dense appearance. Since the majority of the expansion took place outside of the Edison Laboratories, this was the only alteration to the Edison Laboratories landscape.

Thomas Alva Edison Stewardship: 1915-1931

THE WEST ORANGE PLANT

According to William Meadowcroft, Edison's personal secretary and biographer, 1915 stood out as a year of massive effort for the West Orange plant. The fire that had swept through the Phonograph Works was used by Edison and his staff as a turning point in the plant's history. Edison himself led the clean-up efforts at the plant the day after the fire. In 1907, while the storage battery project was causing Edison's health to deteriorate, Edison stated that he was retiring from all commercial work and was devoting himself to his experimental work.[142] This so called retirement was soon forgotten after the 1914 fire, for Edison had new plans for the West Orange plant. In talking with his son Charles Edison, who was preparing to take over Edison's businesses, Edison reassured Charles, "We'll have a much better plant when we get through. We've swept away all the old shacks, and now we can have a good plant."[143] By 1917, much of what was destroyed or damaged by the fire had been either repaired or replaced and the West Orange plant continued to operate as if the fire had not occurred.

Throughout the reconstruction, Edison products were being redesigned and manufactured in the undamaged buildings, primarily the Storage Battery complex. The focus of the staff was now on cost reduction and product engineering rather than product development, which was the primary objective before the fire. This change marked the beginning of the manufacturing stage that the site had entered into, and the end of the experimental period. This was clearly indicated in 1916, when the laboratories became service departments and directed support toward the product line.[144]

World War I kept the staff and the plant quite busy. While the manufacturing plants were producing wartime products, such as storage batteries for submarines, the laboratory group was busy trying to create substitutes for the materials and supplies that were cut off by the war. Unlike other industries at the time, the West Orange complex was not severely crippled by the lack of precious chemical supplies. The laboratory group produced the needed chemical supplies for the plants in a rapid amount of time and prepared the site for the transition to wartime production.

The years that followed the war were years of depression and retrenchment at the West Orange plant. Edison noted that, "...these hard times keep me busy day and night, and I have to work about 18 hours a day to keep the ship afloat."[145] With the laboratory group delegated as a product support facility, little innovation was being performed and as a result, many of the Edison products were not improved

upon. Eventually, the increased competition and the advent of radio forced the Edison enterprises to manufacture products that would not prove to be a high risk, such as household appliances.

Edison's health had begun to deteriorate during the late 1920's. After a month of being confined to his bed, Edison passed away on October 18, 1931. It was Edison's reputation as a "benefactor of mankind" that brought thousands of people to pay their last respects at the West Orange complex, where his body was displayed.

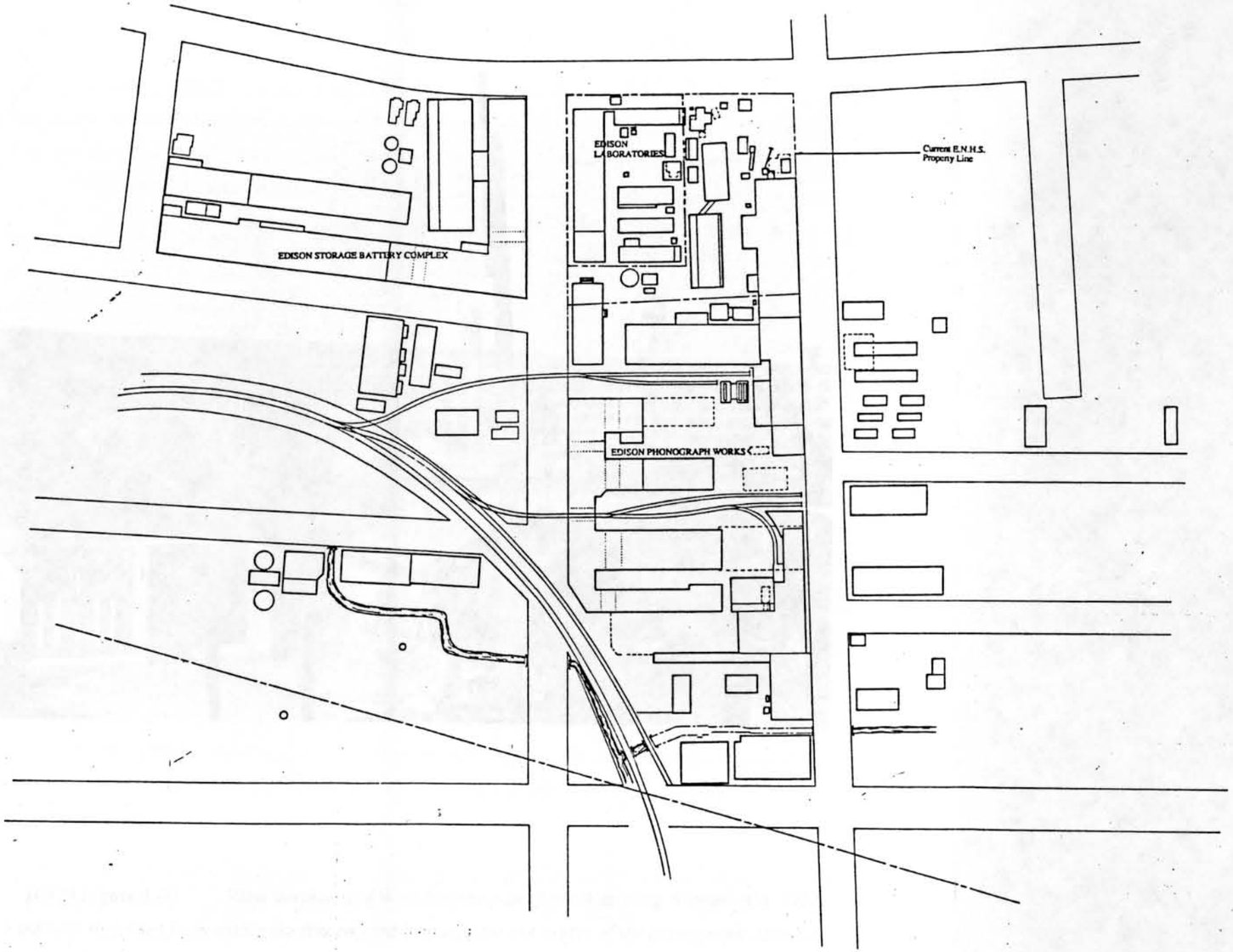
This period has as its chronological boundaries the beginning of the West Orange plant's rebuilding campaign in 1915 and Edison's death in 1931. During this period, the West Orange plant was still recognized as one of the largest industrial establishments in the Oranges. (*See Map [MC4], page 102*)

Environmental Context:

Natural - West Orange's natural landscape continued to be altered through this period. Part of the cause of this alteration was the result of the continual development and growth of residential areas during this period. Another part was the result of the new development and growth of industrial areas within the Oranges.

Cultural - Even though the Town of West Orange had been often characterized as a small industrial suburb, it was not immune to the troubles created by the World War I and the postwar Depression. The inflation brought on by the war proved to serve as a catalyst for radical labor and union groups that preached strikes and sabotage. One of the groups that was active in New Jersey was the Industrial Workers of the World and "infiltrated" the West Orange plant. [146] In 1916 the Edison Phonograph Works was forced to close due to a strike over working on Washington's birthday. The group used this against Edison by pointing it out as a flaw in his patriotism.

Besides the labor problems, the surrounding community was also concerned with the pollution that came from the Edison plant; specifically, the spray basins. In 1919, a resident along Valley Road filed a complaint against the Edison Storage Battery Company.[147] It seemed that the acid solutions in the basins were causing her skin irritation and other health disorders effecting her ears, eyes and gums. Complaints against the basins continued. In November 1924, the Board of Health visited the basin and reported to Charles Edison that the mist was too overwhelming.[148] (*See photo [C13], page 103*) The Edison people said it was just a humid day and things were not normally that misty. Since there were no



Map [MC4]

CULTURAL LANDSCAPE REPORT:EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1600-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: THOMAS ALVA EDISON STEWARDSHIP:1915-1931
ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER
—
SHEET NUMBER
— OF —

SCALE: 1" = 100' ; 0" (Approximately)
0 100 200 400 Feet
0 50 100 Meters

[C13] Figure 1.40. View northwest of West Orange plant from Watchung Avenue. (Ca. 1927) Notice the mist that rises from within the fenced yard located near the center of the photograph. [Source: Photo Album #16, E.N.H.S. Archives.]

more documents concerning this issue in the Edison legal files, it's possible that the Board of Health was content with this explanation.

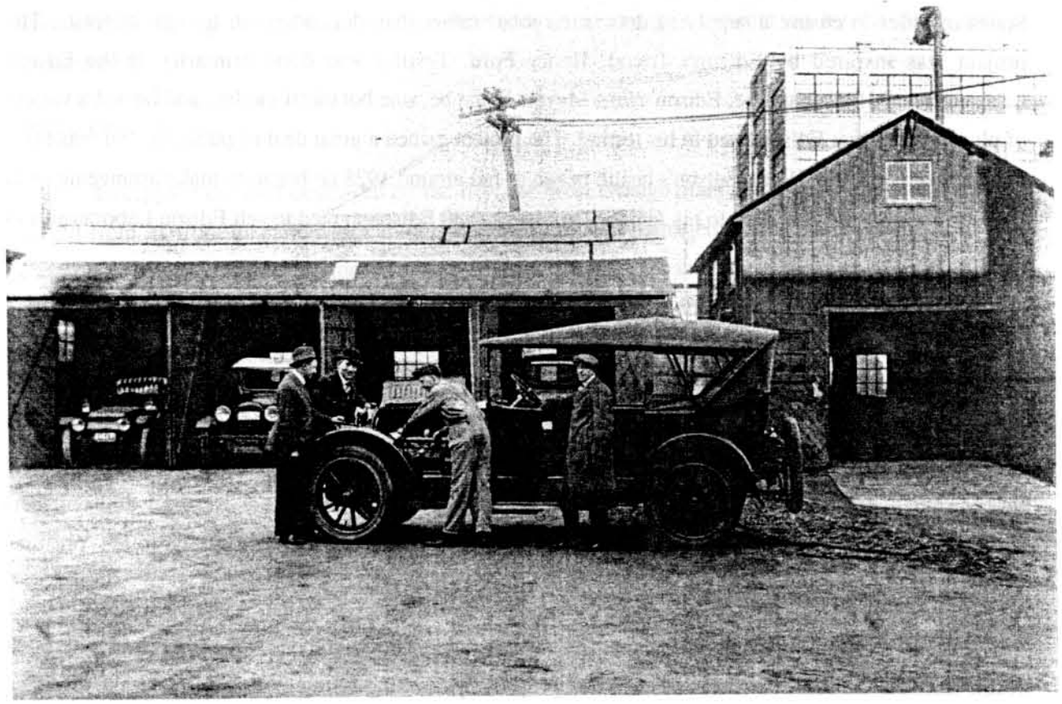
Business - The coming of the War brought new challenges and significant changes to the West Orange plant. New products were manufactured, new contract research initiated, and many new employees came to the site. Like every other major manufacturing concern in the United States, T.A.E. Inc. had to put its production and experimental facilities at the disposal of the government.[149]

Edison was away from the West Orange plant during the majority of time America was involved in the War. He was participating in the desperate search to find a solution to the U-boat problem. While a great deal is known about Edison's work with the Naval Consulting Board (and his attempts to establish a laboratory for military technology at Sandy Hook), most of the details of his war work remain secret.[150]

During Edison's absence, the Edison Laboratories concentrated on devising manufacturing programs for the numerous items of war goods that T.A.E. Inc. had agreed to manufacture: gas masks, bomb sights, and electrical equipment. Although Secretary of the Navy Daniels had talked about applying Edison's "magnificent facilities" at West Orange to the war effort the work done in the Edison Laboratories was more a case of arranging the manufacturing of a specified part than experimenting to come up with a new or better product. This was routine engineering work.[151]

With the war over, and a short lived economic boom beginning, the West Orange plant applied itself to improving the large Edison product line and reducing the cost of manufacturing it. The only new experimental project of any importance was the attempt to convert Edison's alkaline battery to an automobile battery--a project doomed to failure. The automobile was still one of Edison's great loves and the Edison Laboratories was full of them: his own collection in the Garage (Building No. 10)--*(See [C8], page 105)*, test rigs in the Power House (Building No. 6)--after it was converted, and various machines in the courtyard.[152]

Although the 1920's were boom years for much of American industry, they were years of depression and retrenchment at the West Orange plant. The core phonograph business was in a great deal of trouble and did not involve himself with the new popular dance music and new methods of electrical recording and amplification. While the project to improve the acoustic phonograph in the 1880's had taken up the bulk of the experimental facilities of the Edison Laboratories, electronic recording methods



[C8] Figure 1.41. View north from within the Edison Laboratories' courtyard.(1917) Notice the automobile collection located in the Garage (Building No. 10). [Source: Album #42, E.N.H.S. Archives]

and the development of radio in the 1920's was carried out in an atmosphere of secrecy in the Physics Laboratory's small rooms (Building No. 1).[153]

Edison's last project focused on trying extract organic rubber from plants indigenous to the United States in order to ensure a supply of domestic rubber rather than depending on foreign interests. The project was inspired by Edison's friend, Henry Ford. Testing was done primarily at the Edison Laboratories. In the meantime, Edison's Fort Meyers home became botanical garden, and hosted a variety of plant species that Edison used in his testing. The project gained a great deal of publicity, but was not a commercial endeavor. When Edison's health began to fail around 1928 he began to make arrangements to pass his interest in T.A.E. Inc. to his family. On May 1,1930 Edison agreed to sell Edison Laboratories to T.A.E. Inc.[154]

Landscape Site/ Setting:

The landscape site and setting of the West Orange plant after the fire were very similar to the plant before the fire. There were two primary reasons for this. One reason was the type of approach used in reconstructing the buildings damaged or destroyed by the fire. The buildings that were destroyed were reconstructed on the same foundations, while the damaged buildings were repaired and (further) strengthened. This type of reconstruction gave the West Orange plant a look very similar to the "pre-fire" plant.

The other reason was the amount of time and attention Edison and his staff gave towards the site's reconstruction. Edison became a model for employees by working 18 hours a day towards the project. With the entire staff concentrating on the reconstruction, while at the same time trying to keep the plant running, little time could be afforded to alter the layout of the West Orange plant.

Response to Natural Features:

Wigwam Brook, the site's only existing hydrologic features, was again severely altered during this period. Before the fire, the brook ran through an underground channel at the eastern end of the Edison Phonograph Works. At the end of the channel the brook ran into a reservoir at surface level and its overflow ran through another channel, under the tracks and exited the southwestern end of the site. During this period the reservoir was added onto and a spray basin was constructed to the east of the reservoir. (*See Figure 1.43, page 108*) Water from the reservoir entered into the basin by a control gate.

This basin, and a very similar basin constructed across Lakeside Avenue, were used as treatment facilities for the chemicals used within the West Orange plant.

Besides this change, very little was documented concerning the site's natural systems that might have existed during this period. Any possible ecological changes brought on by the fire were not documented.

Spatial Organization:

Except for the area destroyed by the fire, the West Orange plant's spatial relationships were not altered from its from its earlier appearance. The area that was damaged by the fire resembled one large scrap pile for a brief period of time. Although much of the debris was scattered in piles that concentrated around the foundations of the destroyed buildings, the spatial relationships that were once defined were made non-extant by the fire.

As the damaged area was being reconstructed the spatial relationships that once existed were being redefined. Again the emphasis was placed on efficiency and maximizing the building potential of a given space in terms of square footage. This was especially true for the new buildings that were constructed with a larger footprint than their predecessor. All the buildings were constructed parallel or at right angles to each other within a narrow framework so space was not wasted. The fire also gave Edison and his staff the chance to clear out most of the small, deteriorating storage and special use structures that cluttered the narrow spaces. Since most of the structures were never replaced it would be logical to assume that Edison incorporated these special use spaces within the new buildings to increase efficiency within the plant. Some of the old lean-to's were rebuilt as bicycle sheds for the workers.[155]

THE EDISON LABORATORIES:

Although the great fire that ravaged the West Orange plant in December 1914 was a watershed in the history of Edison's business affairs it did not touch the Edison Laboratories, nor did it alter a process of change that had started with the creation of the Engineering Department. What Edison had once called "...the best lab ever..." was now settling down to the mundane task of supporting the Edison product line. Routine production engineering gradually replaced the great experimental campaigns that characterized the Edison Laboratories in the nineteenth century.[156]

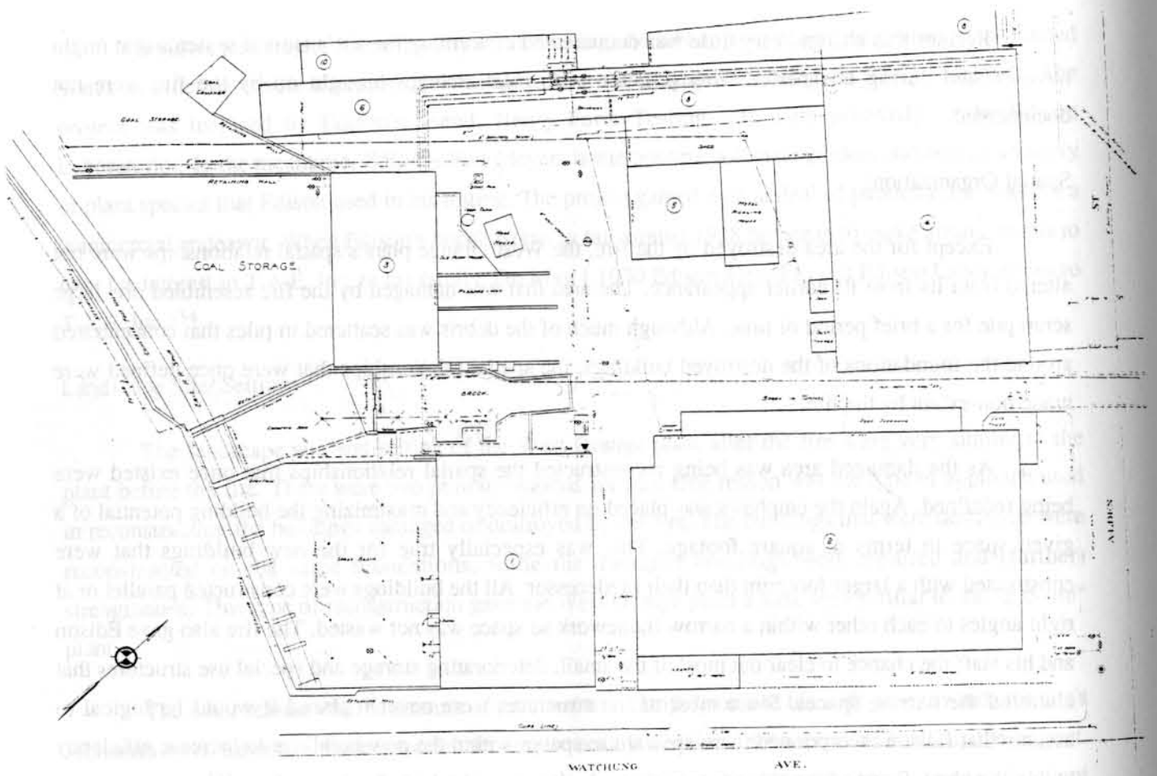


Figure 1.42. Plate 7. The spray basin, located right of the railroad tracks, was used as a treatment facility for the chemicals used within the West Orange plant. [Source: Plates of the West Orange plant (Given to Edison as a birthday present), 1917, Building No. 12, Edison National Historic Site Archives, West Orange, New Jersey.]

This evolution of function brought change to the make up of the Edison Laboratories staff. Instead of the lightly educated generalists hired in the nineteenth century, the Edison Laboratories now employed professional engineers and administrators. The decline of innovation at the Edison Laboratories can be seen in the slow reduction of the numbers of "muckers"--the untrained, flexible experimenters who helped produce the great inventions of the 1870's and 1880's. Edison's secretary Meadowcroft reported in 1916 that the Edison Laboratories work was directed toward support of the Edison product line and "...there is little of mere research done here." The Edison Laboratories that had once had a world wide reputation for developing completely new technology now acquired the patents and skills of others.[157]

The Edison Laboratories work force was reorganized several times during this period. The process of specialization and bureaucratization can be seen in the emergence of a new kind of employee at the Edison Laboratories, the accountant and financial analyst. The old era of muckers and all night experiments was over. In its place was a tightly run business operation.

In terms of the number of men working in the Edison Laboratories, this period marked a slow decline after the boom of World War I. In 1917 government contracts created many new jobs at the West Orange plant and the work force increased significantly. There were around 180-190 men at work in the Edison Laboratories during World War I. After the initial loss of workers to the armed forces, there was a rapid increase in the West Orange plant's labor force. During the War there were about 8,000 men in the whole West Orange plant compared with about 3,000 at the turn of the century. By the end of the hostilities there could have been as many as 10,000 men employed by Edison at the West Orange plant.[158]

But this was to be only temporary prosperity. Throughout the war, Edison was busy serving as a consulting the U.S. Navy about military projects. When he returned to West Orange after the War, Edison was concerned about the hard times ahead; he correctly anticipated greater competition in his core phonograph and storage battery business. The Post War Depression hit hard in 1921. Edison responded to this crisis by going on what was described as "rampage" through the Edison Laboratories and the Edison Phonograph Works, firing men right and left, from common laborers to the chief engineer of the Edison Laboratories. After Edison's purge of 1921, it was estimated that less than 2,000 workers remained in the factories at the West Orange plant. In 1923, Edison went on another purge and discharged hundreds more. "Merrily the axe swings" noted Charles Edison, and the reductions in staff continued as the financial situation of T.A.E. Inc. deteriorated. There were 65 men at work in September 1923 and this number had

dropped to 35 by July 1925. It dropped even further to 21 in February 1926 and there were only 17 left in June 1927. By June 1929 just 12 men were on the Edison Laboratories payroll and throughout 1930 there were only 7.[159]

Landscape Site/ Setting:

Even though the role of the Edison Laboratories had changed significantly, the appearance of its exterior and landscape features did not. (*See map [MC4], page 112*) The only alterations to the Edison Laboratories site were the additions and removal of several temporary experimental studios. Most of these alterations occurred around the perimeter of the Edison Laboratories site.

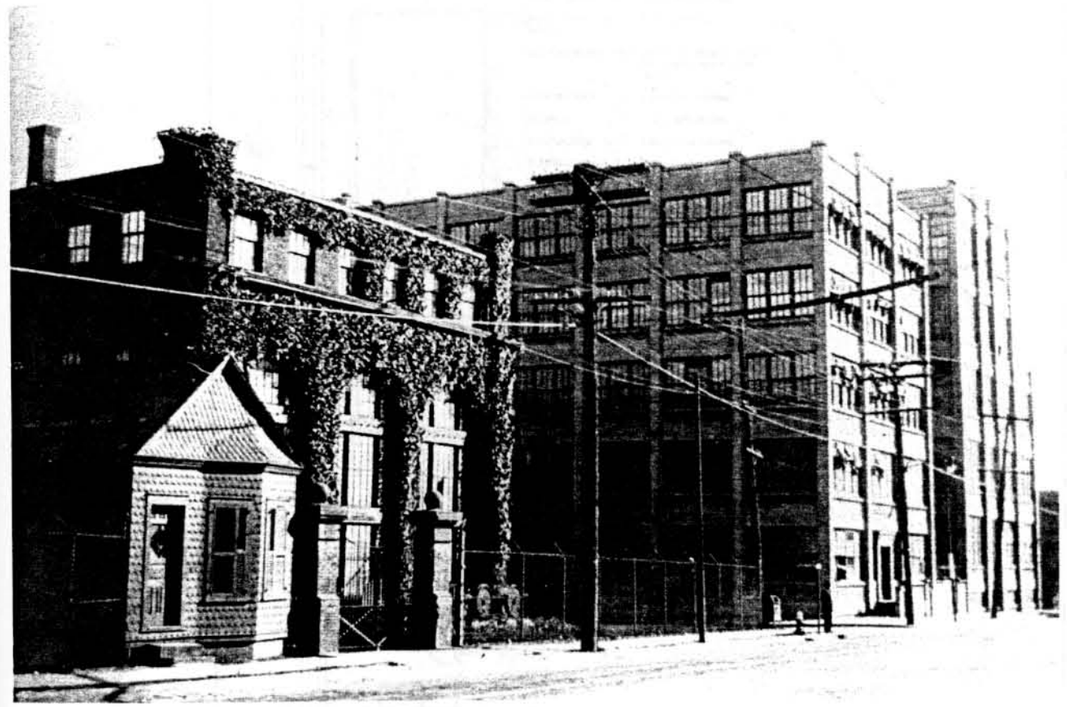
A year before Edison's death he agreed to sell Edison Laboratories to T.A.E. Inc. for the "book value" of $165,000. Included in the settlement were the land, premises and contents of the Edison Laboratories. The Edison Laboratories was described as "operated by Mr. Edison for experimental and development work."[160]

Landform:

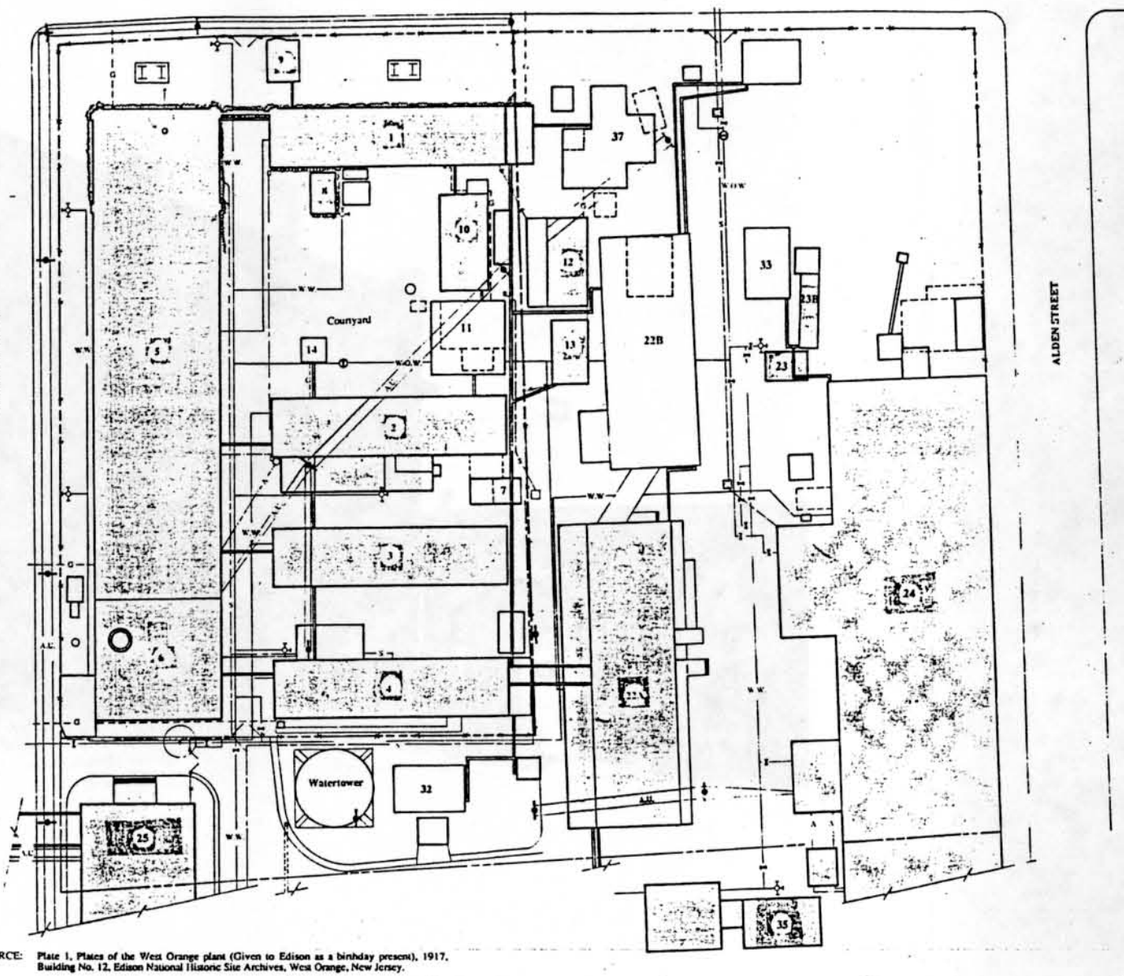
By 1918, fill was added along the southern foundations of the Main Laboratory (Building No. 5) and the Power House (Building No. 6); in between the westernmost basement window in the Main Laboratory (Building No. 5) and the eastern property line of the Edison Laboratories. The fill was added to compensate for the relocation of the Power House's southern entry, which was raised approximately 3'6"-4'.[161] As a result of the fill, a rise in elevation from Lakeside Avenue to the southern foundations of the Main Laboratory and the Power House was created.

Vegetation:

The ivy that was planted earlier, along the western facade of the Main Laboratory (Building No. 5), had grown profusely throughout this period. By 1927, almost the entire western facade of the Main Laboratory was covered. (*See photo [C21], page 111*) The ivy also grew further east along the northern facade of the Main Laboratory and north along both the western and eastern facades of the Physics Laboratory (Building No. 1). (*See photos [C11] & [C18], pages 113 & 119 respectively*) When the ivy continued to spread north along the eastern facade of the Physics Laboratory it covered almost the entire exterior of the Small Storage Vault (Building No. 8). (*See photos [C15] & [C16], pages 115 & 114*)



[C21] Figure 1.43. View southeast of the Edison Laboratories from Valley Road. (1927) The ivy along the western facade of Main Laboratory (Building No. 5) almost covers the entire facade. Also notice the small plantings that surround the railroad truck monument in between the western facade of the Main Laboratory and Valley Road. [Source: Album #16, E.N.H.S. Archives]



MAP SOURCE: Plate 1, Plates of the West Orange plant (Given to Edison as a birthday present), 1917, Building No. 12, Edison National Historic Site Archives, West Orange, New Jersey.

BUILDING KEY

Building No.	Building Name	Building Construction
1	PHYSICS LABORATORY	1 Story Brick Building
2	CHEMICAL LABORATORY	1 Story Brick Building
3	CHEMICAL STORAGE & PATTERN SHOP	1 Story Brick Building
4	METALLURGICAL BUILDING	1 Story Brick Building; *Wood & Iron Lean-to consturcted this period*
5	MAIN LABORATORY	3 Story Brick Building
6	POWER HOUSE	1 Story Brick Building
7	BLACKSMITH SHOP	1 Story Wood Building
8	SMALL STORAGE VAULT	1 Story Concrete Building
9	GATE HOUSE	1 Story Wood Building
10	GARAGE	1 Story Wood Building
11	GARAGE/ EXPERIMENTAL STUDIO	2 Story Wood Building; *This building was expanded during this period*
12	PATTERN STORAGE SHOP	1 Story Wood Building
13	EXPERIMENTAL STUDIO	1 Story Wood Building
14	EXPERIMENTAL STUDIO	1 Story Wood Frame Building, covered with Sheet Iron.
22A	GOLD PLATING BUILDING	2 Story Wood Frame Building, covered with Sheet Iron; *This Building was redesignated as "22A" during this period*
22B	NICKEL PLATING BUILDING	2 Story Wood Frame Building covered with Sheet Iron.
37	FOUNDRY	2 Story Wood Frame Building covered with Sheet Iron
32	VAULT NO. 32	2 Story Concrete Building
33	BLUE AMBEROL VAULT	2 Story Concrete Building

SYMBOL KEY

Symbol	General	Symbol	Furnishings	Symbol	Mechanical Systems	Symbol	Mechanical Systems	Symbol	Mechanical Systems	Symbol	Buildings	Symbol	Vegetation
	FENCE & PROPERTY LINE		FENCE		UTILITY POLE		FIRE HYDRANT		STEAM LINE		BUILDING ERECTED DURING THIS PERIOD		DECIDUOUS TREE
	E.N.H.S. PROPERTY LINE (1992)		GATE		MANHOLE	AU	AERIAL UTILITY LINE	WW	WELL WATER LINE		BUILDING ERECTED DURING PREVIOUS PERIOD		IVY
	EDISON LABORATORIES PROPERTY LINE				ABOVE GROUND WATER VALVE	WOW	WEST ORANGE WATER LINE	S	SEWER LINE		BUILDING REMOVED DURING THIS PERIOD		
					UNDERGROUND WATER VALVE	G	GAS LINE	A	AIR LINE				

Map [MC4]

CULTURAL LANDSCAPE REPORT: EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1689-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
Faculty of Landscape Architecture
Syracuse, New York

WEST ORANGE PLANT: EDISON LABORATORIES: THOMAS ALVA EDISON STEWARDSHIP: 1915-1931

ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

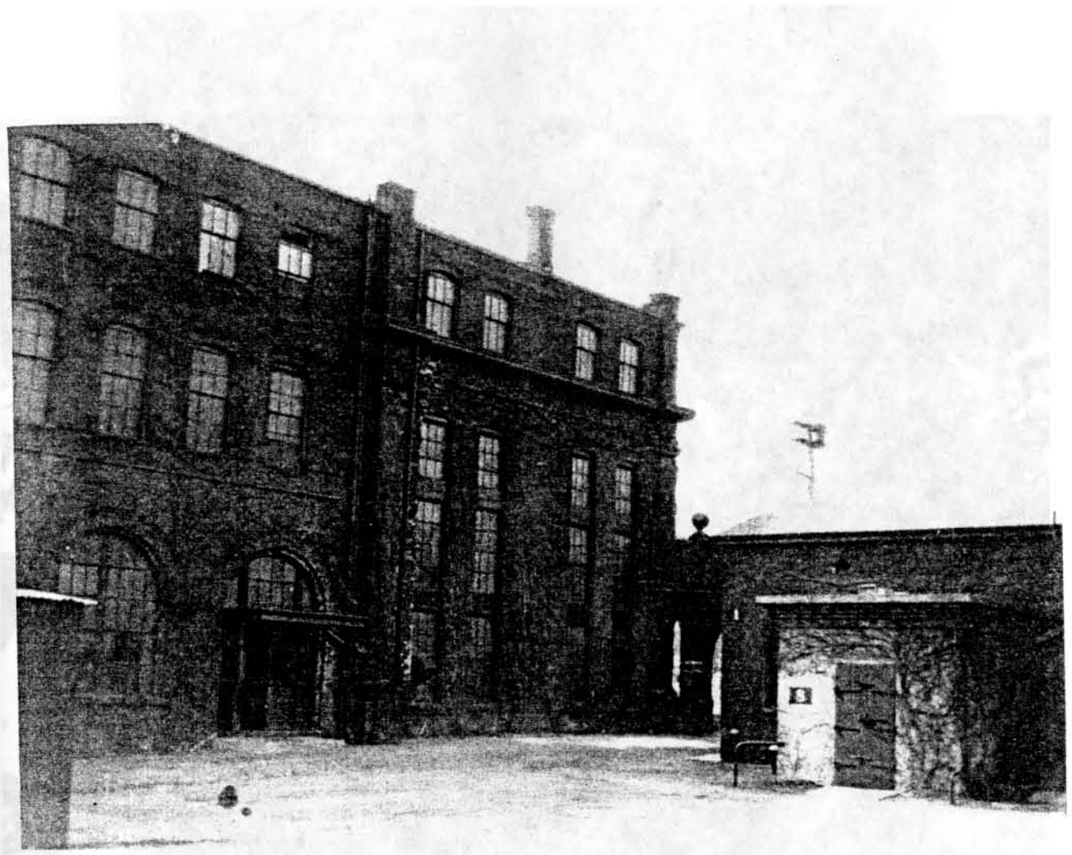
DRAWING NUMBER —

SHEET NUMBER — OF —

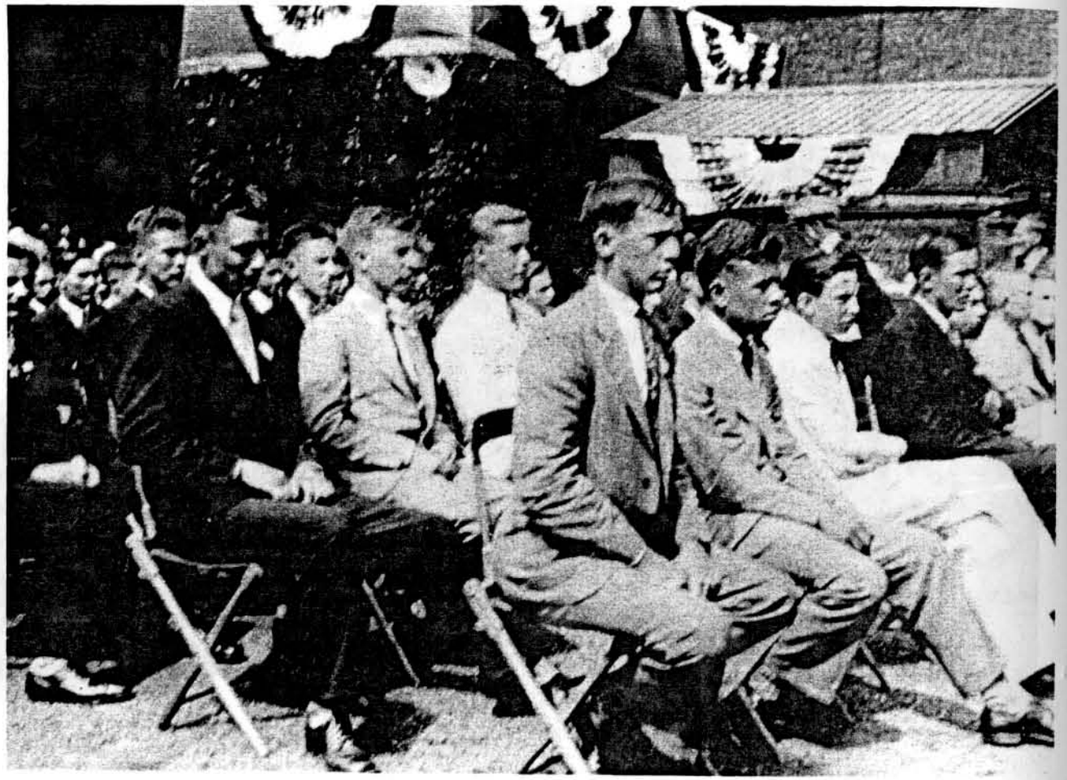
SCALE: 1" = 30' - 0" (Approximately)

0 30 60 120 Feet

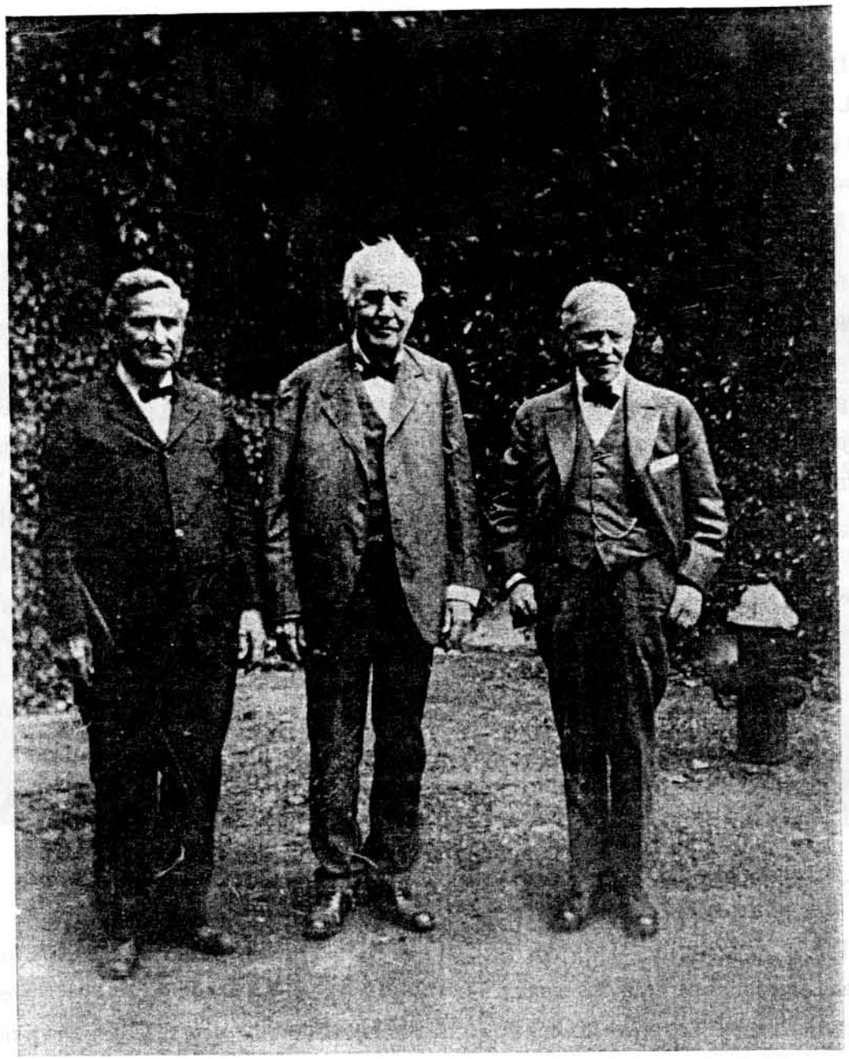
0 10 20 60 Meters



[C11] Figure 1.44. View southwest from within the Edison Laboratories courtyard.(Ca. 1927) Since the photograph was taken in winter only the vines of the ivy can be seen. Notice how the ivy spread along the northern facade of the Main Laboratory (Building No. 5) and the eastern facade of the Physics Laboratory (Building No. 1). Also notice how the Small Storage Vault (Building No. 8) was covered. [Source: Album #16, E.N.H.S. Archives]



[C16] Figure 1.45. View of the Edison Scholarship Candidates taken from within the Edison Laboratories courtyard.(1927) Notice the Small Storage Vault (Building No. 8) located in the background and how it was covered with ivy.[Source: Album #16, E.N.H.S. Archives]



[C15] Figure 1.46. "Ott, Edison & Meadowcroft."(1930) View north of the Physics Laboratory (Building No. 1) and the Small Storage Vault (Building No. 8) from within the Courtyard. Notice that the eastern facade of the Physics Laboratory (on the left) and the southern facade of the Small Storage Vault (on the right) are completely covered with ivy. [Source: Album #16, E.N.H.S. Archives]

During this period, Ivy also grew along the exteriors of other buildings and structures within the Edison Laboratories, as well as within the West Orange plant. For instance, the concrete retaining wall that was constructed east of the Power House (Building No. 6) was partially covered with ivy. (*See photo [C12], page 117*). North of the Edison Laboratories, the T.A.E. Inc.'s Blue Amberol Vault (Building No. 33) was also covered with ivy. (*See photo [C17], page 118*)

Besides the ivy, there were other types of vegetation introduced to the site during this period. Along the Edison Laboratories' western facade several groups of privets were planted. One group was planted north of the Physics Laboratory (Building No. 1), within the grass lawn that existed along the western perimeter of the Edison Laboratories site. (*See photo [C18], page 119*) This group consisted of at least four small privets, approximately 2' in height, planted in a row parallel to Valley Road, approximately 3' o.c.. Another group of privets was planted along the southern edge of the main transportation corridor, near the Valley Road entrance into the Edison Laboratories. (*See photo [C19], page 120*)This group was planted a hedge that began at the eastern side of the main entrance and extended along the southern edge of the main transportation corridor, until it reached the western side of the brick archway. (*See photo [C20], page 121*)

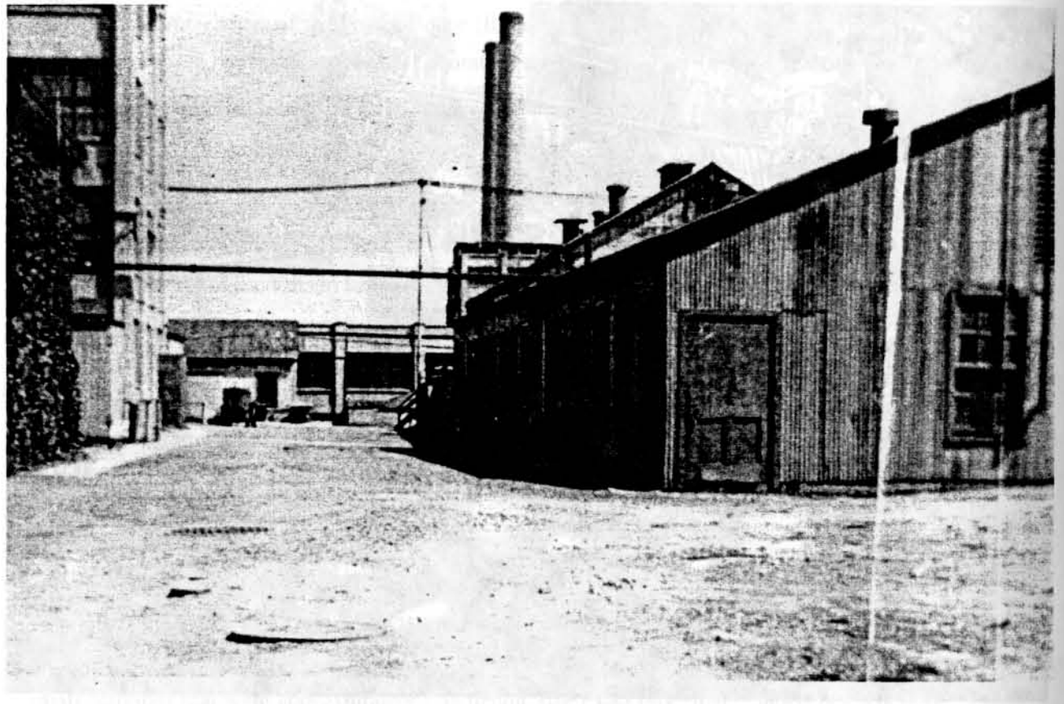
Surrounding the two railroad trucks that were located along the western facade of the Edison Laboratories was another type of vegetation that was introduced to the site during this period. (*See photos [C21] & [C18], pages 111 & 119, respectively*) Both trucks were completely surrounded by series of small plantings that were approximately 1' in height. (the exact type of vegetation is unknown)

Buildings and Structures: (Original)

The Main Laboratory (Building No. 5) - During this period, changes were made to both the interior and exterior of the Main Laboratory. The vestibule outside the library door was removed to open up this entrance area. The stairs leading down from the second floor were enlarged and a new office created to the south of the stairs. A wider corridor was therefore created from the main entrance of the building. The storeroom wall was moved back a few feet where it extended out to encompass a public telephone and the latter was removed to make a broad corridor that led to the first floor machine shop.[162]

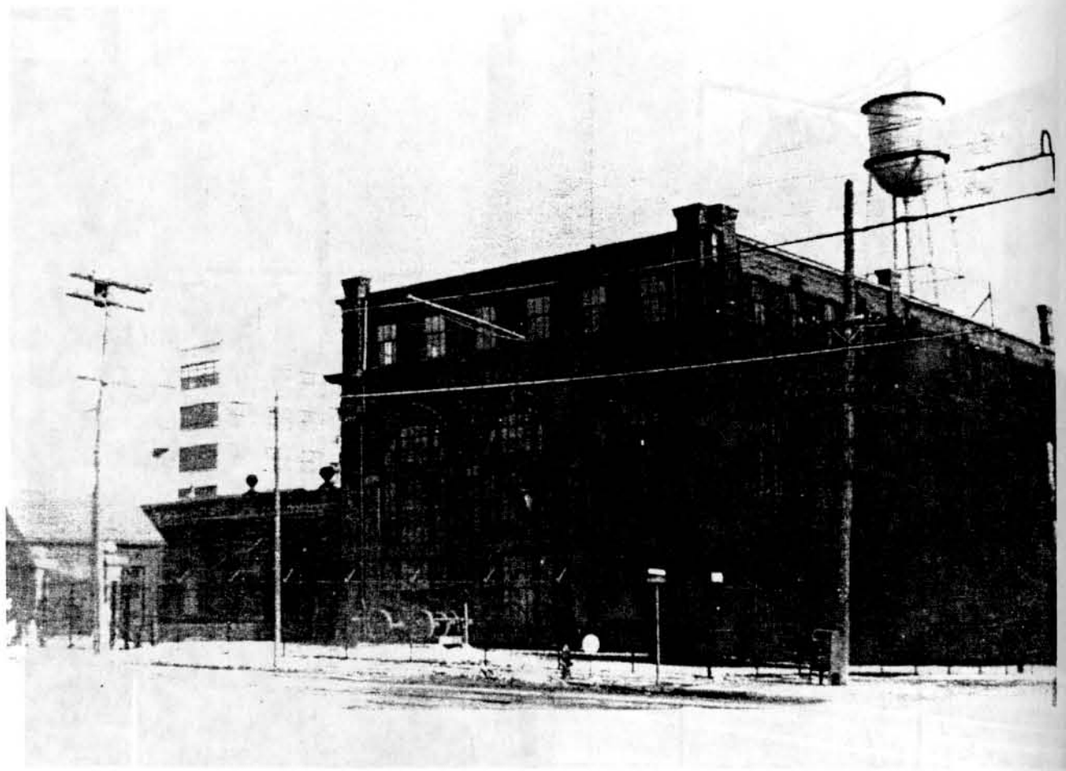
The machine shop and its tools were basically unchanged during this period. In 1918 Charles Luhr, the superintendent of the shop, admitted that it was not equipped with the most up to date machines:

[C12] Figure 1.47. View north of the bandstand and Power House (Building No. 6) from Lakeside Avenue.(1918) Notice the ivy that partially covers the concrete wall on the right of the photo. [Source: Album #15, E.N.H.S. Archives]

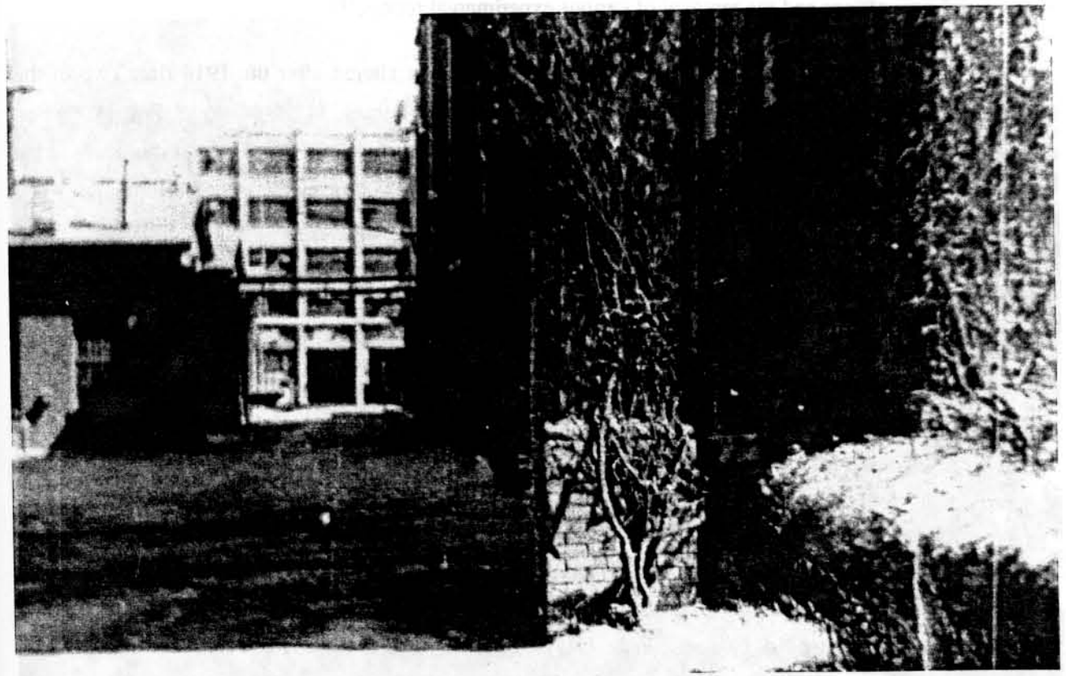


[C17] Figure 1.48. View east in between Building No.'s 33 & 22B.(1930) The building on the left, covered with ivy, is the Blue Amberol Vault (Building No. 33). [Source: Album #10, E.N.H.S. Archives]

[C18] Figure 1.49. View southeast of the Edison Laboratories from across Valley Road.(Ca. 1927) Notice the small plantings that surround the railroad truck located near the bottom-center of the photo. [Source: Album #16, E.N.H.S. Archives]



[C19] Figure 1.50. View northeast of the Edison Laboratories from Valley Road.(1927) The gray "wall" that extends from the main entrance's brick pillar to the brick archway is a row of privets planted by 1927. [Source: Album #16, E.N.H.S. Archives]



[C20] Figure 1.51. View east of the southern foundation of the brick archway.(1927) Notice the row of privets on the right of the photo. [Source: Album #10, E.N.H.S. Archives]

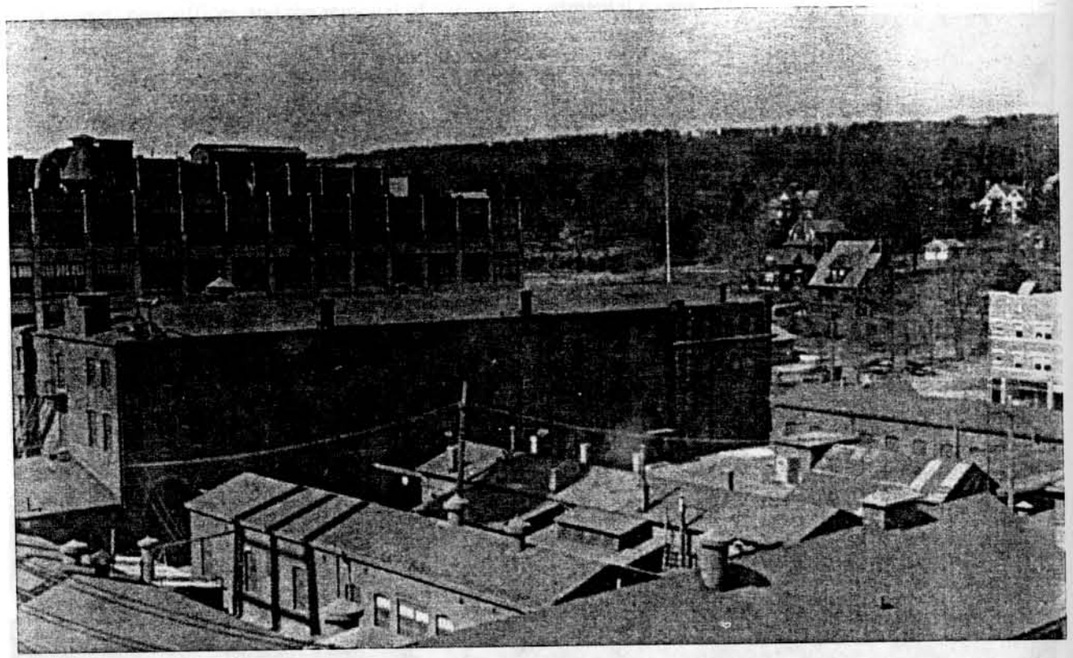
"it is very ancient material." The chief engineer complained of the difficulties in persuading Edison to buy new equipment: "The last thing to get anything is the lab." Other interior alterations include the addition of several new offices and the removal of various experimental rooms.[163]

Several exterior elements of the Main Laboratory were altered after the 1914 fire. Two of the elements were the Main Laboratory's windows and window frames. In the National Fire Protection Association's report on the 1914 fire, it was cited that the major cause for the extent of the fire was the wood window frames that each of the buildings contained.[164] As the fire burned in a building, the wood window frames of the adjacent building would combust from the heat of the fire and then spread throughout the rest of the building. The wood structures were destroyed, while the concrete buildings only had their windows and interiors destroyed. (*See photo [B32], page 123*). Although the fire did not touch the Edison Laboratories, Edison and his staff took the precautionary measure of replacing all of the wood window, and door, frames with metal ones. In addition, the glass panes were replaced with panes of glass that contained a wire mesh inside to prevent the glass from falling out when damaged. The panes of glass that were installed after the fire were approximately the same width as the original panes, but were approximately $1\frac{1}{2}$ their original height, thus creating a more slender window frame.[165]

In addition to the alteration of the Main Laboratory's window and door frames was the addition of two (emergency) exits. Both exits were located on the eastern facade of the Main Laboratory, above the Power House (Building No. 6). (*See photo [C22], page 124*) One exit was located on the second floor, near the center of the facade, and the second exit was located directly above it, on the third floor. Both exits had a metal landing and stairs that led to a landing on the roof of the Power House. The landing led to a set of stairs that led down to the ground level. A third (emergency) exit was created by 1918 through the third story window directly north of the third story (emergency) exit. A landing was connected to the outside window sill and a ladder led down to the metal landing on the roof of the Power House.(*See photo [C12], page 125*) However, b y 1927 this exit was abandoned and the landing and ladder were removed. (*See photo [C22], page 124*)

The main entrance into the Main Laboratory was also altered during this period. By 1927, the wood platform that led into the main entrance was replaced by a concrete step and a metal and glass canopy was installed overhead. (*See photo [C22], page 124*). The concrete step extended along the entire

[B32] Figure 1.52. "From No. 24 Building Looking S.E., Dec. 10,1914." Notice that the major damage the concrete buildings suffered was the destruction of their (wood) window frames, which allowed the fire to spread and destroy their interiors. [Source: Album #10 E.N.H.S. Archives]



[C22] Figure 1.53. Birds-eye view southwest of the Edison Laboratories.(1927) The two (emergency) exits for Main Laboratory (Building No. 5) are located on the left of the photo, above the Power House (Building No. 6). Also notice: the addition of the concrete step and glass canopy to the Main Laboratory's main entrance; and the removal of the shutters along the facade of Physics Laboratory (Building No. 1).[Source: Album #16, E.N.H.S. Archives]

[C12] Figure 1.54. View north of the bandstand and Power House (Building No. 6) from Lakeside Avenue.(1918) Notice the ladder behind the Power House's smokestack, near the top of the photo. The shadow and support brace at the tope of the photo illustrates that the ladder led to a landing on the third story. Also notice that the entry door into the Power House is constructed out of metal and glass and that its elevation was raised. [Source: Album #15, E.N.H.S. Archives]

width of the main entrance and was approximately 2'6" in depth. The canopy also extended along the entire width of the entrance and it extended from the entrance approximately 3'0".[166]

The Power House (Building No. 6) - During this period, the boilers and steam plant of this building were removed to make another garage. Into this space went one of Edison's automobiles and automobile motors used to test lighting equipment devised in the Physics Laboratory (Building No. 1). By 1917, this garage had an automobile battery charging station installed as part of the project to develop electrical systems for Ford motor cars.[167]

The exterior of the Power House was also altered during this period. The same fire precautionary measures performed on the Main Laboratory were also performed on the Power House. All of the wood windows, window frames were replaced with glass panes inserted with wire mesh and metal frames. The original, wood entry doors into the Power House were also replaced with metal and glass doors. (*See [C12], page 125*)

Another modification to the Power House's exterior was the relocation of the southern entry into the Power House from Lakeside Avenue. For reasons not documented, the entrance was raised approximately 3'6"-4'.[168] Although fill was added to the Power House's southern foundation, stairs were also added to allow access into the new entry. In the Power House's northern facade, the central arch window was altered to accommodate a large sliding metal door, which allowed automobiles to enter into the Power House to be tested.

The Physics Laboratory (Building No. 1) - During this period this building was again a general experimental and office area that handled the overflow from other experimental facilities. The interior of the main room in the middle of the building was dominated by the line of pier tables on the west and offices and experimental rooms on the east side. The boundaries of this space were the two offices at the front of the building and a main partition erected across the north end to make offices in the rear. The partition was faced with large display cabinets with glass doors. These extended from the floor o the tops of the windows and the space above them appears to have been used as storage. This partition cut off two pier tables from the main room and housed an enclosed office on the east side.[169] Through this period, the Physics Laboratory became a general use space in the Edison Laboratories with no clear function. It served as experimental rooms, offices and even sleeping quarters.

The modifications to the Physics Laboratory's exterior were similar to the Main Laboratory's' (Building No. 5) and the Power Houses' (Building No. 6). All of the wood door frames, windows frames were replaced with metal ones. The window panes were replaced with glass planes that contained a metal mesh, similar to the replacement panes in the Main Laboratory and Physics Laboratory. The wood doors were replaced with metal doors that contained panes of glass, also similar to the replacement panes. The wood shutters along the eastern facade of the Physics Laboratory were also removed during this period. (*See photo [C22], page 124*)

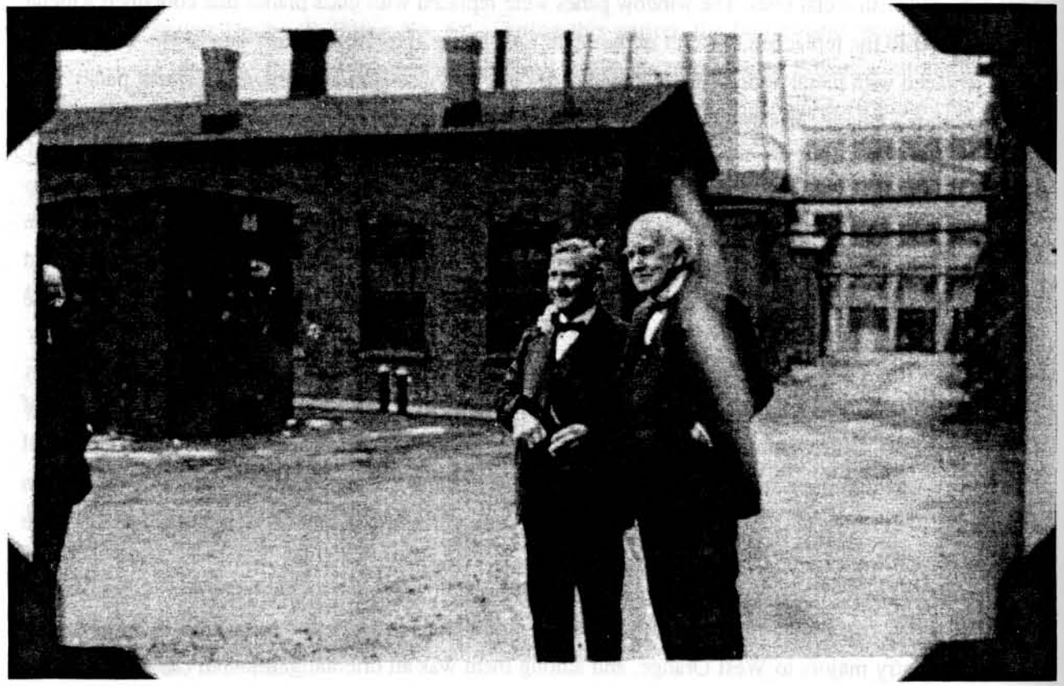
The Chemical Laboratory (Building No. 2) - The storage battery and disc record projects, which had dominated this building's work in the pre war period, both ran down after 1914. Most of the bugs had been eradicated in these two products. The manufacturing processes were perfected and passed over to the Edison Phonograph Works.[170]

World War I brought a great challenge to the Chemical Laboratory because the blockade of Germany cut off supplies of chemicals required in the production of batteries and records. The Chemical Laboratory was therefore devoted to finding substitutes to these strategic materials and Edison and his experiments did so well that T.A.E. Inc. was able to sell the surplus of chemicals at a profit. In 1919 there were 12 men at work in the Chemical Laboratory.[171]

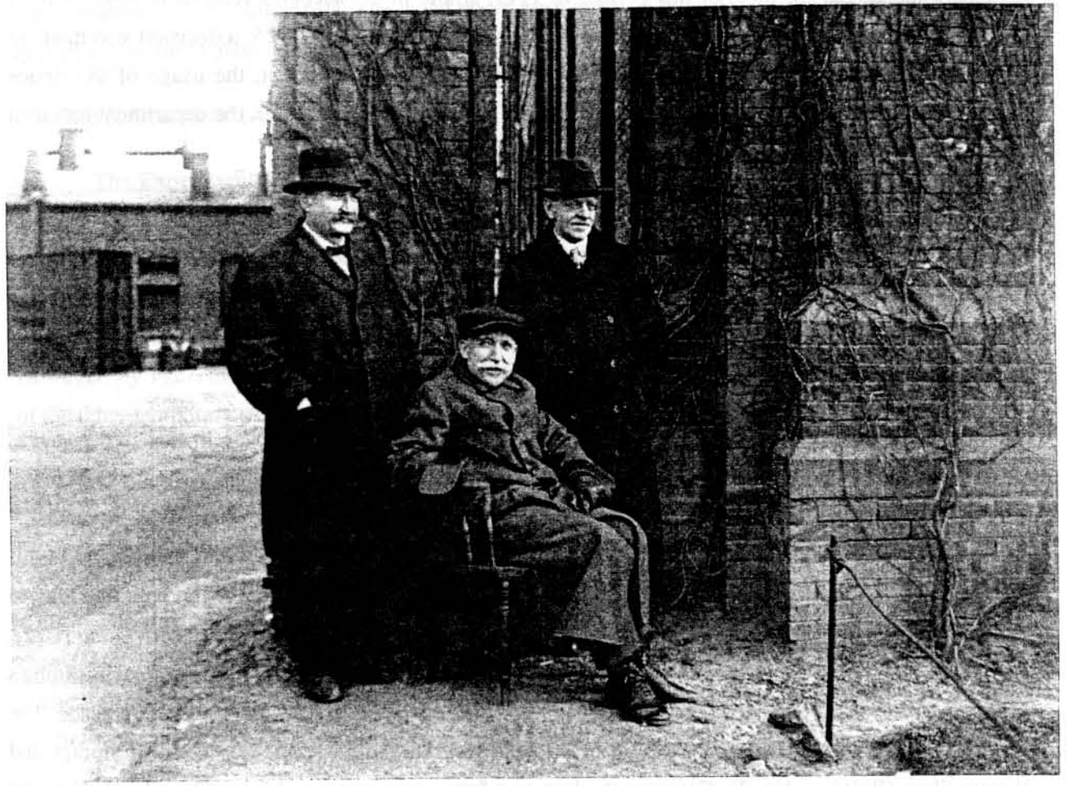
This lab often gave work to college students during their summer vacations. This brought several young chemistry majors to West Orange, and among them was an oriental gentleman called G.C. Lee--the first such minority presence in the Edison Laboratories.[172]

Much like Building No. 1, 5 & 6, the Chemical Laboratory's exterior was modified to make the building more fire-proof. The original wood door frames, window frames were replaced by metal ones, while the window panes were replaced by window panes with metal mesh installed within the glass. The size of the replacement panes were different than the original ones and thus, new framing patterns were created. (*See photo [C14], page 128*)

Another exterior feature of the Chemical Laboratory that was removed was the distilling apparatus installed on the Chemical Laboratory's western facade. (*See photo[C6], page 129*) The apparatus was installed in 1910 in order to distill water used within the Chemical Laboratory and was removed by 1917.



[C14] Figure 1.55. "Edison On His 80th Birthday." (1927) View east of the Chemical Laboratory (Building No. 1) from within the courtyard. The Chemical Laboratory's original window pane pattern consisted of 6 rows and 3 columns[174]. Notice in the photo how the replacement windows have a window pane pattern of 4 rows and 4 columns. [Source: Album #16, E.N.H.S. Archives]



[C6] Figure 1.56. "Veterans," (1917) View east of the archway. Notice that the distilling apparatus, which was located in between the two windows above the crates in the background, is not present in the photo.[Source: Album #42, E.N.H.S. Archives]

Chemical Storage and Pattern Shop (Building No. 3) - The Chemical Storage area appeared to remained unchanged for most of this period. In 1917, a note in the accounts receivable noted that no inventory had been made for several years--indicating a lack of usage. In 1925, a decision was made to centralize all purchasing through this "Chemical Stock Room." As a result, the usage of this space increase considerably. The Pattern Shop had a staff of 8 men in 1919. By 1920, the department included five pattern makers, one carpenter and one cabinet maker.[174]

The exterior of this building received the same fire-proof modifications as Building No. 1, 2, 5 & 6) All wood items, such as window and door frames, were replaced with metal ones that would not combust under heat. The window panes were replaced with glass panes that contained a wire mesh inside them to prevent them from shattering and the wood doors were replaced by metal ones that contained the same type of replacement glass panes.

The Metallurgical Building (Building No. 4) - In 1918, the floor space in this building was divided into two equal halves: "Disc Record Experimental" and Edison experimenters. The first space was devoted to perfecting the production of Diamond Discs. The mechanical press set up here around 1914 was probably still in operation as the effort to refine mass production of discs, and lower the cost, was carried on until the time of the War. The chemicals used for the records were mixed in bulk in a lean-to that was erected at the southern end of the Metallurgical Building's western facade.[175] (*See photo [C22], page 124*) The lean-to's southern facade was approximately 10' north of the Metallurgical Building's southern facade and it extended approximately 28' along the Metallurgical Building's western facade. The lean-to extended approximately 15' west of the Metallurgical Building, toward the Chemical Storage and Pattern Shop (Building No. 3). Covering the lean-to-s frame was corrugated iron. The other half of the Metallurgical Building was devoted to Edison's experimental projects directed at eliminating the surface noise of discs and improving phonograph reproduction.[176]

Edison's experiments with kitchen appliances were also performed in this building. The Edicraft line of kitchen appliances was an effort to regain some of the consumer market that the Edison phonograph had lost in the late 1920's. The development and testing work was carried out in this building, while the design and production was done elsewhere.

Besides the addition of the lean-to, the only other alterations to the exterior of this building were the fire-proof treatments to its windows, doors, and window and door frames. These treatments were

similar to the fire-proof modifications done on Building No. 1-3, 5 & 6) All wood items, such as window and door frames, were replaced with metal ones and the window panes were replaced with glass panes that contained a wire mesh inside. The wood doors were replaced by metal ones that contained the same type of replacement glass panes.

Building & Structures: (Added during the period)

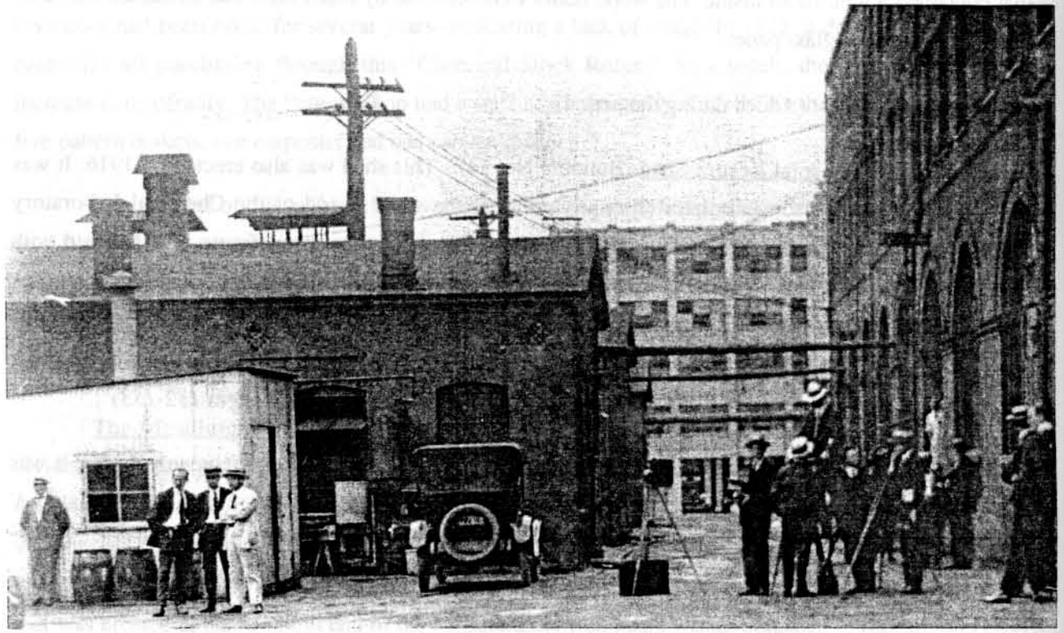
The Experimental Record Shed (Building No. 14) - This shed was also erected by 1916. It was located within the Edison Laboratories' courtyard, near the western end of the Chemical Laboratory (Building No. 2). (*See map [MC4], page 112*) The shed's one-story wood frame was covered with corrugated iron, which was typical of all the temporary structures erected with the Edison Laboratories, and its building number was 14. When the shed was first constructed, its exterior was painted white. However, by 1927, the shed was painted over with a darker color, most likely red since this was the color of the other temporary structures during this period. (*See photos [C5] & [C14], pages 132-133*)

The Ice House - This small building was erected by 1917 and was approximately 4'x10'. It was located perpendicular to the Small Storage Vault's northern facade (Building No. 8) and approximately 1' east of the Physics Laboratory. (*See map [MC4], page 112*).

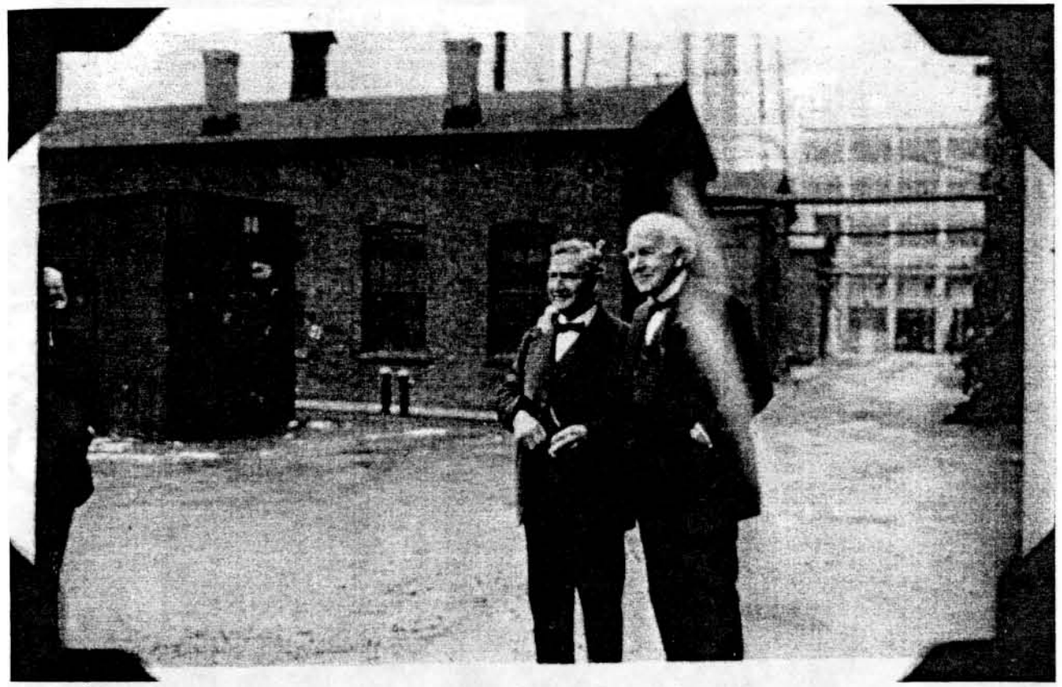
The Hose House - This building was erected approximately 1' east of the Ice House by 1917. (*See map [MC4], page 112*) Much like the other temporary structures during this period, the Hose House's frame was covered with corrugated iron. (*See photo [C16], page 134*) This building most likely contained the fire hoses needed in case of a fire at the Edison Laboratories.

The Foundry (Building No. 37) - This building was erected by 1916 directly north of the Physics Laboratory (Building No. 1), on the T.A.E. Inc.'s property, which was once the property of the National Phonograph Company before it was incorporated into T.A.E. Inc. (*See map [MC4], page 112*) The building was erected to produce copper for disc master plating and was thus, established as the Copper Foundry (Building No. 37). (*See photo [C25], page 135*) Corrugated iron was used to cover the building's two-story, wood frame.[177]

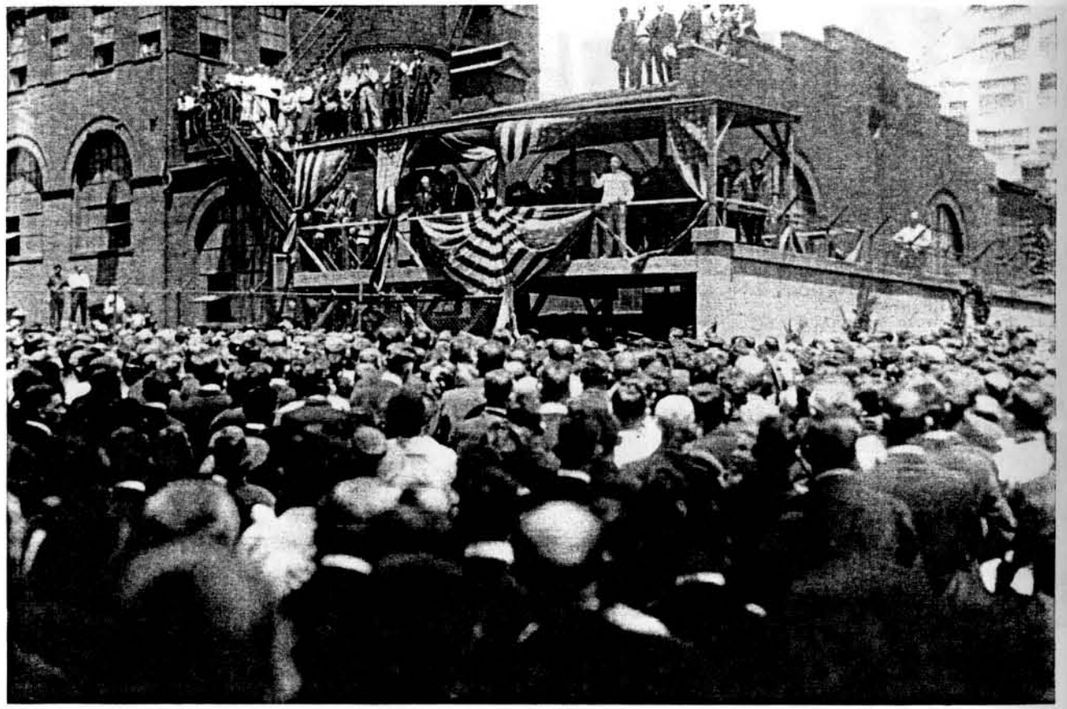
The Nickel Plating Building (Building No. 22B) - The Nickel Plating Building was erected west of the Copper Plating (Building No. 22A[22]), which was adjacent to the Edison Laboratories site. (*See map [MC4], page 112*) This building was one-story and its frame was covered with



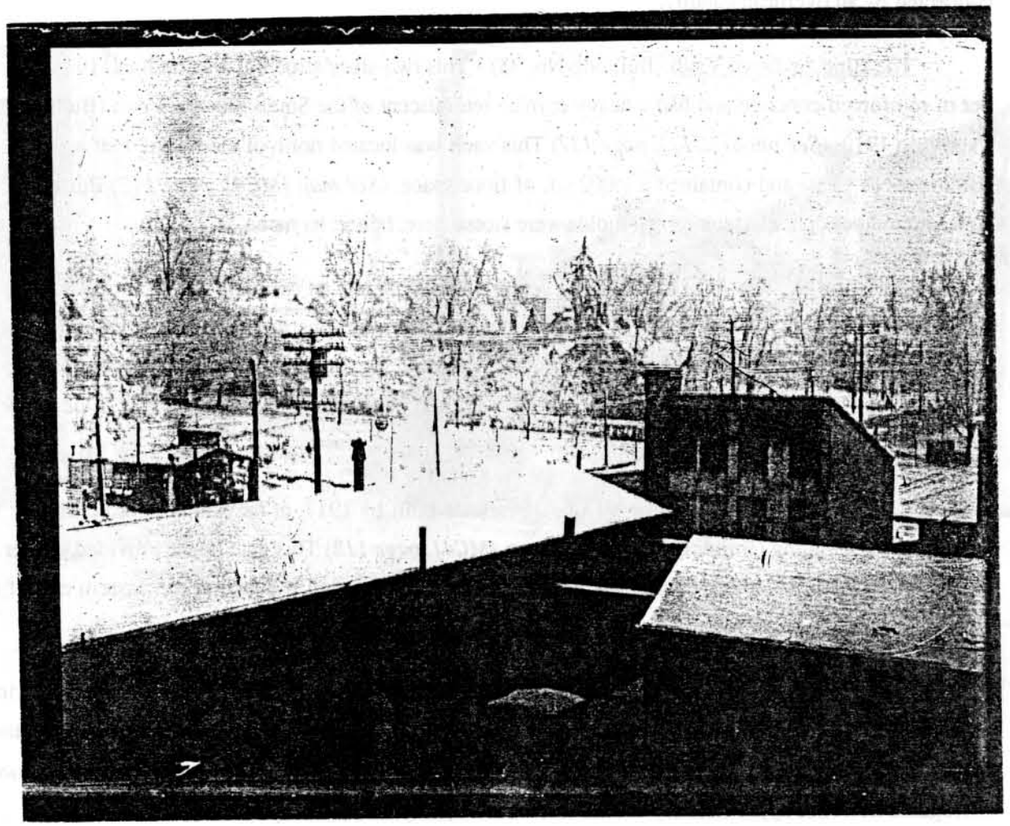
[C5] Figure 1.57. "Cameras Awaiting For Edison's Departure." (1916) View east of the Chemical Laboratory (Building No. 2) from within the courtyard. The white building on the left of the photo was the Experimental Record Shed (Building No. 14). [Source: Album #10, E.N.H.S. Archives]



[C14] Figure 1.58. "Edison on his 80th Birthday." (1927) View east of the Chemical Laboratory (Building No. 2). Notice that the Experimental Record Shed (Building No. 14) is a darker color in this photo.[Source: Album #16, E.N.H.S. Archives]



[C16] Figure 1.59. View of the Edison Scholarship Candidates taken from within the Edison Laboratories courtyard.(1927) The building to the right of the ivy covered Small Storage Vault (Building No. 8) was the Hose House. [Source: Album #16, E.N.H.S. Archives]



[C25] Figure 1.60. View north of the Physics Laboratory (Building No. 1) and the Foundry (Building No. 37) The Foundry was the two-story structure located north of the Physics Laboratory and has a slanted roof. [Source: Neg. No. 10.380.45, E.N.H.S. Archives]

corrugated iron. (*See photo [C17], page 137*) Both the Nickel and Copper Plating buildings were connected by an overhead canopy.

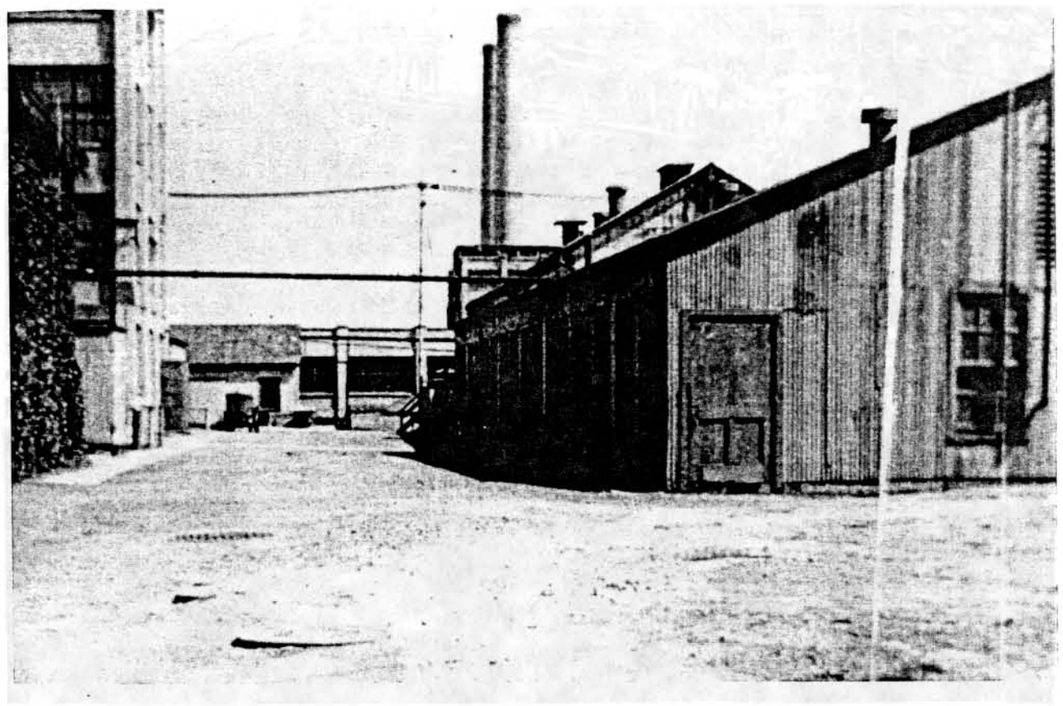
The Blue Amberol Vault (Building No. 33) - This two-story structure was built ca. 1915 entirely out of reinforced concrete and had a heavy cornice reminiscent of the Small Storage Vault (Building No. 8) built in 1912. (*See photo [C17], page 137*) This vault was located north of the Nickel Plating Building (Building No. 22B) and contained a 1,002 s.f. of floor space. (*See map [MC4], page 112*) Edison's Blue Amberol cylinder phonograph record molds were stored here, hence, its name.

(Building No. 32) - The historical name of this building and its use were not documented, only its building number was. This building was a concrete vault that was constructed very similarly to the Blue Amberol Vault (Building No. 33) and was located parallel to the Metallurgical Building's eastern facade (Building No. 4). The dimensions of the vault were approximately 20'x30', the same as the Blue Amberol Vault's.

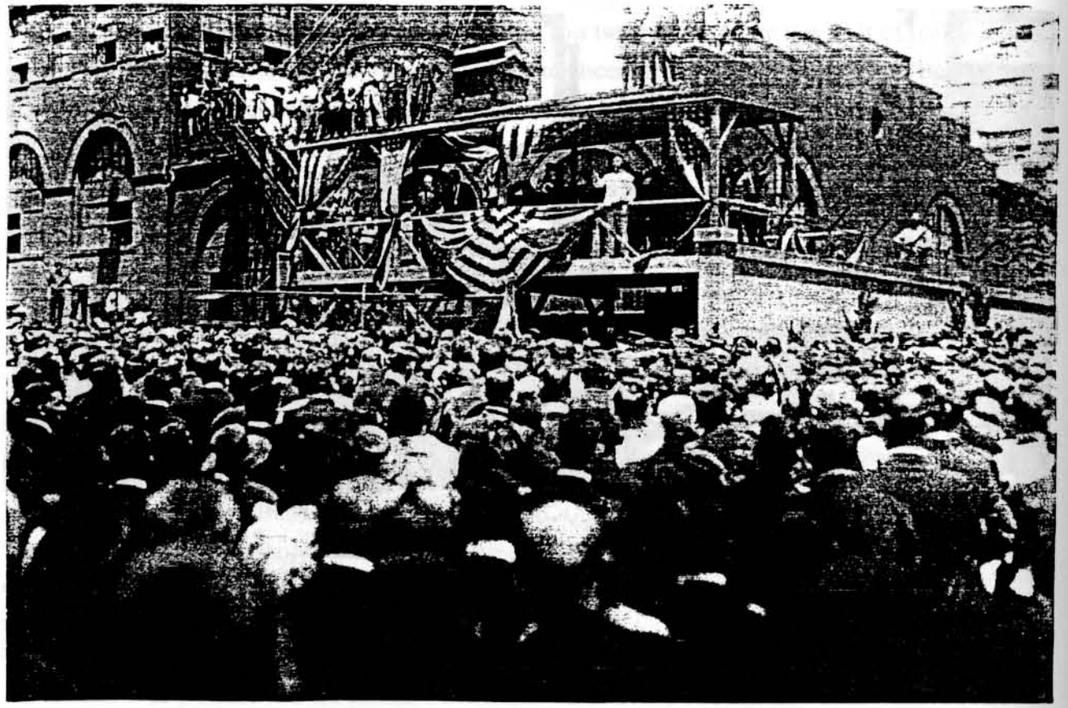
(Gate House) - This additional Gate House was built by 1917, at the southeastern corner of the Metallurgical Building (Building No. 4). (*See map [MC4], page 112*) This gate house provided shelter for the security personnel who would check anyone entering the through the gate at the eastern end of the Edison Laboratories site, which was constructed during this period.

The Bandstand - The Bandstand was constructed by 1917 for rally's during America's involvement in World War I. It's 25'x15' wood frame was erected parallel to the Power House's southern facade (Building No. 6). The wood structure stood approximately 9' above the ground and contained a corrugated iron roof approximately 10' above the floor. (*See photo [C12], page 138*)

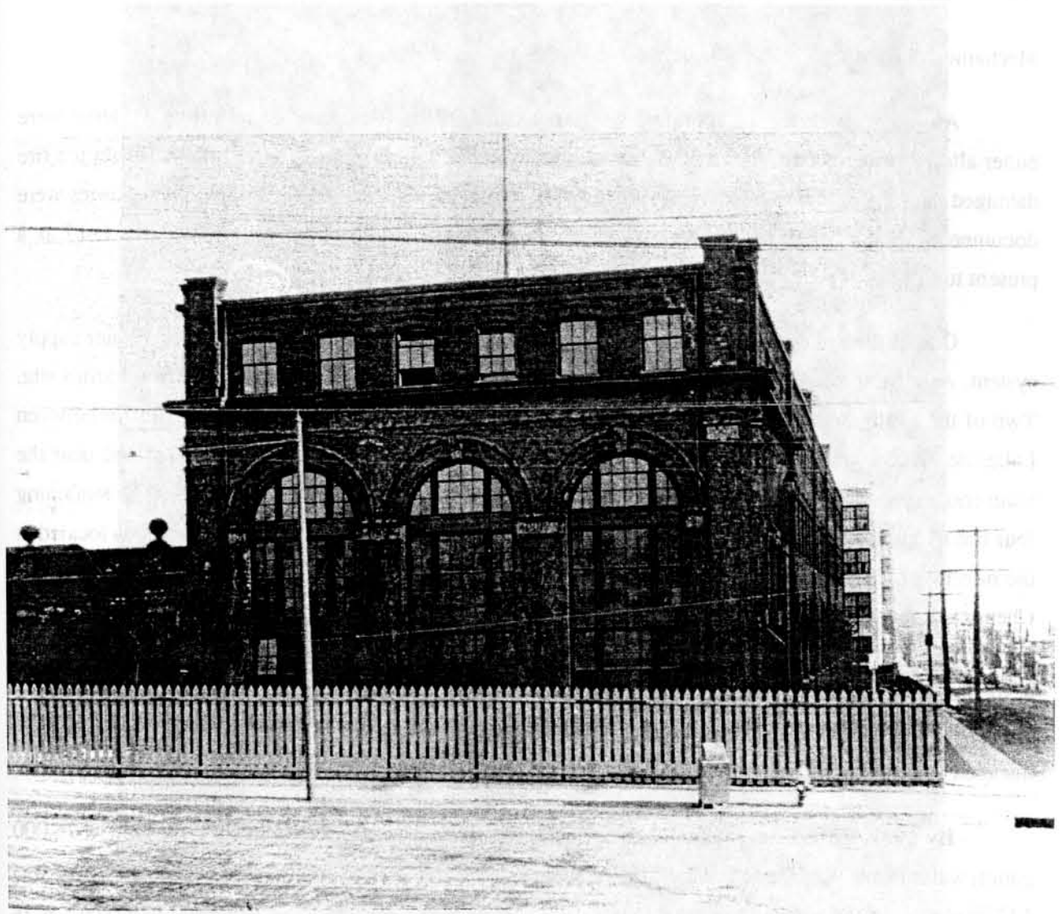
The Vault - This vault was located in between Lakeside Avenue and the southeast corner of the Main Laboratory (Building No. 5). (*See map [MC4], page 112*) Unlike the other concrete vaults that existed during this period, this vault was partially submerged into the ground. (*See photo [C3], page 139*). The contents of this vault were not documented.



[C17] Figure 1.61. View east in between Building No.'s 33 & 22B.(1930) The building on the right was the Nickel Plating Building (Building No. 22B), while the building on the right was the Blue Amberol Vault (Building No. 33) [Source: Album #10, E.N.H.S. Archives]



[C12] Figure 1.62. View north of the bandstand and Power House (Building No. 6) from Lakeside Avenue.(1918) [Source: Album #15, E.N.H.S. Archives]



[C3] Figure 1.63. View east of the Edison Laboratories from Valley Road. In between the fence along Lakeside Avenue and the Main Laboratory (Building No. 5) is a vault that was partially submerged beneath the surface. Only the top round surface can be seen above the fence in this photo. [Source: Album #42, E.N.H.S. Archives]

Mechanical Systems:

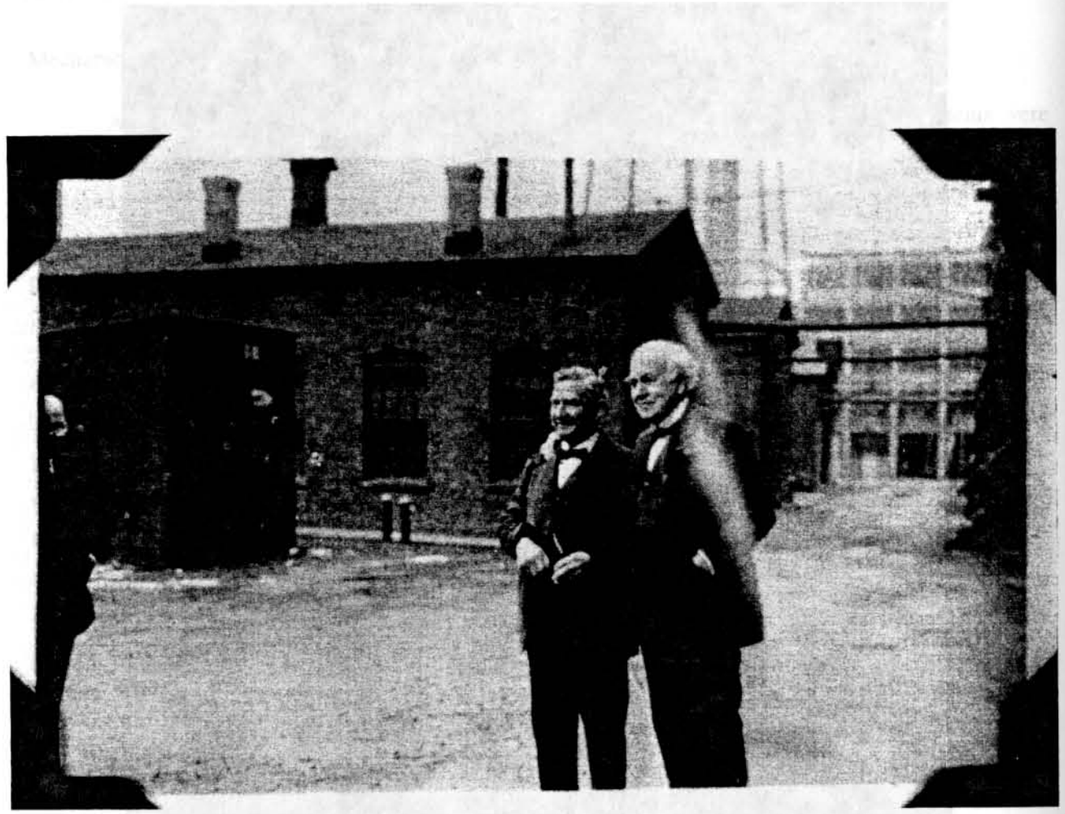
Although the Edison Laboratories was not damaged by fire, many of its utility systems were either altered or replaced because they were connected to the buildings and power houses within the fire damaged the Edison Phonograph Works. Many of the utility systems within the Edison Laboratories were documented as part of a series of plates of the West Orange plant, which were created in 1917 as a present to Edison. (*See [MC4], page 112*)

One of the systems that was altered during this period was the Edison Laboratories' water supply system. As a fire precautionary measure, seven fire hydrants were added to the Edison Laboratories site. Two of the fire hydrants were located along the southern facade of the Edison Laboratories, in between Lakeside Avenue and the Main Laboratory (Building No. 5). A third fire hydrant was located near the main entrance into the Edison Laboratories from Valley Road, south of the pedestrian gate. The remaining four fire hydrants were distributed between the smaller laboratories (Building No. 1-4): one was located at the northwest corner of the Chemical Laboratory (Building No. 2); another was located in between the Chemical Laboratory and the Chemical Storage and Pattern Shop (Building No. 3); another was located at the southeast corner of Metallurgical Building (Building No. 4) and the last one was originally located at the northeast corner of the Small Storage Vault (Building No. 8), but by 1927 it was relocated to the Small Storage Vault's southeast corner (*See photo [C15], page 141*). A public fire hydrant was also installed during this period, at the corner of Valley Road and Lakeside Avenue.

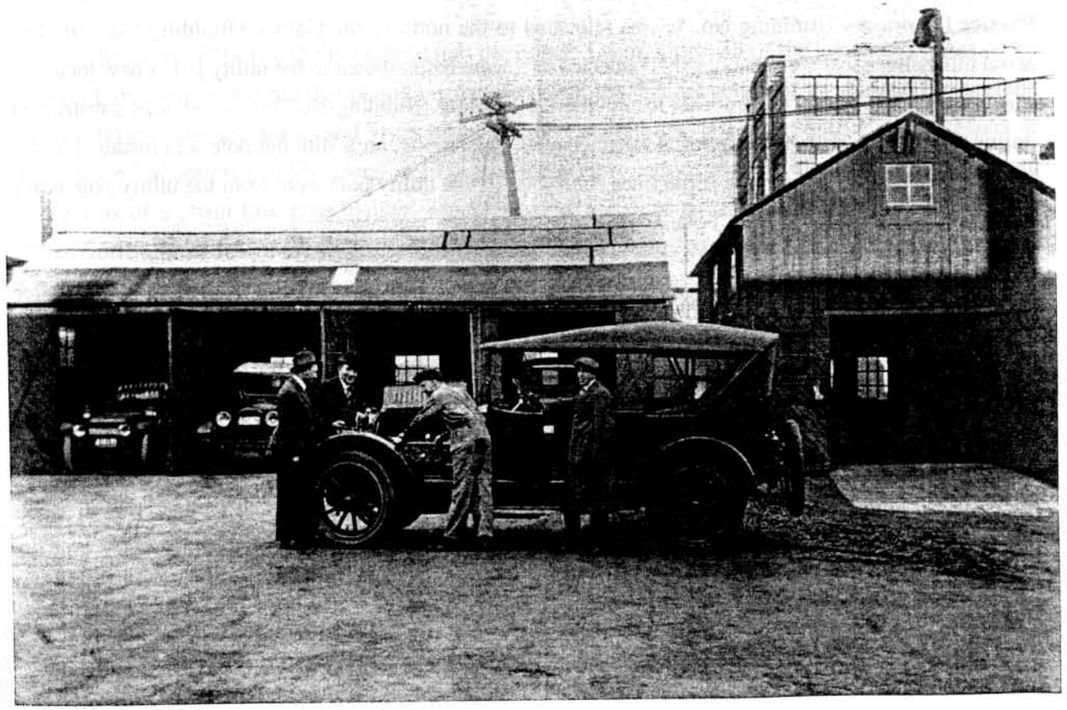
By 1927, the Edison Laboratories' water supply system was further modified. In 1926, a 75,000 gallon water tower was erected east of the Metallurgical Building (Building No. 4). The water tower was 132' in elevation and was built for emergency use.[178] In addition, several above ground water valves were installed by 1927. Two of these valves were located within the Edison Laboratories' courtyard, at the southwest corner of the Chemical Laboratory. (*See photo [C14], page 142*) The valves provided the Edison Laboratories site with emergency access to additional water.

The aerial utility lines within the Edison Laboratories were also altered during this period. The aerial utility lines that extended from the Edison Phonograph Works' Administration Building (Building No. 25) to the utility pole located at the southwest corner of the Metallurgical Building (Building No. 4) were destroyed by the 1914 fire. After the fire, the lines were distributed from the Edison Phonograph Works' Administration Building to the eastern end of the Power House (Building No. 6), rather than the to

[C15] Figure 1.64. "Ott, Edison & Meadowcroft."(1930) View north of the Physics Laboratory (Building No. 1) and the Small Storage Vault (Building No. 8) from within the Courtyard. The fire hydrant located in the background was previous located at the Small Storage Vault's northeast corner. [Source: Album #16, E.N.H.S. Archives]



[C14] Figure 1.65. "Edison On His 80th Birthday." (1927) View east of the Chemical Laboratory (Building No. 1) from within the courtyard. The two objects standing under the Chemical Laboratory's window (Building No. 2) were above ground water valves. Notice the concrete foot drain that extends along the foundation of the Chemical Laboratory [Source: Album #16, E.N.H.S. Archives]



[C8] Figure 1.66. View north of the Garage (Building No. 10) and the Garage/ Experimental Studio (Building No. 11) from within the courtyard.(1917) The utility pole located in the background was previously located at the northeast corner of the Physics Laboratory (Building No. 1). [Source: Album #42, E.N.H.S. Archives]

the utility pole located at the Metallurgical Building's southwest corner.

Another alteration during this period was the relocation of several aerial utility lines and poles at the northwestern end of the Edison Laboratories. The utility pole that existed at the northeast corner of the Physics Laboratory (Building No. 1) was relocated to the north of the Garage (Building No. 10). The aerial utility lines that were previously connected to it were redistributed to the utility pole's new location. (*See photo [C8], page 143*) In order to provide the Foundry (Building No. 37), which was constructed during this period, with electricity and telephone communication, an additional pole was installed at the Foundry's northeast corner. The aerial lines connected to this utility pole were from the utility pole north of the Garage. (*See map [MC4], page 112*)

During this period, the drainage swale located along the southern foundations of the smaller laboratory buildings (Building No. 1-4) was covered with poured concrete. In addition, concrete foot drains were installed along several of the smaller laboratories' foundations. (*See photo [C14], page 142*) The concrete foot drains emptied into the drainage swale along the southern foundations of the smaller laboratory buildings.

Two large, underground gas tanks were also installed during this period. (*See map [MC4], page 112*). One was a 220 gallon tank that was located in between the Lakeside Avenue fence and the Powerhouse (Building No. 6). The other tank was a 500 gallon tank that was located within the courtyard, near the southeast corner of Garage (Building No. 10). Although the use for these tanks was not documented, the courtyard tank was most likely used for the automobiles that were stored in the Garage.

Circulation:

The 1914 fire and the reconstruction of the Edison Phonograph Works had minimal affects on the Edison Laboratories' circulation systems. One effect was the creation of a checkpoint at the eastern end of the Edison Laboratories. The gate house erected at the southeastern corner of the Metallurgical Building (Building No. 4) was established to restrict any unwanted visitors from entering the Edison Laboratories (*See "Buildings & Structures (Added during this period)", page 37*).

Another effect was designation of the gates that led into the West Orange plant. The main entrance into the Edison Laboratories from Valley Road was designated as Gate One. The Valley Road

entrance into the T.A.E. Inc. property north of the Edison Laboratories was designated as Gate Two. All of the internal gates within the West Orange plant were not designated.

Views/ Vistas:

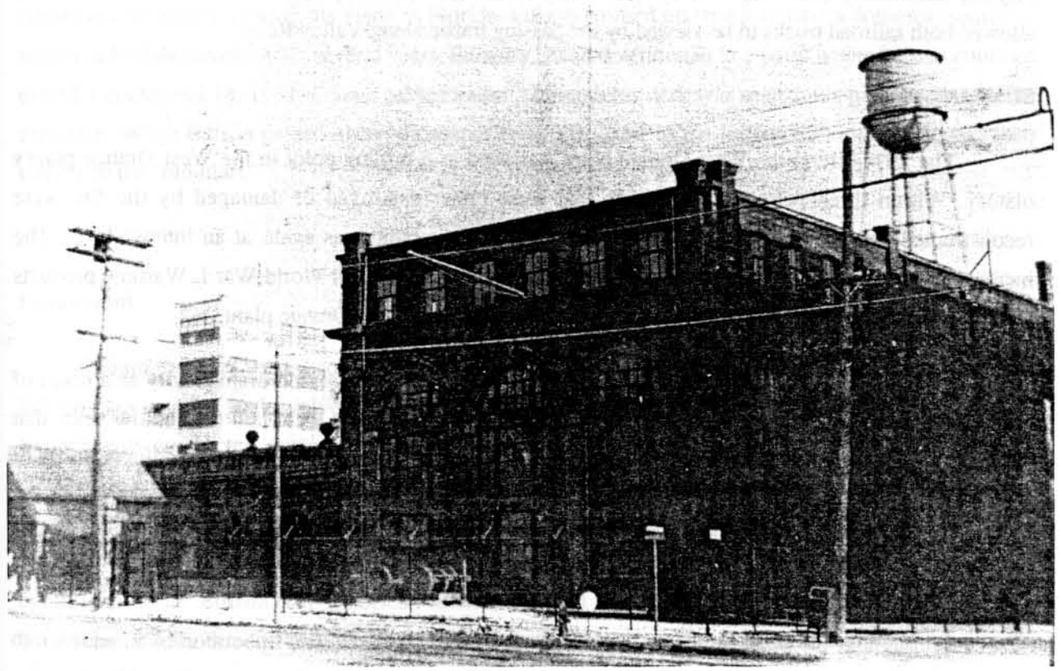
Since the 1914 fire did not spread into the Edison Laboratories, all of the views and vistas of the Edison Laboratories entered this period unchanged. Even the reconstruction of the Edison Phonograph Works did not alter the views and vistas of the Edison Laboratories. It was not until the replacement of the Edison Laboratories' wood fence in 1918 that these view and vistas were altered. The replacement fence was of a chain link construction, which allowed views of the ground plane within the Edison Laboratories. In addition, views of the Edison Laboratories western facade were no longer obstructed. (*See photo [C18], page 145*)

Furnishings & Objects:

One of the Edison Laboratories' furnishings that was altered during this period was the wood fence that extended along the southern and western boundaries of the Edison Laboratories. In 1918, the wood fence was replaced with a metal chain link fence. The chain link fence was installed along the same fence line as the wood fence it replaced and the locations of the original gates were note altered. In addition, a chain link fence was installed along the northern and eastern boundaries of the Edison Laboratories. (*See map [MC4], page 112*) After the se additional sections of fence were installed, the only two access points into the Edison Laboratories were at the gates located at both ends of the main transportation corridor, which were both under surveillance from a gate house. The vehicular and pedestrian gates at the main entrance were constructed out of wrought iron. The iron gates were suspended from two brick pillars with concrete cornices. The concrete globes on top of each of the cornices were repetitive of the larger globes located on top of the archway. (*See photo [C19], page 147*). Another furnishing that was removed from the Edison Laboratories during this period was the sign and signpost that was located at the corner of Lakeside Avenue and Valley Road.

Furnishings added to the Edison Laboratories during this period include a war memorial and two railroad trucks. The war memorial consisted of a bronze plaque dedicated to the men of the Edison industries who gave their life in World War I and was installed on May 28, 1920. The plaque was located on the southern facade of the Main Laboratory (Building No. 5), in between two of the first story windows. The railroad trucks were originally from the train Edison used in his Menlo Park laboratory.

[C18] Figure 1.67. View southeast of the Edison Laboratories from across Valley Road.(Ca. 1927) Notice that the views of the Edison Laboratories' western facade are not obstructed by the chain link fence that was installed in 1918. Unlike the previous wood fence, which obstructed the lower views. [Source: Album #16, E.N.H.S. Archives]



[C19] Figure 1.68. View northeast of the Edison Laboratories from Valley Road.(1927) Notice that the ornamental globes located on top of the brick archway are repeated on top of the brick pillars supporting the entry gates. Located in front of the Main Laboratory (Building No. 5) is one of the railroad trucks relocated to the site during the mid-1920's. [Source: Album #16, E.N.H.S. Archives]

During the mid-1920's, these trucks were relocated to the Edison Laboratories where they were established as exhibits. One of the railroad trucks was installed in between the western facade of Main Laboratory and Valley Road, while the other railroad truck was installed between the western facade of Physics Laboratory (Building No. 1) and Valley Road. (*See [C19], page 147*) The chain link fence allowed both railroad trucks to be viewed by the passing traffic along Valley Road.

SUMMARY:

The 1914 fire at the West Orange plant was used as a turning point in the West Orange plant's history. Within three years, the buildings that were either destroyed or damaged by the fire were reconstructed and the industrial activity at the West Orange plant was again at an intense level. The increase in activity was heavily influenced by America's involvement in World War I. Wartime products and industrial supplies kept Edison and his staff quite busy at the West Orange plant.

After the war, however, activity at the West Orange plant decreased dramatically as a result of the postwar depression. Many of the workers at the West Orange plant were laid off and the years that followed were years of retrenchment at the West Orange plant. Throughout this period , the majority of the research and experiments conducted at the West Orange plant ceased to exist and the manufacturing of low risk products became the West Orange plant's primary focus. The Edison Laboratories was transformed from a highly active research facility to a routine production facility.

Throughout the period, there were several alterations to the Edison Laboratories, in addition to the alteration of its purpose. After it was reported that the major cause for the extent of the 1914 fire was the wood elements that each of the buildings contained, severe fire precautionary measures were taken. All wood window and door frames were removed from each of the buildings and replaced with metal ones. All glass panels were replaced with glass panels that contained a wire mesh, which prevented the panel from falling apart when damaged. In addition, several emergency exits were installed in the Main Laboratory (Building No. 5).

There were also other exterior alterations to the Edison Laboratories during this period. For instance, in 1918 the wood fence was replaced with a metal chain link fence, which completely surrounded the Edison Laboratories site. Another change during this period was the introduction of exhibits, such as the railroad trucks. One of the more significant changes to the exterior of the Edison Laboratories during this period was the introduction of plant material. After the chain link fence was

installed and the view of the western facade of the Edison Laboratories became unobstructed, plant material, such as privets and groundcover, were planted along the Edison Laboratories' western facade.

By 1928, Edison's health had began to deteriorate and the time spent at his Florida home and laboratory increased. During his visits in Florida, Edison worked on trying to find a domestic source of rubber at his laboratory. After several years, Edison's health deteriorated to a point where he was confined to bed. On October 18, 1931, Edison passed away. Although his desk was sealed, his presence was never forgotten. When Edison passed away, thousands of people came to the Edison Laboratories to pay their respect to the "old man."

Conclusion

From the time the Edison Laboratories was erected in 1887 to the day Edison passed away, the Edison Laboratories had evolved into one of the nation's leading research and experimental facility. Experiments conducted within the Edison Laboratories led to major improvements in the fields of electricity, entertainment, motion picture and in the field of industrial research and development. In documenting the Edison Laboratories site history, three periods of history were established: 1887-1899, 1900-1914,1915-1931. These periods were based on many historical events that took place during the evolution of the Edison Laboratories, which impacted the site's development. The chronological boundaries for the three periods are historical events that stand out as being more significant due to the greater influence they had upon not only the Edison Laboratories development, but the development of the West Orange plant as well. In order to document the historical significance of the Edison Laboratories a "period of significance " needed to be established. The Edison Laboratories' period of significance is the Thomas Alva Edison Stewardship: 1900-1914 period, in which the intense experimental activity within the buildings and structures of the Edison laboratories heavily influenced the physical development of the Edison Laboratories by creating the need for additional buildings and experimental space. Between the years of 1910 and 1918, the activity within the Edison Laboratories was at its highest level in terms of the number of employees working at the site, even though the Edison Laboratories had changed roles from a research facility to an engineering facility in 1914. In order to distinguish this period (1910-1918)of intense interior activity from the period of significance (1900-1914), which focuses on the period when the interior and exterior activities were inter-related, the former period (1910-1918) was established as the

period of interpretation. After the period of interpretation (1910-1918) the activity the Edison Laboratories steadily decreased until Edison death. After Edison passed away, the Edison Laboratories closed and became a storage facility for the T.A.E., Inc. until 1955, when the Edison Laboratories was donated to the National Park Service .

Currently, the National Park Service still owns and manages the Edison Laboratories, except that the current title of site is the Laboratory Unit of the Edison National Historic Site. The existing conditions for the Laboratory Unit are documented in the following chapter, which is preceded by a brief discussion as to how the Edison laboratories evolved into the Laboratory Unit. The format used in the following chapter is similar to the format used throughout this chapter.

EXISTING CONDITIONS

Introduction

During the years that followed Edison's death, the Edison Laboratories became a storage facility used by the T.A.E. Inc. In 1946, a year before Edison's centenary, the Thomas Alva Edison Foundatioon, Inc. was created. The foundation obtined a lease from the Edison company to open the Edison Laboratories as the Edison Museum on February 11, 1948.

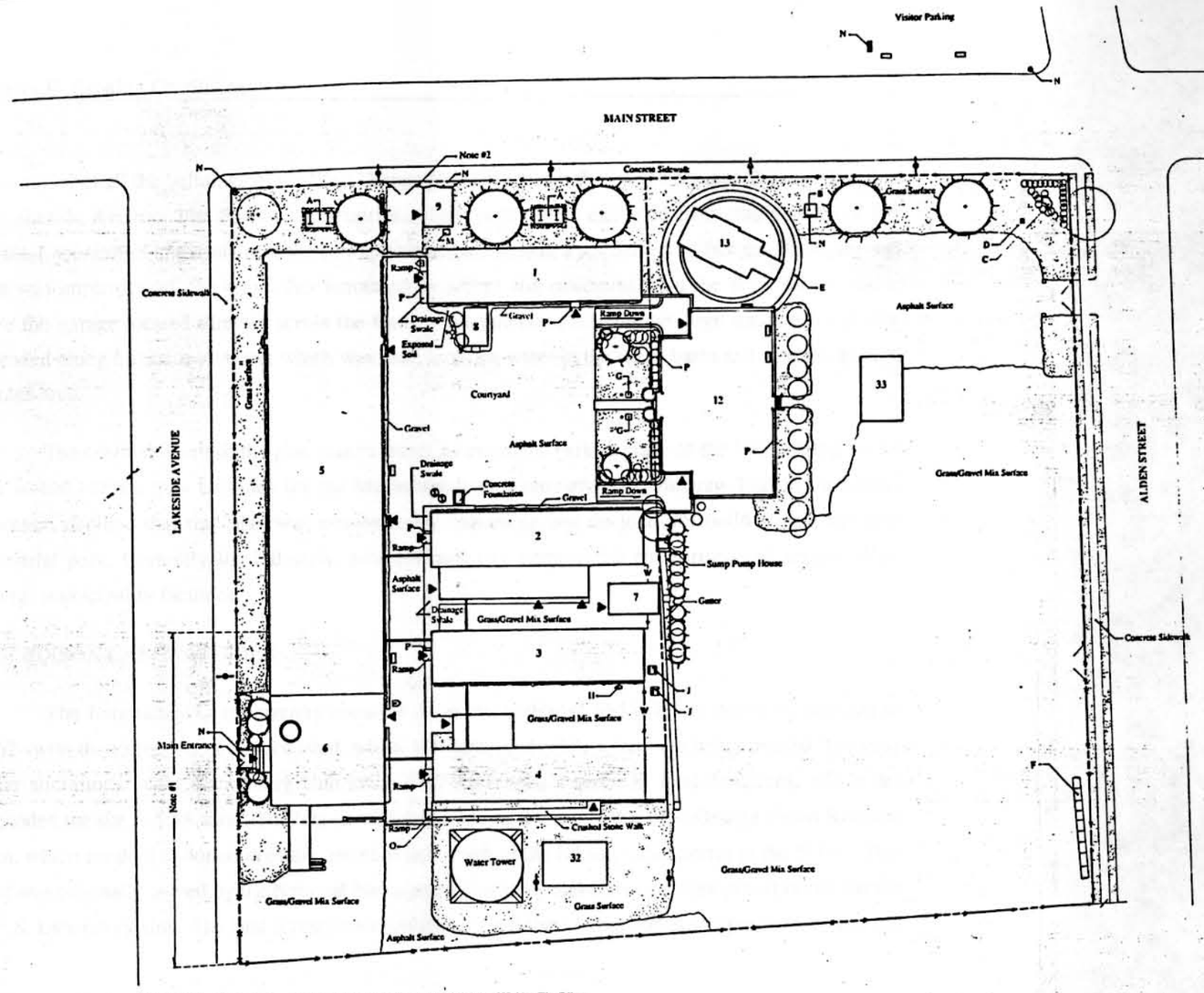
In 1955, the Edison Laboratories was presented to the Secretary of the Interior, Douglas McKay, as a donation by the T.A.E. Inc. and Edison Corporation. Included in the donation were all of the buildings and exhibits erected within the Edison Laboratories and the 1.51 acres of land upon which they were erected. On September 5, 1962, an Act of Congress was passed that combined the Edison Laboratory National Monument and Glenmont into the Edison National Historic Site (E.N.H.S.).

This chapter documents the existing conditions of the present landscape elements within the Laboratory Unit of the Edison National Historic Site. The format for this chapter follows the landscape category format used in the Site History Chapter. Accompanying the text within this chapter is a map that graphically documents the existing conditions at the site. (*See Map [ME1], page 152*)

The Destruction of the West Orange Plant

After Edison's death, the West Orange plant continued to operate as a manufacturing facility under the administration of the T.A.E., Inc.. Business was slow during the 1930's, but increased during America's involvement in World War II because of government contracts and the manufacturing of war time products--the same reason for the increase in the plant's activity during World War I. However, after the war, business at the West Orange plant steadily declined and during the mid-1950's T.A.E., Inc. became a subsidiary of a larger Edison company; the McGraw-Edison Company.

During the 1960's and continuing into 1970's, the Federal governments Urban Renewal Program was an attempt to revitalize the urban centers. The Town of West Orange participated in the program and in 1969 West Orange and the McGraw-Edison Company agreed on an urban renewal plan that called for



MAP SOURCE: Underground Electrical Line Placement Laboratory Unit Site Plan, 1977, Map File, Edison National Historic Site Archives, West Orange New Jersey. *(See Note #3)*

SYMBOL KEY

Symbol	General	Symbol	Mechanical Systems	Symbol	Furnishing	Symbol	Furnishing	Symbol	Furnishing	Symbol	Furnishing	Symbol	Furnishing
	FENCE & PROPERTY LINE		STEAM LINE (Inoperable)		GATE	A	RAILROAD TRUCK EXHIBIT	E	PAVEMENT MATERIAL TEST TRACK	J	PICNIC TABLES	N	SIGN
	E.N.H.S. PROPERTY LINE		UTILITY POLE		CHAIN LINK FENCE	B	CONCRETE SLAB EXHIBIT	F	CONCRETE WALK REMNANT		BENCH	O	BARRICADE
	(HISTORIC) EDISON LABORATORIES PROPERTY LINE		ABOVE GROUND WATER VALVE	I	WROUGHT IRON FENCE	C	WAR MEMORIAL	G	ORIENTAL TEA LANTERNS		TRASH RECEPTACLE	P	RAILING
	ENTRANCE/ EXIT		FIRE HYDRANT	W	WOOD FENCE	D	FLAGPOLE (part of the War Memorial)	H	COAL CHUNK	M	WATER FOUNTAIN		

BUILDING KEY

Building No.	Building Name	Building Use
1.	PHYSICS LABORATORY	This building is currently divided into three parts: the northern end contains offices for administrative staff; toward the middle of this building is a conference room; and the southern end of this building is designated as exhibit space for Edison's Phonographs.
2.	CHEMICAL LABORATORY	The interior of this building is the closest out of all the Edison National Historic Site's buildings to being fully restored to its appearance during the site's period of significance and serves as an exhibit.
3.	CHEMICAL STORAGE & PATTERN SHOP	The southern end of this building is devoted to rest rooms for the Laboratory Unit. Directly north of the rest rooms are offices for the site's Park Ranger staff. The rest of the building
4.	METALLURGICAL BUILDING	The majority of this building is devoted to the storage and categorizing of the E.N.H.S. Archives' Photo Collections. The lean-to attached to the western facade of this building contains a sensitive storage facility for the archives Photo Album Collection.
5.	MAIN LABORATORY	The first floor of this building is partially restored to its historical appearance and serves as an exhibit; this especially true for the library located at the western end of the building. The second floor contains offices for the Thomas A. Edison Papers and the curator staff.
6.	POWER HOUSE	This building currently serves as the Visitors Center for the Laboratory Unit and contains various exhibits of Edison's work. Also contained within this building is a small theater that presents some of the films Edison was involved in.
7.	BLACKSMITH SHOP	This building currently serves as a storage facility.
8.	SMALL STORAGE VAULT	This building currently serves as a storage facility.
9.	GATE HOUSE	This building is currently a security station for the Laboratory Unit and contains several video monitors and security switchboards.
12.	UNDERGROUND STORAGE VAULT	This building is the Laboratory Unit's main storage facility for its archival collection. Many of Edison's personal, laboratory, and business records.
13.	BLACK MARIA	This replica of the original Black Maria is functional as a revolving film studio and serves as an exhibit.
32.	BLUE AMBEROL VAULT	This building currently serves as a storage facility.
33.	VAULT	This building currently serves as a storage facility.

NOTES

1. The change in grade within this area was the result of fill added toward the southern foundation of the Power House. The fill added was part of T.A.E. Inc.'s renovation of the Power House and its main entrance, which was elevated approximately 3'6".
2. The iron gates at this entrance are supported by two brick pillars that contain a concrete cornice with a decorative ball on top.
3. The source for this map served as a general basemap, which documented the locations of all the building and several of the existing landscape elements. All other landscape elements, including the majority of the vegetation documented, was based on field work conducted in 1991.

Existing Conditions Map

CULTURAL LANDSCAPE REPORT:EDISON NATIONAL HISTORIC SITE
LABORATORY UNIT

Prepared For:
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
North Atlantic Region
Cooperative Agreement: CA1600-1-9013, 1991-1992

Prepared By:
STATE UNIVERSITY OF NEW YORK: COLLEGE OF ENVIRONMENTAL SCIENCE & FORESTRY
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EDISON NATIONAL HISTORIC SITE: LABORATORY UNIT: EXISTING CONDITIONS
ON THE CORNER OF VALLEY ROAD (MAIN STREET) AND LAKESIDE AVENUE

WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWING NUMBER —

SHEET NUMBER — OF —

SCALE: 1" = 30' - 0" (Approximately)
0 30 60 120 Feet
0 10 20 60 Meters

the removal of all the buildings of the West Orange plant, except for the Edison Storage Battery Complex on Lakeside Avenue. The Edison Laboratories automatically were excluded from this plan since the Edison Laboratories site was under the stewardship of the National Park Service. After the urban renewal plan was implemented, the only other remaining buildings and structures from the West Orange plant were the garage located directly across the Battery Storage complex and the large retaining wall that extended along Lakeside Avenue, which was used to retain water in the spray basin and coal in the coal storage area.

The original intent of the plan was to create an industrial park in place of the West Orange plant that would contain new facilities for the McGraw-Edison Company. The McGraw-Edison Company, however, decided that this plan was economically unfeasible and decided not build within the new industrial park. Currently the industrial park contains two commercial enterprises and several West Orange municipality facilities.

THE EDISON LABORATORIES:

The Laboratory Unit currently contains all of the buildings and exhibits that were donated in 1962--with the exception of a wood shed, which was destroyed while a tree was being pruned. The only other alterations to the Laboratory Unit since 1962 have been a series of land donations, which has expanded the site to 5.58 acres. The largest land donation was the result of a West Orange Urban Renewal Plan, which resulted in donation of the parcel of land north of the Edison Laboratories to the N.P.S.. This land was originally owned by the National Phonograph Company and composes almost half of the current N.P.S. Laboratory Unit. The land formerly recognized as the Edison Laboratories composes the remaining half.

The N.P.S. currently is using the buildings for: office space housing the site's administrative and archival staffs (Bldg. No. 1, 4, 5); storage of archival material (Bldg. No. 4, 5, 12, 32, 33); a Visitors Center (Bldg. No. 6.); and as interpretive facilities for visitors (Bldg. No. 1, 2, 5, 13). The N.P.S. has identified a need to construct additional facilities at the E.N.H.S to preserve the historic buildings. The new facilities will accommodate: a Visitors Center; offices for the various staffs and a storage area for the five million archival resources. The required total floor space for the new facilities has been estimated at 17,600 square feet.

Landscape Site/ Setting:

The current streetscape along Main Street is significantly different from what existed during the historic period. The street trees that once existed were removed and utility poles have been installed. approximately 80' on center. The present sidewalk along Main Street is constructed entirely out of concrete, including the entrance ramp into the Edison Laboratories.

The streetscapes along Lakeside Avenue and Alden Street also have been altered. Currently, the sidewalk along the northern edge of Lakeside Avenue is 8' wide and constructed of concrete, similar to Main Street. Although the sidewalk along Alden Street still retains its 4' width, its bluestone slabs have been replaced with concrete. In addition, all of the street trees along Alden Street have been removed, except for one, which is located near the corner of Main Street and Alden Street.

Landform:

There is currently an increase in surface elevation from Lakeside Avenue to the southern facade of the Main Laboratory and Power House. The change in grade increases from the westernmost basement window in the Main Laboratory and continues eastward to the southeast corner of the Power House (Building No. 6), approximately 4' above the grade of Lakeside Avenue. This change in grade was the part of T.A.E., Inc.'s alteration to the Power House's entry from Lakeside Avenue, and included concrete stairs and decorative door surround.

Vegetation:

The majority of the vegetation that is present at the Edison Laboratories today consists of plantings that were introduced after the period of significance This vegetation includes: the yews (*Taxus spp.*)and pachysandra (*Pachysandra spp.*) south of the Power House (Building No. 6); the yews (*Taxus spp.*) along the southern foundation of the Underground Vault (Building No. 12); the boxwoods (*Buxus spp.*) that exist along the eastern and western edges of the ramps leading down to the Underground Vault ; the row of privets (*Ligustrum spp.*) running parallel to the northern foundation of the Underground Vault; the row of Eastern Arborvitaes (*Thuja occidentalis*) north of the smaller laboratory buildings (Bldg. No. 2-4); the Norway Spruces (*Picea abies*) and cherry tree (*Prunus spp.*) along the western edge of the site ; the English Ivy (*Hedera helix*) surrounding each "railroad truck" monument; the row of privets (*Ligustrum spp.*) along the southwestern edge of the entrance corridor to the E.N.H.S.; the roses (*Rosa*

spp.) planted south of the Small Storage Vault (Building No. 8); and the yew (*Taxus spp.*) hedge surrounding the memorial at the northwestern corner of the Edison Laboratories site, including the Creeping Juniper (*Juniperus horizontalis*) planted adjacent to the memorial.

Another existing planting at the Laboratory Unit is the Boston Ivy (*Parthenocissus tricuspidata*) growing along the foundations of several of the buildings. The ivy presently is kept at a height no greater than 3'-3'6" along: the southern and northern foundations of the Main Laboratory and Power House; the eastern foundation of the Physics Laboratory; the western foundation of the Chemical Laboratory; the eastern foundation of the Chemical Storage and Pattern Shop; and the northern end of the eastern foundation of the Metallurgical Building (*See Figures 3.37-3.39*)

Buildings and Structures: (Original)

The Main Laboratory (Building No. 5) - The first floor of this building is partially restored to its historical appearance and serves as an exhibit; this is true for the library located at the western end of the building. The second floor contains offices for the Thomas A. Edison Papers and the curator staff. The appearance of this building's exterior is similar to its appearance at the time of Edison's death.

The Power House (Building No. 6) - This building serves as the Visitors Center for the Laboratory Unit and contains various exhibits of Edison's work, as well as a small theater that presents some of Edison's films.

The Power House presently contains an addition to its eastern wall. This addition was part of a walkway that led to the former Administration Building that existed east of the Power House. The removal of the Administration Building caused the eastern end of the walkway to be sealed by a brick wall. The addition is used for visitor center shop storage

By 1918, the main entrance into the Power House was raised 3'-4' above its original entrance elevation. By 1939, the entrance again was altered with addition of a decorative door surround and stairway, as well as ornamental lights on either side of the entrance. The present entrance into the Power House still retains the 1918 and 1939 alterations.

The Physics Laboratory (Building No. 1) - This building currently is divided into three parts: the northern end contains offices for administrative staff; near the center of this building is a conference

room; and the southern end of this building is designated as exhibit space for Edison's Phonographs. The appearance of this building's exterior is similar to its appearance at the time of Edison's death.

The Chemical Laboratory (Building No. 2) - The interior of this building is (the closest out of all the Edison National Historic Site's buildings to being) fully restored to its appearance during the site's period of significance (and serves as an exhibit). The appearance of this building's exterior is similar to its appearance at the time of Edison's death.

Chemical Storage and Pattern Shop (Building No. 3) - The southern end of this building is devoted to rest rooms for visitors to the Laboratory Unit. Directly north of the rest rooms are offices for the site's Park Ranger staff. The appearance of this building's exterior is similar to its appearance at the time of Edison's death.

The Metallurgical Building (Building No. 4) - The majority of this building is devoted to the storage and categorizing of the E.N.H.S. Archives' Photo Collection. The lean-to attached to the western facade of this building contains a sensitive storage facility for the archives Photo Album Collection. The appearance of this building's exterior is similar to its appearance at the time of Edison's death.

Building & Structures: (Added during the period of significance)

The Garage/ Experimental Studio (Building No. 11) was moved in 1940 to Greenfield Village, Dearborn, Michigan, while the Garage (Building No. 10) was destroyed. Both buildings were removed in order to provide room for the underground storage vault built in 1940, which is extant. Although the location of the underground vault is north of the historic locations of the Garage/ Experimental Studio and Garage, the ramps that lead down into the vault extend into the historic locations. All of the other buildings that were added to the current E.N.H.S. site during the period of significance, except for the Small Storage Vault (Building No. 8), have been removed.

Two of the vaults present at the E.N.H.S. were constructed after the period of significance. The Blue Amberol Vault (Building No. 32) and Vault No. 33, located east of the Metallurgical Building,(Building No. 4) were constructed in 1915. They are similar to the Small Storage Vault in terms of materials and forms, but are larger than the Small Storage Vault. In addition to these buildings, there have been several other buildings added to the site:

A Replica of the Black Maria Film Studio (Building No. 13) - built in 1954 as an exhibit for the T.A.E. Museum Foundation. The building was constructed using historical photographs and literature as references. This replica is similar to the 1893 Black Maria: it rotates around a wooden track and part of its roof can be raised to capture the sunlight. The replica is located directly north of the Physics Laboratory (Building No. 1).

The Underground Storage Vault (Building No. 12) - This building was erected in 1940, during America's involvement in World War II. To protect Edison's papers and other important archival material from any possible air assault. The building is located along the northern boundary of the courtyard and contains two concrete ramps that extend from its underground entrance into the courtyard as a means of access to the building.

Mechanical Systems:

Since Edison's death many of the Edison Laboratories' utilities have been altered or removed because they have become either dangerous or insufficient. The aerial utility lines that existed during Edison's life were removed and replaced with underground utility lines. The only utility poles that presently exist are two abandoned metal poles installed to the east of the Metallurgical Building after the 1914 fire. The historic steam lines are the only extant aerial utility lines within the Edison Laboratories; The only steam lines that have been removed are those that were connected to buildings removed or destroyed.

The Edison Laboratories drainage system also was altered. The current drainage swale still retains both sections. However, they are both constructed of concrete. In addition, the catch basin located at the southwest corner of the Physics Laboratory has been either removed or covered by the courtyard's asphalt paving.

One addition to the Edison Laboratories' mechanical systems was a 75,000 gallon water tower, erected east of the Metallurgical Building (Building No. 4). This water tower was taken out service of when the McGraw-Edison Company relocated during the 1950's.

Circulation:

QMuch Like the Edison Laboratories' mechanical systems, many of the circulation systems within the Edison Laboratories also have been altered. The wood ramps located in front of the smaller laboratories (Bldg. No. 1-4) were replaced by wider concrete ramps after Edison's death. The wood platform that was located in front of the main entrance into the Main Laboratory was replaced by a concrete platform. The length of the outer dimension of the door is approximately 2'6" wide. The new platform is at the same height as the wood platform it replaced. A steel and glass canopy also was installed over the Main Laboratory's main entrance. In addition, all of the vehicular circulation systems have been resurfaced with asphalt .

Views/ Vistas:

The majority of the experiments Edison and his staff worked on were performed within the buildings of the Edison Laboratories. The experiments that were too large to be conducted inside, such as the Black Maria, were conducted in remote areas within the Edison Laboratories site and kept from public view. The Black Maria was constructed in the Edison Laboratories' first period of history and needed to be conducted outside of the Edison Laboratories' buildings. Unlike its predecessor, the current replica of the Black Maria is located directly north of the Physics Laboratory and fronts Valley Road, which presents a misinterpretation of how Edison conducted his experiments within the Edison Laboratories. In addition, the track that allows the Black Maria to rotate is located within Edison's test track for different types of pavement material and thus, suggests a physical and functional relationship between the two projects, which never existed.

Furnishings & Objects:

By 1939, the chain link fence that was installed in 1918 was altered to its present appearance. Part of the alteration was a new section of fence extending from the southeast corner of the Main Laboratory south to the existing Lakeside Avenue fence line. The fence section east of this juncture was replaced by an ornate wrought iron fence with a gate that led to the Power House's altered entrance. Part of the alteration also included the relocation of the National Phonograph Company's gate from Valley Road to Alden Street. In addition to the 1918 chain link fence, a white, wood fence was installed from the northwest corner of the Metallurgical Building to the northeast corner of the Chemical Laboratory.

The concrete wall erected during the Edison Laboratories' period of significance also was altered during T.A.E., Inc.'s renovation of the Power House (Building No. 6). In order to construct the walkway

connecting the Power House to the adjacent Administration Building (Building No. 25), part of the freestanding concrete wall was removed. Currently, all that remains of the wall is a 20' +/- portion.

In addition to the alterations to several of the Edison Laboratories' furnishings, various monuments and memorials have been added to the site: a set of two railroad trucks, which were previously located at Edison's Menlo Park, were introduced to the landscape by 1923; a concrete slab produced by Edison's Portland Cement Company was introduced during the latter part of this period; a War memorial was installed at the northwest corner of the site as a tribute the "...Edison Men and Women Who Risked Their Lives During the Second World War..."; a set of Oriental tea lanterns were given to the site as a tribute to Edison and are located in front of the underground vault and a test track containing various pavement materials used by Edison was installed north of the Physics Laboratory.

In addition, after the Edison Laboratories closed for business, all of the material (i.e. crates and barrels of supplies) stored outside of the laboratory buildings was removed in order to promote the site as a museum.

SUMMARY:

After Edison's death, the Edison Laboratories became a temporary storage facility for T.A.E.. By the mid 1940's a museum foundation was founded and the Edison Laboratories became the Edison Museum and was open to the public. Charles Edison continued his hope of establishing the Edison Laboratories as a memorial to his father; and, by 1955, the Edison Laboratories became designated as a historic site. After Glenmont was donated in the early 1960's an act of Congress was passed and established both the Edison Laboratories and Glenmont as the Edison National Historic Site. Currently the Edison Laboratories is recognized as part of the Laboratory Unit at the Edison National Historic Site.

Following Edison's death, there have been several alterations to the Edison Laboratories, the majority of which have occurred in between Edison's death and the National Park Service's acquisition of the Edison Laboratories. Several of these early alterations include the removal of several historic buildings and aerial utility lines, as well as the addition of several buildings and exhibits. The alterations to the Edison Laboratories after it was donated to the National Park Service include the addition of several furnishings--such as benches and trash receptacles--and the asphalt paving of the vehicular circulation systems within the Laboratory Unit.

Despite these alterations, the primary fabric of the Edison Laboratories exists. Currently, there is a movement towards developing treatment plans for both the building interiors and landscape that will rehabilitate the Laboratory Unit's appearance during the period of significance. In addition to the rehabilitation, discussions are underway regarding the need to construct new facilities that will house offices, archival storage and a visitors center.

Conclusion:

The current Laboratory Unit site occupies an area that was once the location for two different historic facilities, the Edison Laboratories and the National Phonograph Company. The Edison Laboratories originated in 1887 and was located on the southwestern portion of the Laboratory Unit site. The National Phonograph Company originated in 1900 and was located on the northeastern portion and along the eastern boundary of the Laboratory Unit site. Although both facilities were physically contiguous, their operations were quite different. The Edison Laboratories was a research facility, while the National Phonograph Company served as the legal department of the Edison Phonograph Works and eventually became a record manufacturing facility. Presently, the Edison Laboratories retains all of its original buildings, as well as several historical additions. On the other hand, all but three of the National Phonograph Company's buildings and structures were removed by 1975 by the urban renewal program. The only existing remnants of the National Phonograph Company are the Blue Amberol Vault (Building No. 33), an additional Vault (Building No. 32) and the water tower.

The Edison Laboratories contains a moderate degree of integrity due to the number, condition and spatial arrangement of the historical buildings that are still extant. Quite contrary to this is the adjacent National Phonograph Company site, whose degree of integrity is much lower than that of the Edison Laboratories since very few historical landscape elements are still extant.

Since Edison's death, the degree of integrity for both sites has continually been diminished by alterations made to the Laboratory Unit as a whole, to the point of possibly creating false historical interpretations. In order to restore the integrity of the Edison Laboratories and the National Phonograph Company, several landscape elements within the Laboratory Unit will need to undergo specific treatments. The following Treatment Plan states several proposals that would help would help restore the integrity of the Laboratory Unit.

TREATMENT PLAN

Introduction:

The Laboratory Unit at the Édison National Historic Site is complex, with respect to its history, present composition and integrity. The Laboratory Unit is perceived as one facility. However, historically, the Laboratory Unit was the location of two individual and separate facilities. Currently there is no distinction of this historic situation. The Laboratory Unit's highest degree of integrity is contained within the southwestern portion of the site, which is the location of the historic Edison Laboratories. The high integrity of this portion of the Laboratory Unit is the result of the number and condition of the historic buildings that are extant. The northeastern portion of the Laboratory Unit site, which was the location of the National Phonograph Company, has no integrity since only two historic buildings and one structure are extant.

The first step that must be taken in the rehabilitation of the Laboratory Unit's landscape is to recognize and present the site as two separate facilities: the historic location of the Edison Laboratories and the historic location of the National Phonograph Company. With the recognition of this historic difference, a number of scenarios can be developed that focus on the treatment of the two facilities. The scenario of the following treatment plan focuses on rehabilitation of the two historic facilities to their appearance during the period of significance, 1900-1914.

The table format of the plan provides a comparison between the conditions of the various landscape elements that existed within both the Edison Laboratories and the National Phonograph Company during its period of significance and their existing condition. The landscape elements addressed within the treatment table are outlined according to the landscape category format used throughout the report. To help illustrate the historic and existing conditions, several descriptions reference photos, which follow the text of the treatment plan. The proposed treatments are in accordance with The Secretary of Interior Standards for the Treatment of Historic Properties, amended in 1992.

Thomas Alva Edison Stewardship: 1900-1914	**Existing Conditions**	**Proposals**
THE WEST ORANGE PLANT:		
Environmental Context:		
Not Applicable	Not Applicable	Not Applicable
Landscape Site/ Setting:		
The West Orange plant expanded to three times its' original size; most of the new buildings were massive 5-6-story buildings constructed out of Edison's Portland Cement. (*See Figure 3.1 & 3.2*)	The majority of the buildings and structures outside of the Edison Laboratories were destroyed by the urban renewal plan. The only buildings left standing are the Storage Battery Plant and what was a garage. (*see Figures 3.3 & 3.4*)	**PROPOSAL #1:** Recognition of the garage and the storage battery complex by placing both on the National Register of Historic Places. The storage battery complex is especially important since it is the only industrial building existing today at the site that was constructed out of Edison Portland cement. An additional proposal, or as an alternative, would be to acquire the building or acquire an easement on the building.
A retaining wall was constructed from the southeastern end of Bldg No. 11-13-15 and ran along the railroad tracks toward Watchung Avenue. This wall was used to retain the large amount of coal that was stored at the site. (*See Figure 3.5*)	The retaining wall still remains and is used as a protective barrier by the new occupants of the site.	**PROPOSAL #2A:** Interpretation of the retaining wall by installing an informational plaque/ sign along the wall to identify it as the historic property boundary. **PROPOSAL #2B:** Recognition of the retaining wall by placing it on the National Register of Historic Places.(?)
Response to Natural Features		
Not Applicable	Not Applicable	Not Applicable
Spatial Organization		
Not Applicable	Not Applicable	Not Applicable

Thomas Alva Edison Stewardship: 1900-1914	**Existing Conditions**	**Proposals**
THE EDISON LABORATORIES		
Landscape Site/ Setting:		
The streetscape along Valley Road (Main Street) and Alden Street contained street trees planted at approx. 25' on-center. (*See Figures 3.6, 3.7 & 3.8*) There was also a 3'-4' wide sidewalk, constructed either out of slate or bluestone slabs(*See Figures 3.11 & 3.12*). Integrated into the sidewalk along Valley Road (Main Street) was an entrance ramp into the Edison Laboratories that contained pavement materials that differed from that of the sidewalk. The streetscape along Lakeside Avenue during this period was much like the one along Valley Road, except there were no street trees. *See Figures 3.15 &3.16*)	There are no street trees along Main Street, only utility poles (*See Figures 3.9 & 3.10*), and along Alden Street there is only one street tree. The present sidewalk along Main Street is constructed entirely out of concrete (*See Figures 3.13 & 3.14*), while the sidewalk along Alden Street has retained much of its original layout. There is no integration of an entrance ramp into the Edison Laboratories within the sidewalk along Main Street. The present sidewalk along the northern edge of Lakeside Ave. is 8' wide and constructed out of concrete. (*See Figure 3.17*)	**PROPOSAL #3:** "Restoration" of the Main Street, Alden Street and Lakeside Avenue streetscapes to their appearance during the period of significance. The proposal involves: A. Replacement in-kind of missing historic street trees along Main street and Alden street. B. Documentation and Removal of the altered sidewalks along Main street, Alden street and Lakeside Avenue. C. Replacement in-kind of missing historic sidewalks along Main street, Alden street and Lakeside Avenue. D. Replacement in-kind of missing historic entrance pavement into the Edison Laboratories from Main Street.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Landform:		
There was no grade change (berm) from the sidewalk along Lakeside Avenue to the entry into the Power House (*See Figures 3.18 & 3.19*)	There is an increase in surface elevation from Lakeside Avenue to the southern facade of the Main Laboratory and Power House. The change in grade increases from the westernmost basement window in the Main Laboratory and continues eastward to the southeast corner of the Power House, which is approximately 4' above the grade of Lakeside Avenue.(*See Figure 3.20*)	**PROPOSAL #4:** "Restoration" of the grade between Lakeside Avenue and the southern facades of the Main Laboratory and Power House to its appearance during the period of significance. The proposal involves: A. Documentation and Removal of the fill that was placed on top of the original grade along Lakeside Avenue, from the easternmost basement window of the Main Laboratory to the southeast corner of the E.N.H.S. property. B. Documentation and Removal of concrete stairway that leads into southern entrance of Power House

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Vegetation:		
There were two types of vegetation that existed at the Edison Laboratories during this period was: 1) a grass lawn that extended along the southern property line (In between Bldg. the Main Laboratory and Power House and Lakeside Ave.) and along the western property line (in between Bldg. the Main Laboratory and Physics Building and Valley Road [Main Street]) (*See Figures 3.21-3.23*)	The majority of the vegetation that is present at the Edison Laboratories today consists of plantings that were introduced after the period of significance This vegetation includes: the yews and the underlying groundcover south of the Power House (*See Figure 3.20*); the foundation plantings along the southern foundation of the underground vault and the eastern and western edges of the ramps that lead down to the underground vault (*See Figure s 3.24-3.26*); the row of privets that run parallel to the northern foundation of the underground vault (*See Figure 3.27*); the row of arborvitae north of Bldg. No. 2-4 (*See Figure 3.27*); the spruce trees and cherry tree that exist along the western edge of the site (*See Figures 3.28-3.29*); the groundcover that surrounds each "railroad truck" monument (*See Figure 3.30*); the row of privets that exist along the southwestern edge of the entrance corridor to the E.N.H.S. (*See Figure 3.31*); the roses planted south of the Small Storage Vault (*See Figure 3.32*); and the yew hedge that surrounds the memorial at the northwestern corner of the Edison Laboratories site, including the juniper that is planted adjacent to the memorial (*See Figures 3.33-3.34*)	**PROPOSAL #5:** "Restoration" of the vegetation within the Edison Laboratories as it appeared during the period of significance. The proposal involves: A. Documentation and Removal of all vegetation introduced after the period of significance.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Vegetation (Con't.):		
2) ivy was introduced during this period along the facade of the Main Laboratory. By the end of the period, the ivy had spread profusely along the western facade of the Main Laboratory, the archway that connected the Main Laboratory and Physics Laboratory, the southern facade of the Physics Laboratory and was beginning to spread northerly along the eastern facade of the Physics Laboratory. (*See Figures 3.35-3.36*)	The ivy is presently kept at a height no greater than 3'-3'6" along: 1) the southern and northern foundations of the Main Laboratory and Power House 2) the eastern foundation of the Physics Laboratory; 3) the western foundation of the Chemical Laboratory; 4) the eastern foundation of the Chemical Storage and Pattern Shop; and 4) the northern end of the eastern foundation of the Metallurgical Building (*See Figures 3.37-3.39*)	B. Documentation and Removal of all ivy along the foundations of all buildings within the Edison Laboratories, except for the Main Laboratory, Power House and Physics Laboratory. The ivy along the foundations of the Main Laboratory, Power House and Physics Laboratory shall be carefully removed from the facade and attached to an innovative trellis system that would be installed along: 1) the western facade of the Main Laboratory from ground level to the concrete cornice that exists beneath the third story windows; 2) the western end of the Main Laboratory's southern facade (the library's southern facade), from ground level to the concrete cornice that exists beneath the third story windows; 3) the western end of the Main Laboratory's northern facade, from ground level to the concrete cornice that exists beneath the third story windows; 4) Both the western and eastern facades of the brick archway; and 5) the southern facade of the Physics Laboratory. The trellis system will allow the ivy to spread along the facades of the buildings without creating structural harm to them.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Buildings and Structures: (Original)		
The Power House during this period still retained its original 50'x50' footprint.	The Power House presently contains an addition to its eastern wall. This addition was part of a walkway that led to the former Administration Building that existed east of the Power House. The removal of the Administration Building caused the eastern end of the walkway to be sealed by a brick wall.	**PROPOSAL #6:** "Restoration" of the Power House's exterior to its appearance during the period of significance. The proposal involves: A. Documentation and Removal of walkway structure presently attached to eastern end of Power House. B. Documentation and Removal of the ornamental lights, the decorative door surround and stairs that lead to the main entrance into the Power House. C. Restoring the Power House's original entrance elevation. *If the entrance is to correspond with the 1910-1920 period of significance (as proposed by E.N.H.S. 9/92) then C. can be omitted, but not b. Since this was added in the late 1920's.*
The entrance into the Power House was at the same elevation of Lakeside Avenue.	By 1918, the main entrance into the Power House was raised 3'-4' above its original entrance elevation. By 1939, the entrance was again altered with addition of a concrete door surround and stairway, as well as ornamental lights on either side of the entrance. The present entrance into the Power House still retains the 1918 and 1939 alterations. (*See Figure 3.42*)	
7' to the east of the Power House was a concrete wall that was approximately 10' tall. The wall ran perpendicular from the sidewalk, along the northern edge of Lakeside Avenue, to the main transportation corridor that existed along the northern foundation of the Main Laboratory and Power House. (*See Figures 3.40-3.41*)	In order to construct the walkway, part of the freestanding concrete wall was removed. A 20' +/- portion of the wall still remains.	**PROPOSAL #7:** "Restoration" of the concrete wall that existed during the period of significance.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Building & Structures: (Added during the period of significance)		
Two of the first buildings to be added during this period were: 1) The Garage, a one-story wood structure with a 40'x20' footprint; and 2) The Garage/ Experimental Studio, a two-story wood structure with a 20'x25' footprint. Both of these structures were significant because of their spatial relationship to the courtyard. Both buildings, because of their locations, enclosed the courtyard's northern end. The courtyard became smaller in size, but still alowed plenty of room for Edison's outside experiments. This spatial relationship was not altered again until after this period.	The Garage/ Experimental Studio was moved in 1940 to Greenfield Village, Dearborn, Michigan, while the Garage was destroyed Both were removed in order to provide room for the underground storage vault.that is still present. Although the location of the underground vault is further north than the historic locations of the Garage/ Experimental Studio and Garage, the ramps that lead down into the vault extend into the historic locations. (*See Figures 3.3.49-3.50*)	**PROPOSAL #8:** "Reconstruction" of the Garage and the Garage/ Experimental Studio. This will include: A. Documentation and alteration of the underground storage vault. More specifically, altering the ramps that lead down into the vault so that they do not extend into the historic locations of the Garage and the Garage/ Experimental Studio. B. Relocation and Reconstruction of the Garage/ Experimental Studio from Greenfield Village, Dearborn, Michigan, to the E.N.H.S.
Other Buildings that were added during this period include: (*See Figure 3.48*) The Blacksmiths Shop: a free standing, one-story building constructed out of wood. The Small Storage Vault: a one-story reinforced concrete structure. The Pattern Storage Shop: a wood, one-story building that resemble a small lean-to. The Experimental Studio: closely resembled the Pattern Storage Shop.	All of the other buildings that were added to the current E.N.H.S. site during the period of significance, except for the Small Storage Vault, have been removed. There have been, however, several additions to the site. Two of the vaults present at the E.N.H.S. were constructed after the period of significance. The Blue Amberol Vault, located north of the underground storage vault, and Vault No. 33, located east of the Metallurgical Building, were constructed by 1915. Their construction is similar to the Small Storage Vault's construction in terms of materials and forms, but are relatively larger than the Small Storage Vault, hence its name.	**PROPOSAL #9:** Documentation and Removal of both the Blue Amberol Vault and Vault No. 33.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Mechanical Systems:		
The Edison Laboratories telephone systems and part of its electrical systems were distributed throughout the site by a series of aerial wires. The wires were originated from the Edison Phonograph Work's Power Houses. The wires ran from the Power Houses, through the Edison Phonograph Works' site and were connected to the main distribution pole, immediately west of the Metallurgical Building. A series of wires then ran to the western end of the Main Laboratory, while another series was connected to the roof of the Gold-Plating Building. A third set of wires was connected to a pole immediately east of the Chemical Laboratory and then continued over the courtyard and to a pole northeast of the Garage.	All of the E.N.H.S.'s electricity and telephone systems are underground fed. The only utility poles that exist presently are two abandoned metal poles that were installed to the east of the Metallurgical Building after the 1914 fire.	**PROPOSAL #10:** "Restoration" of the identified missing utility systems of the E.N.H.S. to their appearance during the period of significance. These systems would be replicas of the utility systems that existed during the period of significance and would not be operable. The proposal involves: A. Replacement in-kind of missing historic utility poles . B. Replacement in-kind of missing historic overhead wires.
Another overhead utility system was the site's steam lines. each of the buildings within the Edison Laboratories was connected to each other by a series of steam lines installed 10' above ground. (*See Figure 3.48*)	The majority of the historic steam lines are still present. The only lines that have been removed are those that were connected to buildings that were removed or destroyed.	C. Replacement in-kind of missing historic overhead steam lines
During this period the water tower that was located on top of the Main Laboratory was removed and the wells located within the West Orange plant, in addition to the water supplied by West Orange, supplied the E.N.H.S. with all ofits water.	The E.N.H.S. currently contains a 75,000 gallon water tower, east of the Metallurgical Building. This water tower was taken out of use when the McGraw-Edison Company relocated during the 1950's.	**PROPOSAL #11:** Documentation and Removal of the 75,000 gallon water tower.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Mechanical Systems (Con't.):		
The drainage system at the Edison Laboratories consisted of a drainage swale that began at the southwest corner of the Physics Laboratory and extended along its southern foundation to a catch basin that was installed at its southeast corner. The water collected within this section of the swale ran along its dirt surface and into the catch basin and was sent under the courtyard through a 3" pipe. The water emptied into the second section of the swale, which began at the southwest corner of the Chemical Laboratory and ran along the southern foundations of Bldg. No. 2-4. The second section of the swale was constructed out of brick and mortar laid in a running-bond pattern. (*See Figure 3.48*)	The current drainage swale still retains both sections. However, they are both constructed entirely out of concrete. In addition, the catch basin located at the southwest corner of the Physics Laboratory has been either removed or covered by the courtyard's asphalt paving. (*See Figure 3.52*)	**PROPOSAL #12:** "Restoration" of the altered drainage swale to its appearance during the period of significance: The proposal involves: A. Documentation and Removal of both sections of concrete swale. B. Replacement in-kind of the missing historic brick and mortar drainage swale section. C. Replacement in kind of the missing historic compacted soil drainage swale located in front of the Physics Laboratory. D. Replacement in kind of the missing historic catch basin and grate that was located at the southeast corner of the Physics Laboratory.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Circulation:		
Each of the smaller laboratory buildings within the Edison Laboratories (Bldg. No. 1-4) had a wood ramp that extended from their main entrance, over the drainage swale and into the main circulation corridor. Each of the ramps was constructed out of 4 2"x12" boards that were laid perpendicular to the entrance door. (*See Figure 3.53*)	Each of the wood ramps located in front of the smaller laboratories (Bldg. No. 1-4) was replaced by wider concrete ramps (*See Figure 3.54*)	**PROPOSAL #13:** "Restoration" of the specified circulation system within the Edison Laboratories to their appearance during the period of significance. The proposal involves: A. Replacement in-kind of missing historic wood ramps that led into each of the smaller laboratories (Bldg. No. 1-4)
The main entrance into the Main Laboratory was from the courtyard. To gain access to the main doors a narrow wood platform was constructed. The platform was as long as the length of the main doors and approximately 6" in height and 12" wide. (*See Figure 3.55*)	The wood platform that was located in front of the main entrance into the Main Laboratory was replaced by a concrete platform that is as long as the distance between the outer door frames and approximately 2'6" wide. The new platform is at the same height as the wood platform it replaced. In addition, a steel and glass canopy was installed over the entrance. (*See Figure 3.56*)	B. Replacement in-kind of missing historic wood platform that led into the main entrance of the Main Laboratory. An item that needs to be considered is how this would conform to the new handicap accessibility standards set by the A.D.A. (?) C. Documentation and Removal of Canopy over entrance
The courtyard and main transportation corridor within the Edison Laboratories were dirt paths, which were created during the site's first period of history. Because of the increased volume of traffic during the second periodof history, the soft dirt pathswere changed to a hard, less permeable surface that resembled a paved surface. (The exact material is unknown) (*See Figure 3.57*)	All of the vehicular circulation systems have been paved with an asphalt surface.	D. Documentation and Removal of asphalt surface from all vehicular circulation systems within the Edison National Historic Site. E. Replacement in-kind of the historic paving surface material established by the end of the period of significance.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Circulation (Con't):		
The entry into the Power House from Lakeside Avenue did not require any type of pathway leading to the door. (*See Figure 3.40*)	There is currently a concrete sidewalk that leads from the sidewalk along the northern edge of Lakeside Avenue to the Power House stairs.	F. Documentation and Removal of the sidewalk that leads from the Lakeside Avenue sidewalk to the concrete stairs.
The National Phonograph Company, an Edison company, was located within the West Orange plant, directly north of the Edison Laboratories. To gain direct access to the company's site an entrance was installed along Valley Road, approximately 200' north of the Edison Laboratories Valley Road entrance.	The Valley Road (Main Street) entrance was removed and relocated to Alden Street, near the intersection of Aden Street and Valley Road.	G. Replacement in-kind of missing historic Valley Road (Main Street) entrance, which includes: 1. The alteration of the sidewalk that presently exists along Valley Road (Main Street). (see Proposal #3) 2. The replacement in-kind of the missing historic gates that opened into the historic National Phonograph Propoerty (Currently the northern half of the E.N.H.S.) (see Proposal #13)
		H. Documentation and Removal of Alden Street entrance. (see Proposal #13)

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Views/ Vistas:		
The majority of the experiments Edison and his staff worked on were performed within the buildings of the Edison Laboratories. The experiments that were too large to be conducted inside the buildings, such as the Black Maria, were conducted in remote areas within the Edison Laboratories site and kept from public view. The Black Maria was constructed in the Edison Laboratories' first period of history and needed to be conducted outside of the Edison Laboratories' buildings.	The site presently contains a full scale, working replica of the Black Maria, built in 1954. Unlike its predecessor that was constructed in the remote area east of the Power House the replica is located directly north of the Physics Laboratory and fronts Valley Road. In addition, the track that allows the Black Maria to rotate is located within Edison's test track for different types of pavement material and thus, presents a possible relation between the two projects. (*See Figures 3.45-3.46*)	**PROPOSAL #14:** Relocation of the Black Maria, and its track, to a new location, yet to be determined, within the Edison National Historic Site that would not interfere with the interpretation of the historic views of: 1. the Black Maria itself 2. the Edison Laboratories from Valley Road (Main Street) 3. the test track that the Black Maria is now located within.

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Furnishings & Objects:		
The wood fence that surrounded the Edison Laboratories was installed during the site's first period of history (*See Figure 3.58*) During the expansion of the West Orange plant, this wood fence was extremely altered. The fence line that marked the northern boundary of the Edison Laboratories was removed. The section of fence along Valley Road (Main Street), was extended further north to the intersection of Alden and Main Streets. A new wood fence was constructed from this intersection and extended east, toward Watchung Avenue. The entire eastern half of the wood fence that extended along Lakeside Avenue was removed. The remaining section extended east from the intersection of Lakeside Avenue and Valley Road to the concrete wall that was constructed east of the Power House. A new gate was installed within the fence at the corner of the concrete wall. (*See Figure 3.59*)	In late 1917 the wood fence was removed and a chain link fence was installed along the wood fence line that was established during the expansion of the West Orange plant. The locations of the gates within the 1918 fence were similar to the ones created within the wood fence that was replaced. To support the main entry gates into the E.N.H.S. from Valley Road, two brick pillars were constructed. By 1939, the chain link fence was altered to its present appearance. (*See Figure 3.10*)Part of the alteration was a new section of fence that extended from the southeast corner of the Main Laboratory south to the existing Lakeside Avenue fence line. The fence section east of this juncture was replaced by an ornate wrought iron fence with a gate that led to the Power House's altered entrance. (*See Figure 3.60*) Also part of the alteration was the relocation of the National Phonograph Company's gate from Valley Road to Alden Street. In addition, a white, wood fence was installed from: the northwest corner of the Metallurgical Building to the northeast corner of the Chemical Laboratory. (*See Figures 3.61-3.63*)	**PROPOSAL #15:** "Restoration" of the wood fence as it appeared during the period of significance. The proposal involves: A. Documentation and Removal of existing chain link and wrought iron fences and their supports. (This includes the brick pillars that support the Main Street entrance gates.) B. Replacement in-kind of missing historic wood fence and in the same location as during the period of significance. C. Restoration of gates and gate locations as they appeared during the expansion of the West Orange plant. D. Documentation and Removal of wood fences

Thomas Alva Edison Stewardship: 1900-1914	Existing Conditions	Proposals
Furnishings (Con't.):		
The majority of the furnishings and objects that were located within the Edison Laboratories were directly related to the site's research and development aspects. Examples include the piles of surplus construction material and clutter of crates and experimental prototypes that were stored outside of the laboratory buildings. The only furnishing that was documented during this period was a signpost that was located at the southwest corner of the Edison Laboratories site, near the intersection of Valley Road (Main Street) and Lakeside Avenue. (*See Figure 3.64*) The post was 8' (approx.) in height and contained a 12"x18" (approx.) sign at the top. The sign faced the traffic along Valley Road (Main Street) and contained the word "OFFICE" over a hand that pointed down Lakeside Avenue. The sign referred to the Administration Building that was located along Lakeside Avenue, east of the Power House.	Since the early 1920's several furnishings, monuments and memorials have been added to the site: A set of two railroad trucks, which were previously located at Edison's Menlo Park, were introduced to the landscape. (*See Figure 3.65*) A concrete slab produced by Edison Portland Cement Company was introduced and serves as a display. (*See Figure 3.66*) A War memorial was installed at the northwest corner of the site as a tribute the "...Edison Men and Women Who Risked Their Lives During the Second World War...". A set of Oriental tea lanterns were given to the site as a tribute to Edison and are currently located in front of the underground vault. (*See Figure 3.67*) A test track for Edison's pavement material was installed north of the Physics Laboratory. In addition, after the Edison Laboratories closed for business, all of the material (i.e. crates and barrels of supplies) that was stored outside of the laboratory buildings was removed in order to promote the site as a museum	**PROPOSAL #16:** "Restoration" of the furnishings and objects of the Edison Laboratories as it appeared during the period of significance. The proposal involves: A. Relocation of railroad trucks to a site yet to be determined B. Relocation of concrete slab to a site yet to be determined C. Relocation of war memorial to a site yet to be determined D Relocation of oriental tea lanterns to a site yet to be determined E. Further Research and Documentation of the test track. F. Replacement in-kind of missing objects (i.e. crates and barrels of supplies) as it appeared during the period of significance.

Existing Conditions

Proposals

NEW CONSTRUCTION:

New Facility(S)

Presently, the interiors of several historic laboratories (Bldg. No. 1, 3-5, 7-9,12,32-33) are being used for: 1) office space by the site's administrative and archival staffs; 2) storage of archival material; and 3) a Visitors Center (Bldg. No. 6.). Due to the limited amount of floor space that exists within the laboratory buildings and the fact the interiors of these buildings are to be restored, there is a need to construct an additional facility(s) within the E.N.H.S. The new facility(s) will require sufficient floor space to accommodate: 1) a Visitors Center; 2) offices for the various staffs & 200,000 artifacts; 3) a storage area for the five million archival resources that are presently stored at the E.N.H.S. site and 4) a research library The required total floor space for the new facility(s) has been estimated at 17,600 s.f.

PROPOSAL #17A: New construction of two additional facilities located within the E.N.H.S. whose minimum total floor space is 17,600 s.f.

PROPOSAL #17B: New construction of one large additional facility located within the E.N.H.S. whose minimum total floor space is 17,600 s.f.

PROPOSAL #17C: Purchase and/or leasing the Storage Battery Building and rehabilitating it to facilitate the needs of the E.N.H.S.

Signage System:

The current signage system consists of signs installed at different times and thus, lacks continuity:

The building numbers attached to the facades of the laboratory buildings (1917-1927).

The plaque identifying the railroad trucks (1917-1927)

The memorial plaque attached to the southern facade of the Main Laboratory (1920).

The plaques identifying the oriental tea lanterns (1940)

The identification sign for the Black Maria (1954)

The memorial plaque attached to the war memorial (1955-)

The identification sign for the Edison Portland concrete exhibit (1939-)

The National Park Service signs (1955-)

PROPOSAL #18: Development of a contemporary signage system that will utilize mediums and lettering styles similar to those used within the period of significance.

Site Furnishings (benches and trash receptacles)

The E.N.H.S. currently contains several benches alongthe southern edge of the main circulation corridor and along the edges of the roof of the underground vault. All of the benches are constructed out of wood slats bolted to a metal frame and are painted green, similar to the color of all the window and door frames within the E.N.H.S.

The trash receptacles located within the E.N.H.S. are of metal construction and are painted the same color as the benches.

PROPOSAL #19: Development of a contemporary site furnishings (benches and receptacles) system that will utilize mediums similar to those used within the period of significance and will correlate with the proposed signage system. (see Proposal #16.)

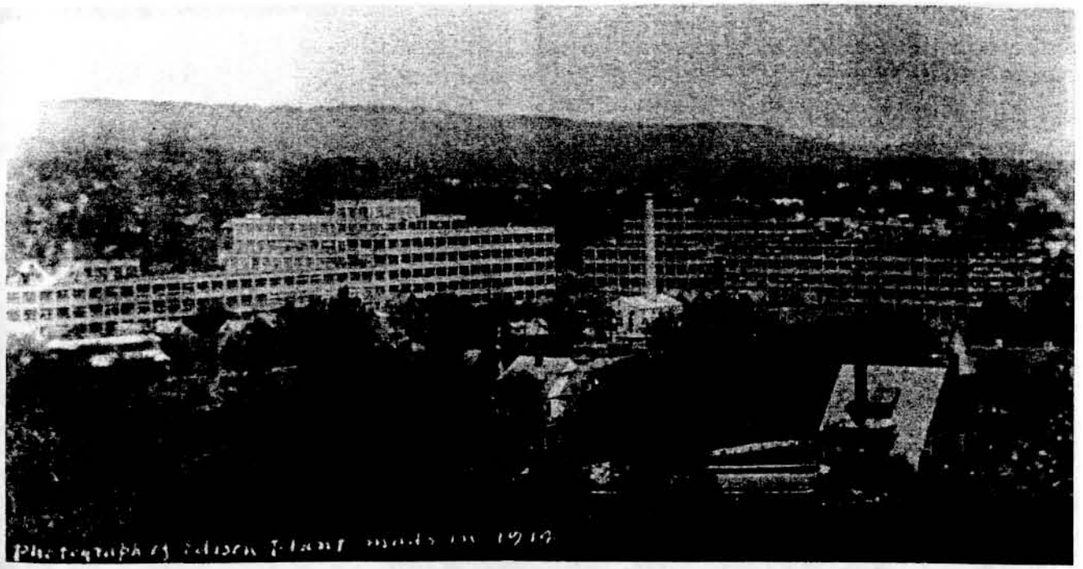


Figure 3.1.

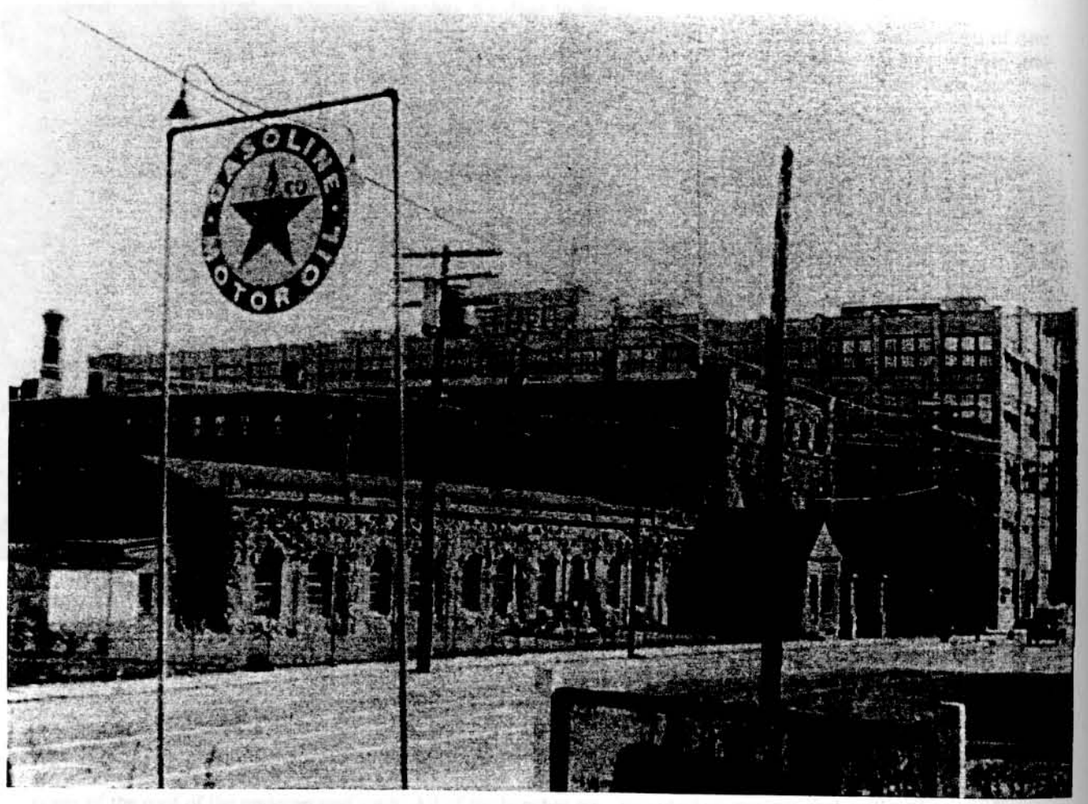


Figure 3.2.

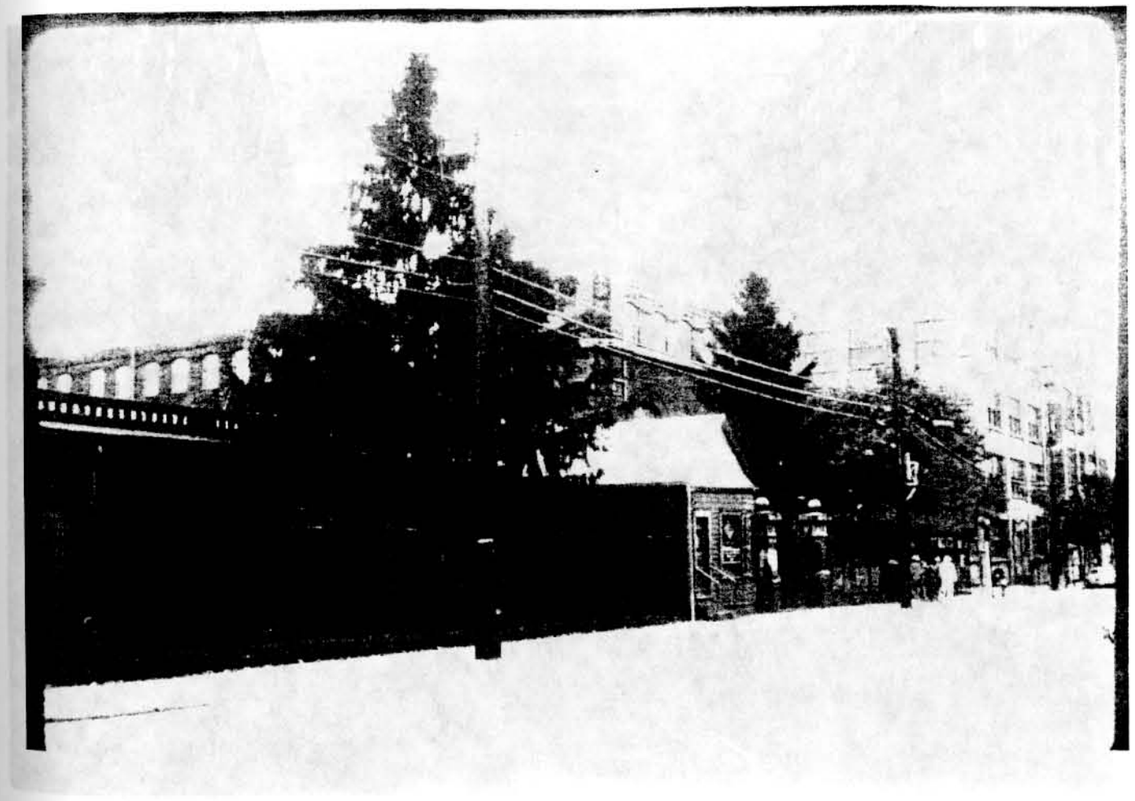
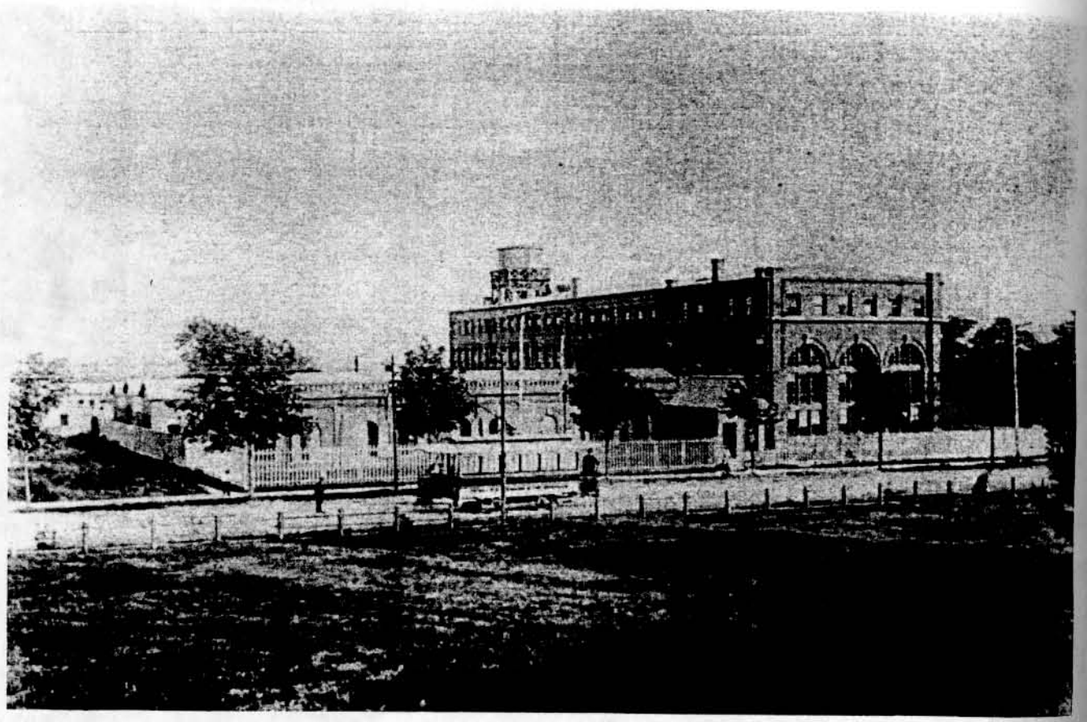


Figure 3.3. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.4. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.5.



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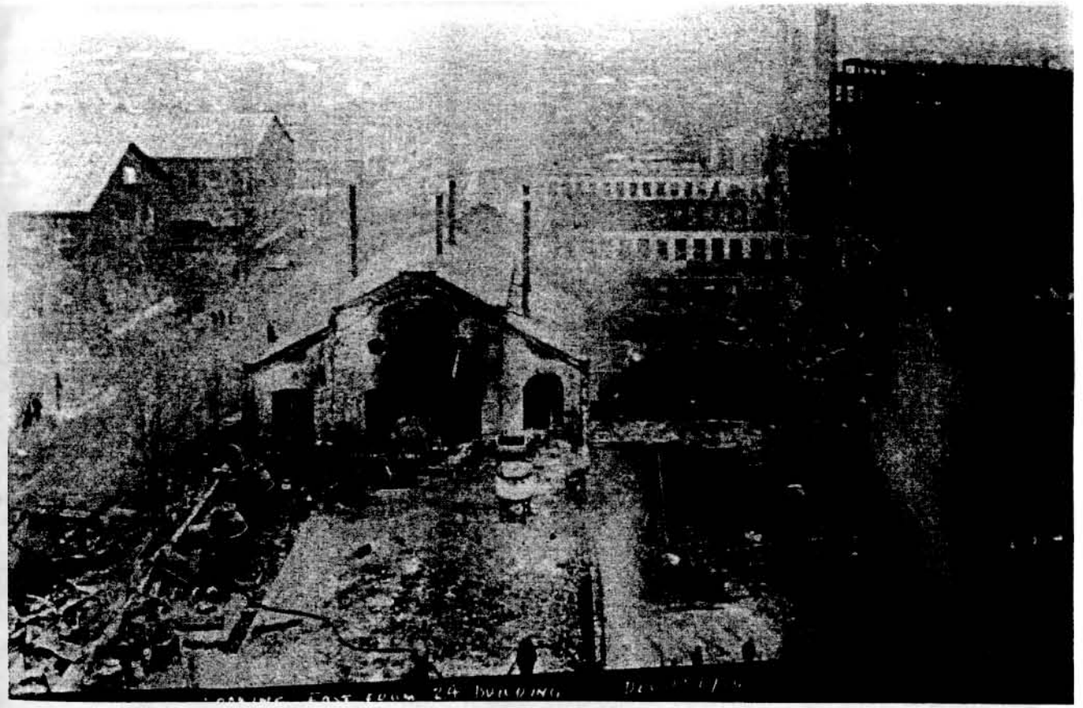
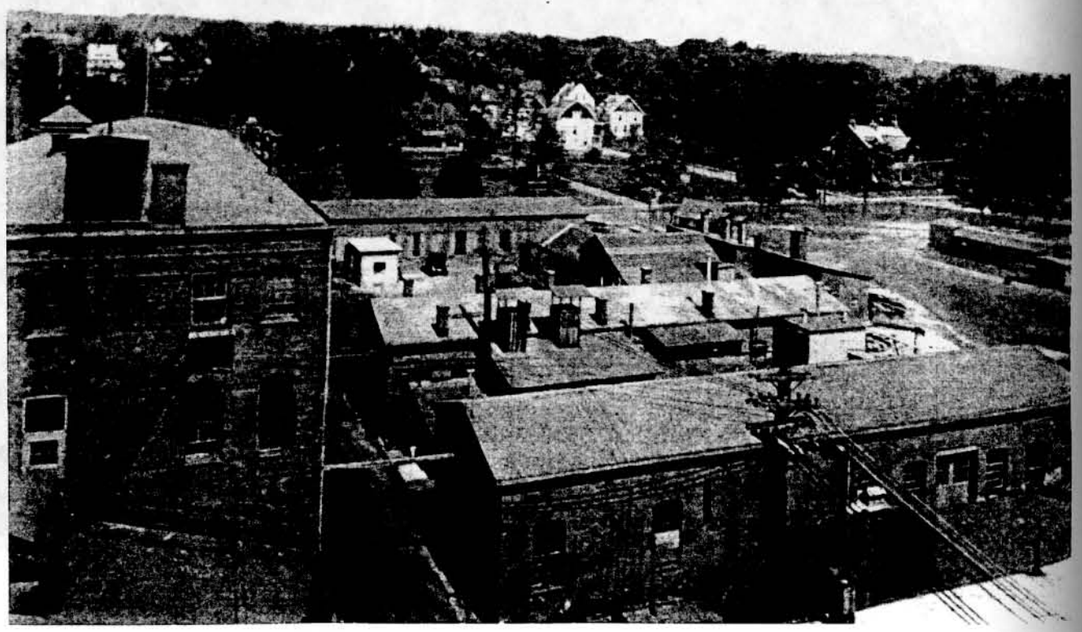


Figure 3.7.



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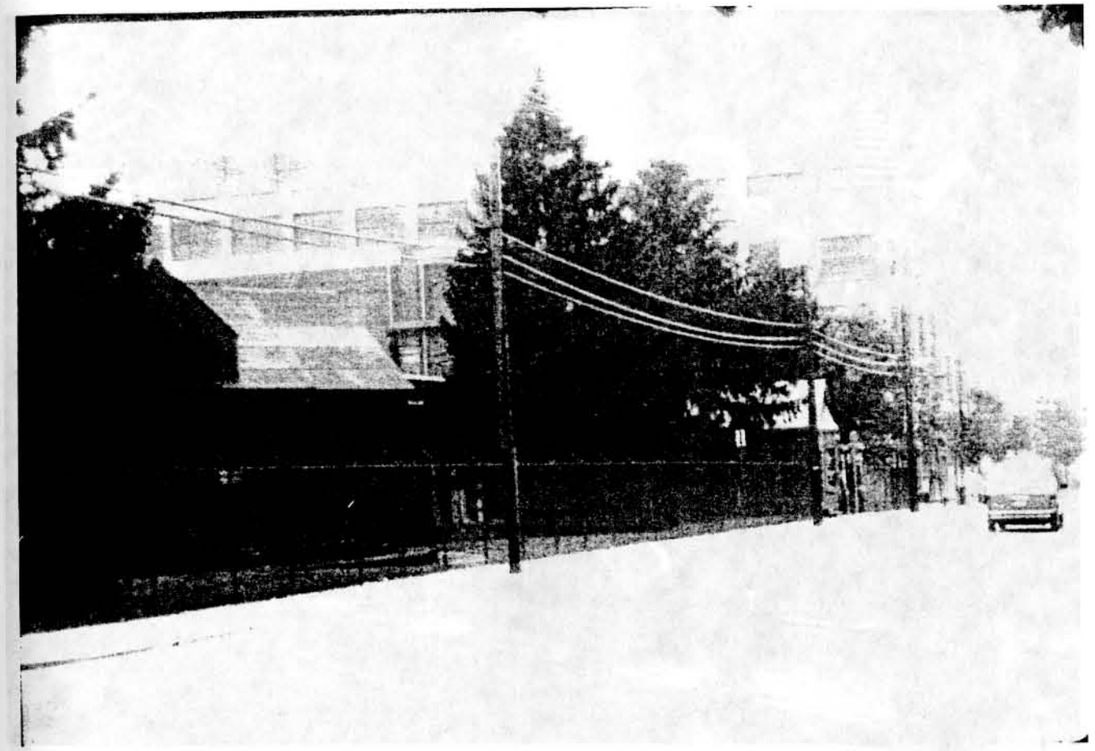


Figure 3.9. *[Source: Photo taken by author, Nov. 1991]*

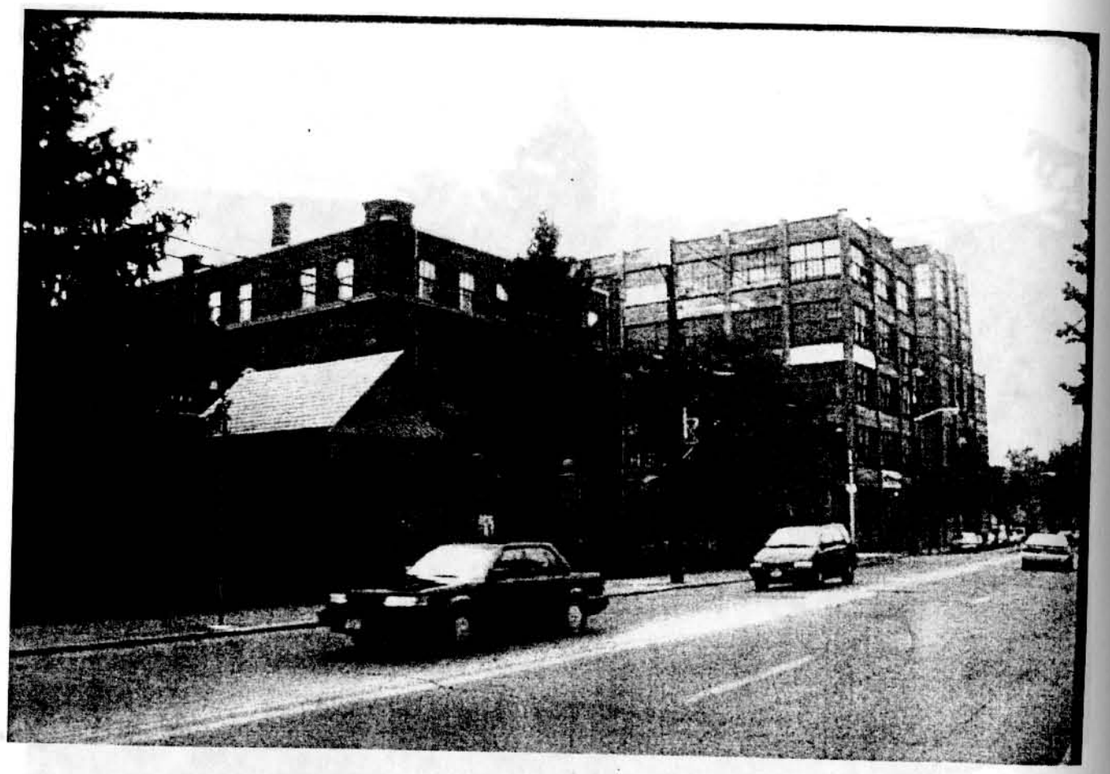


Figure 3.10. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.11.

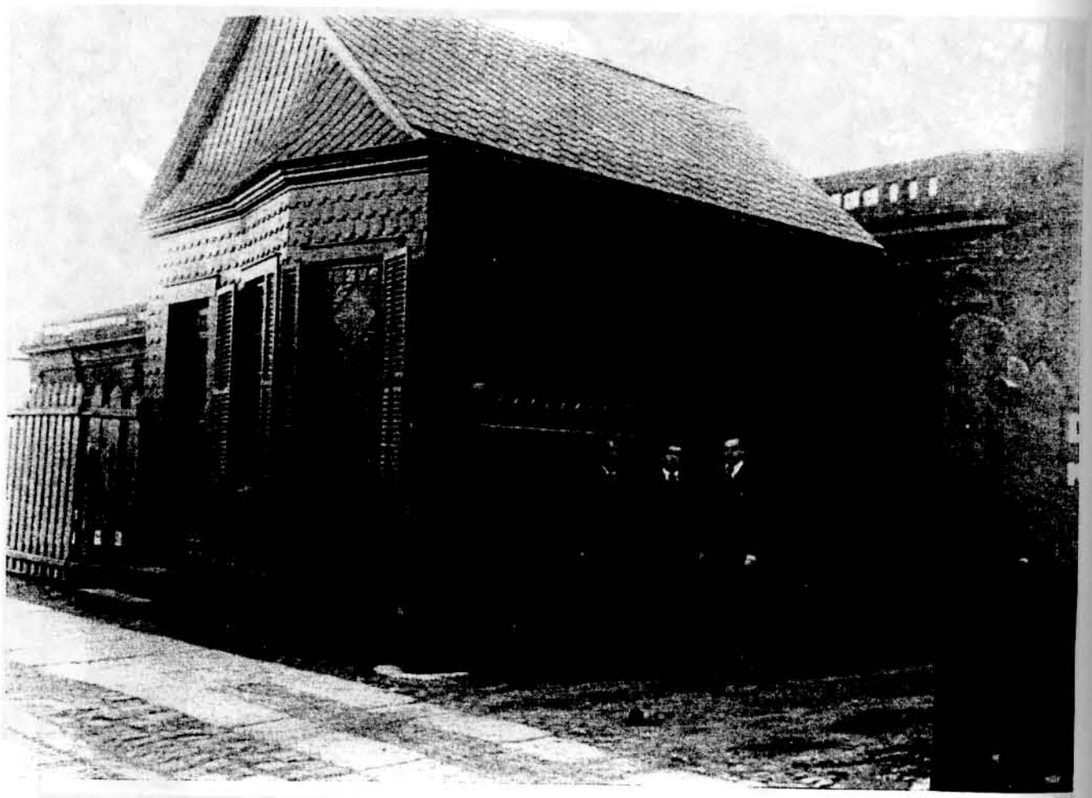


Figure 3.12.

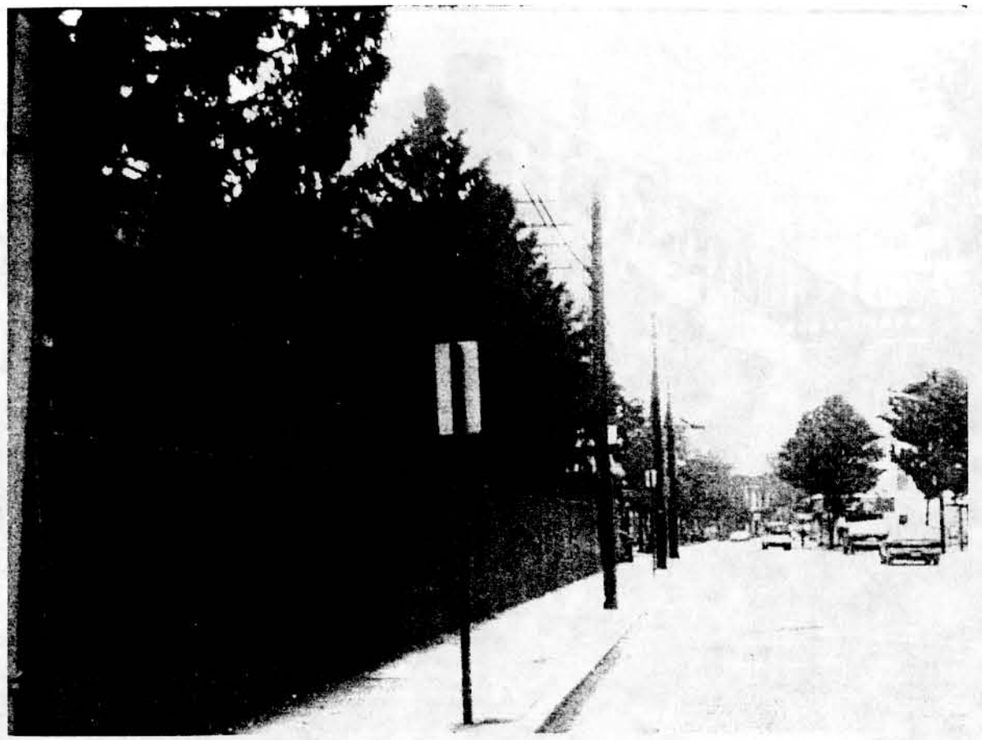


Figure 3.13. *[Source: Photo taken by author, Nov. 1991]*

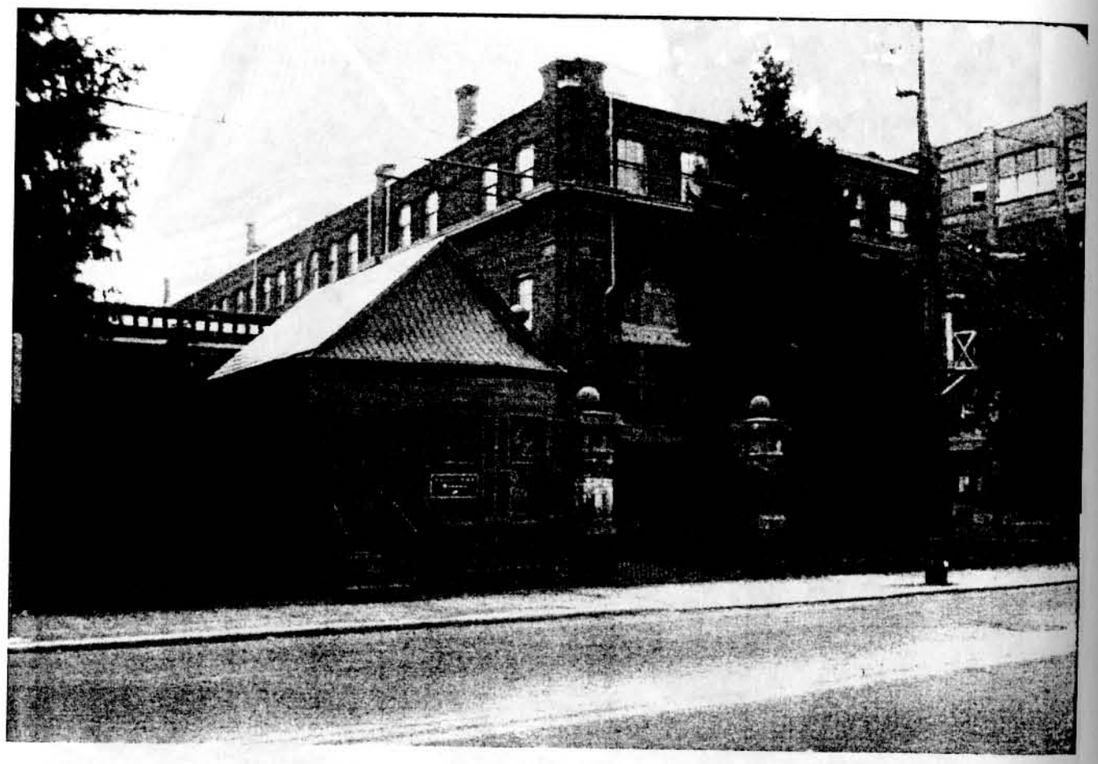


Figure 3.14. *[Source: Photo taken by author, Nov. 1991]*

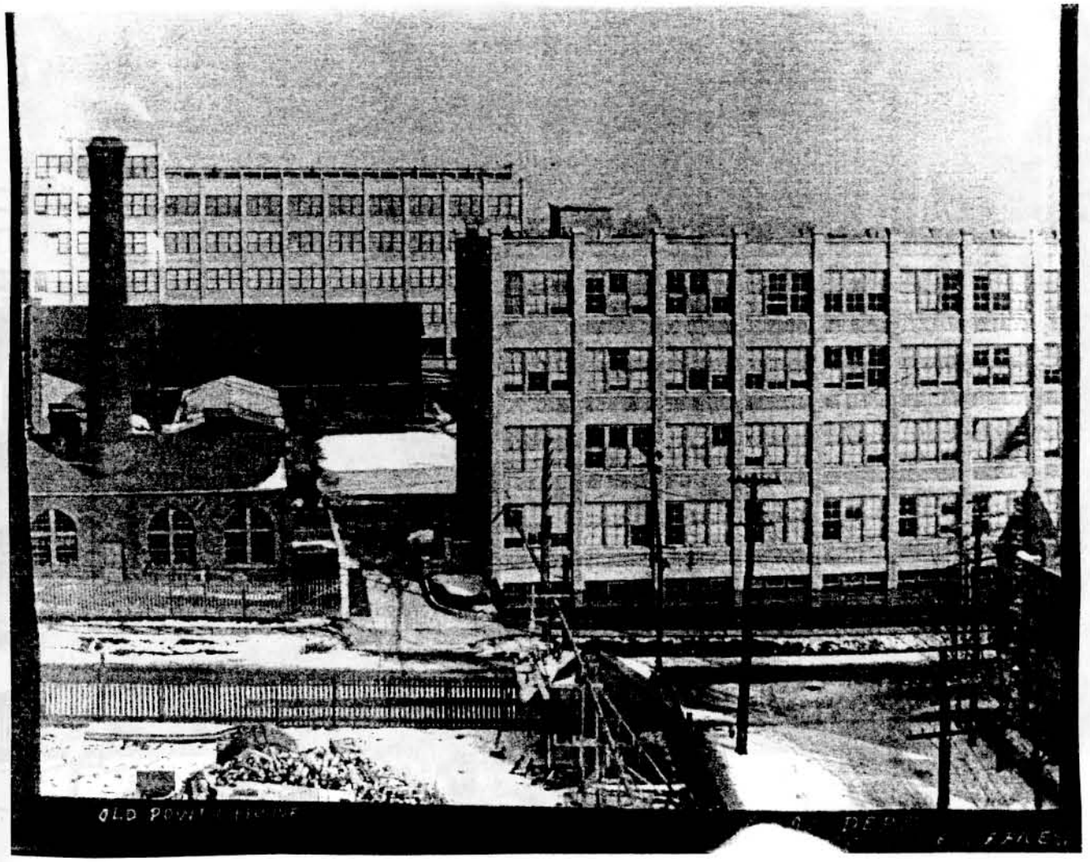


Figure 3.15.

Figure 3.16.

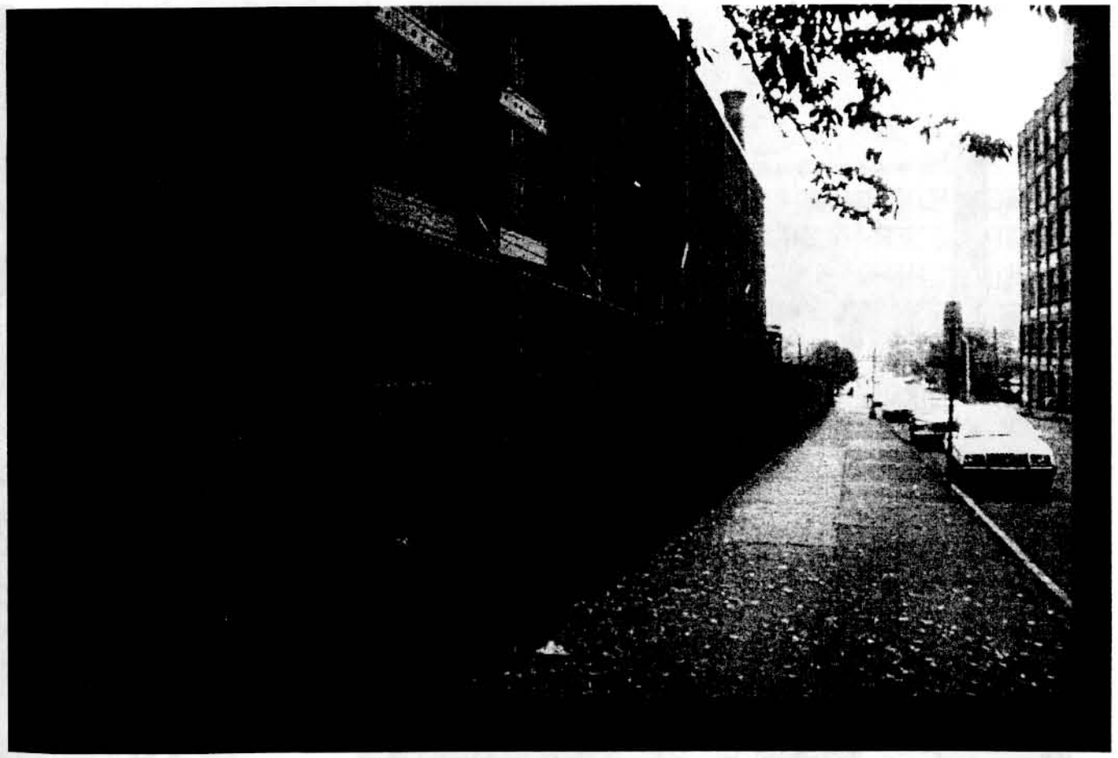


Figure 3.17. *[Source: Photo taken by author, Nov. 1991]*

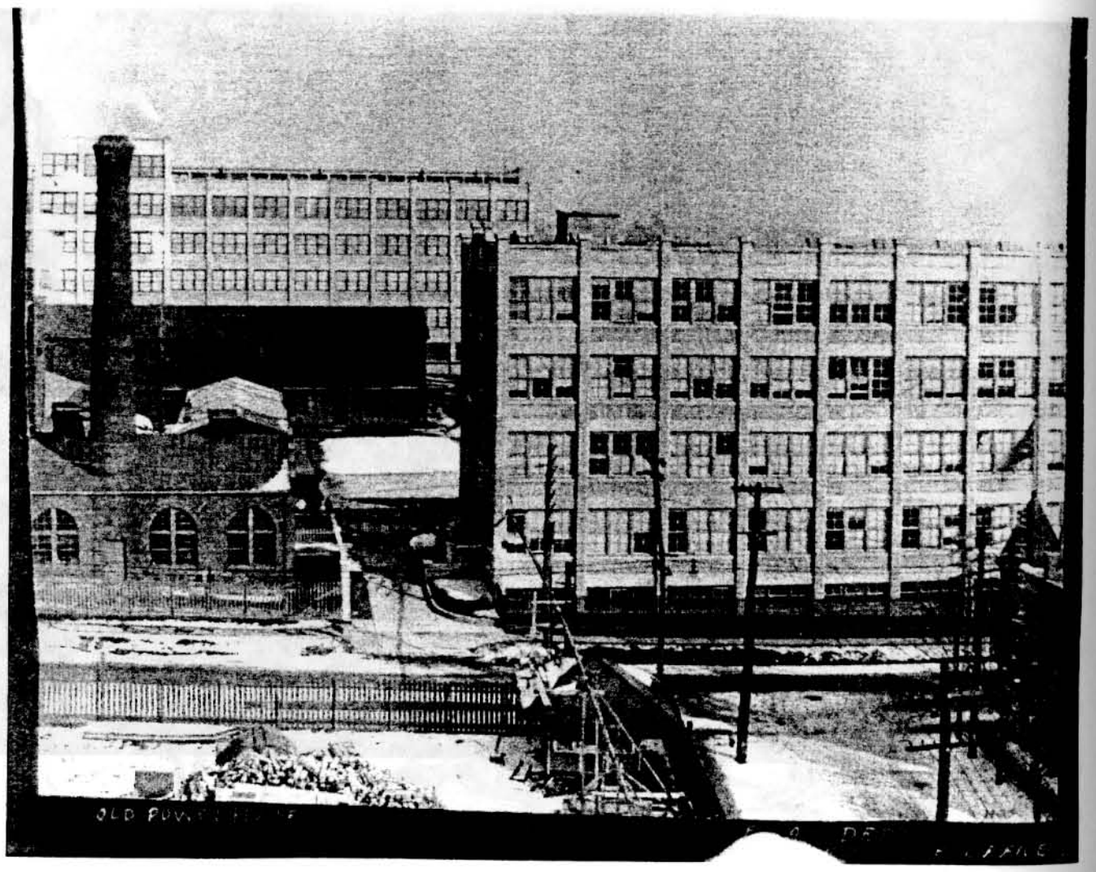
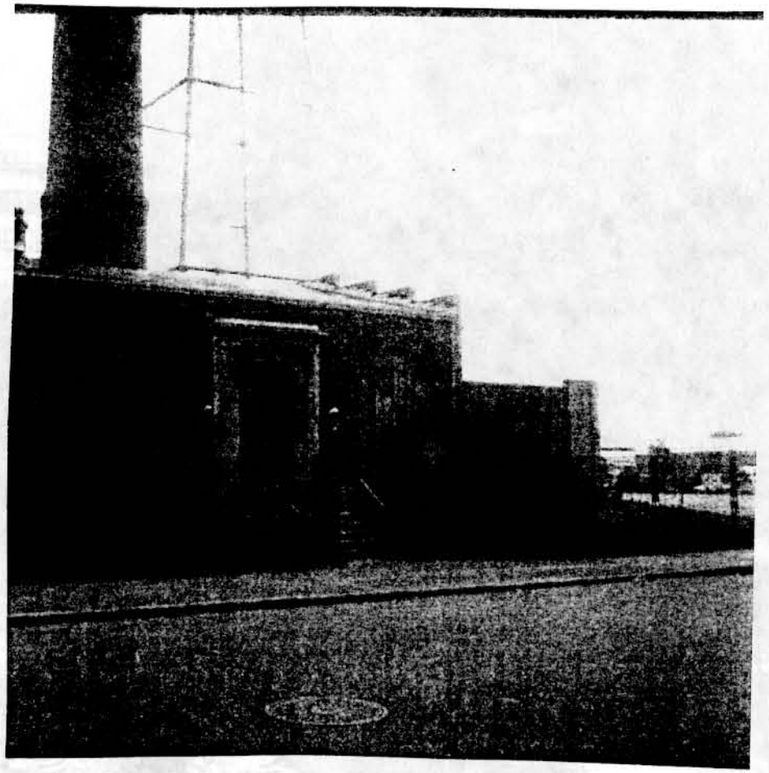


Figure 3.18.

Figure 3.19.



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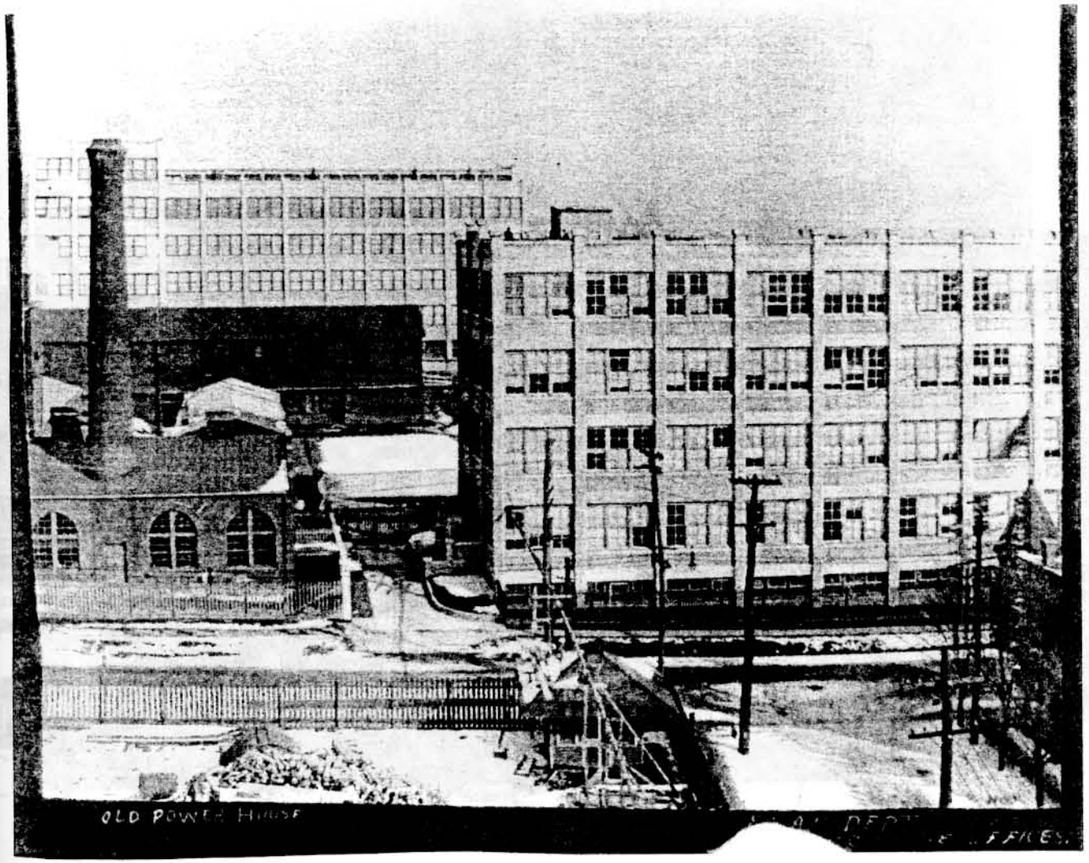
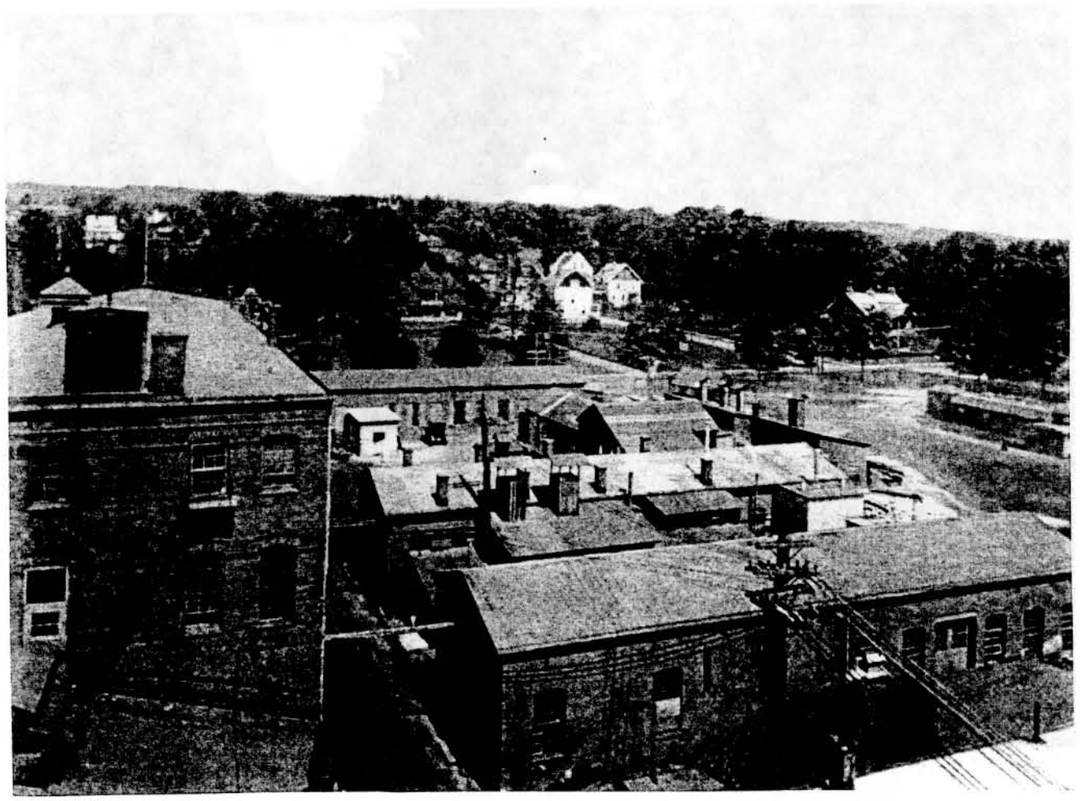


Figure 3.21.

Figure 3.22.



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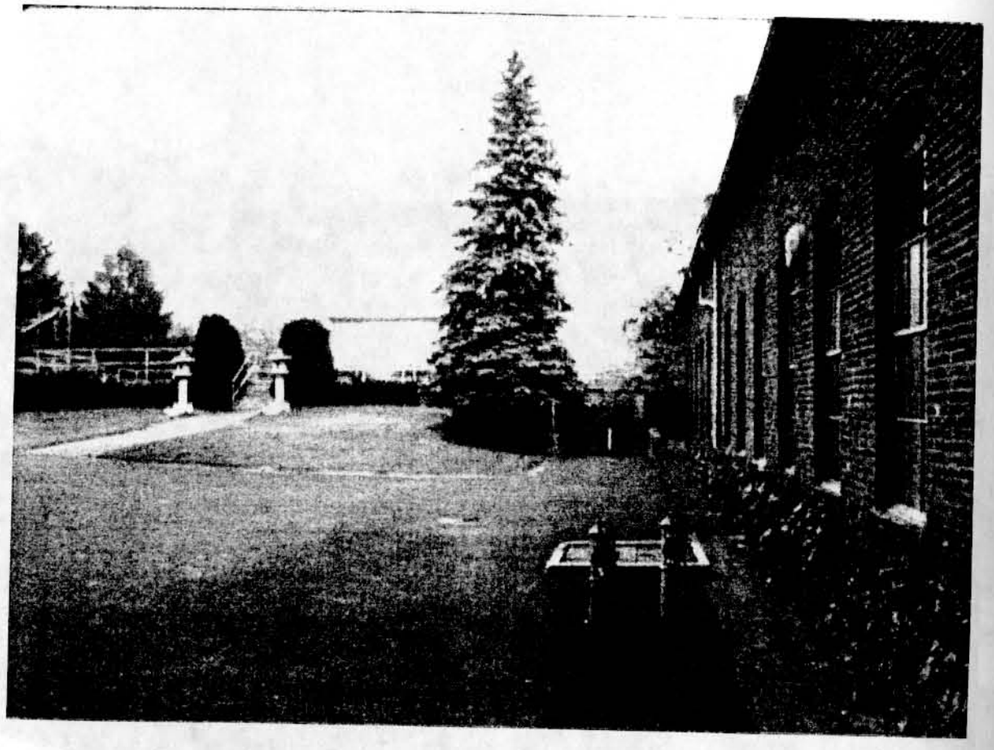

Figure 3.24. *[Source: Photo taken by author, Nov. 1991]*

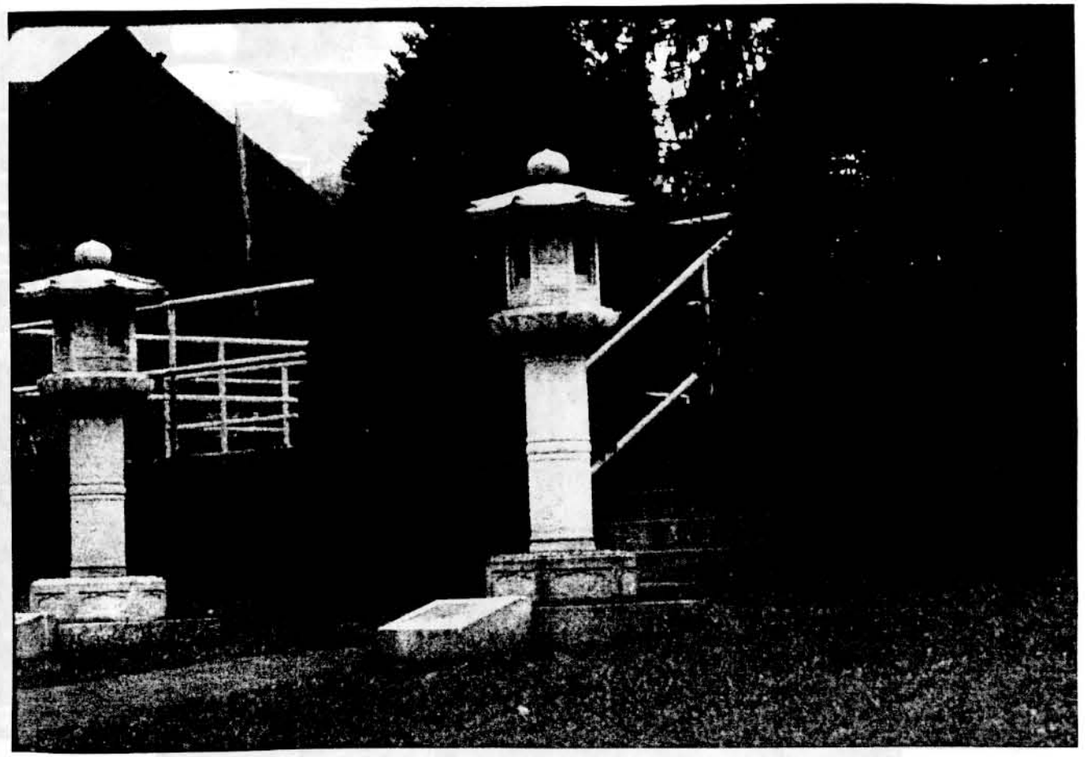

Figure 3.25. *[Source: Photo taken by author, Nov. 1991]*

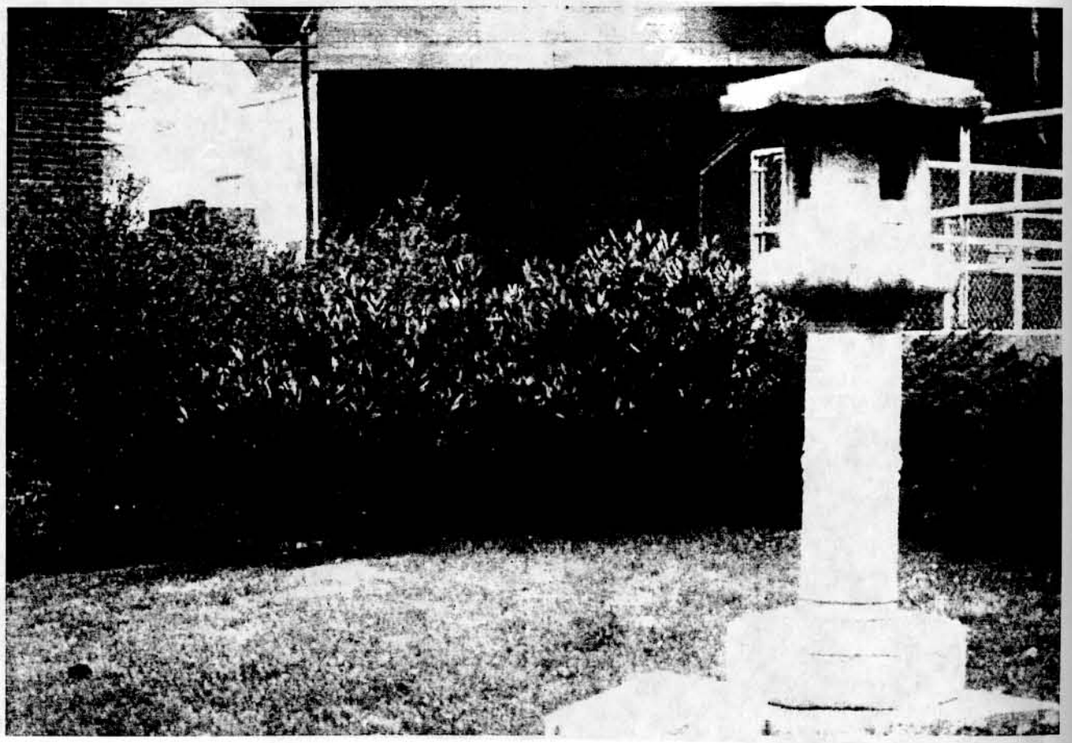

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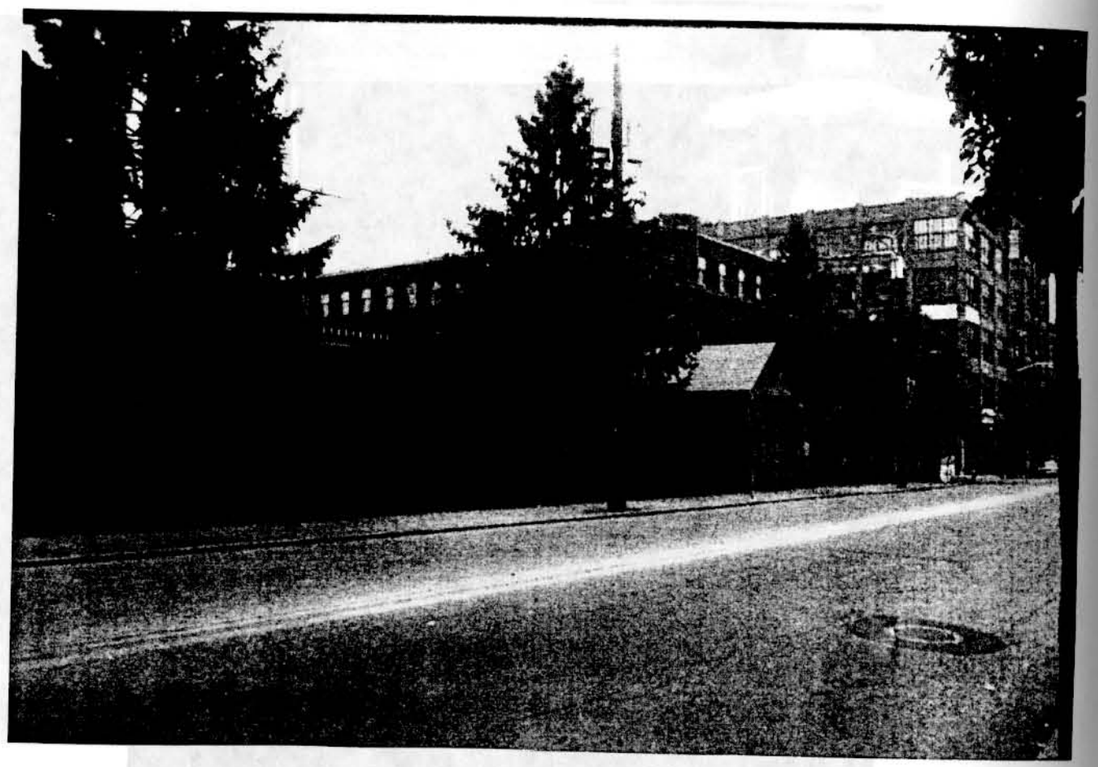
Figure 3.27. *[Source: Photo taken by author, Nov. 1991]*



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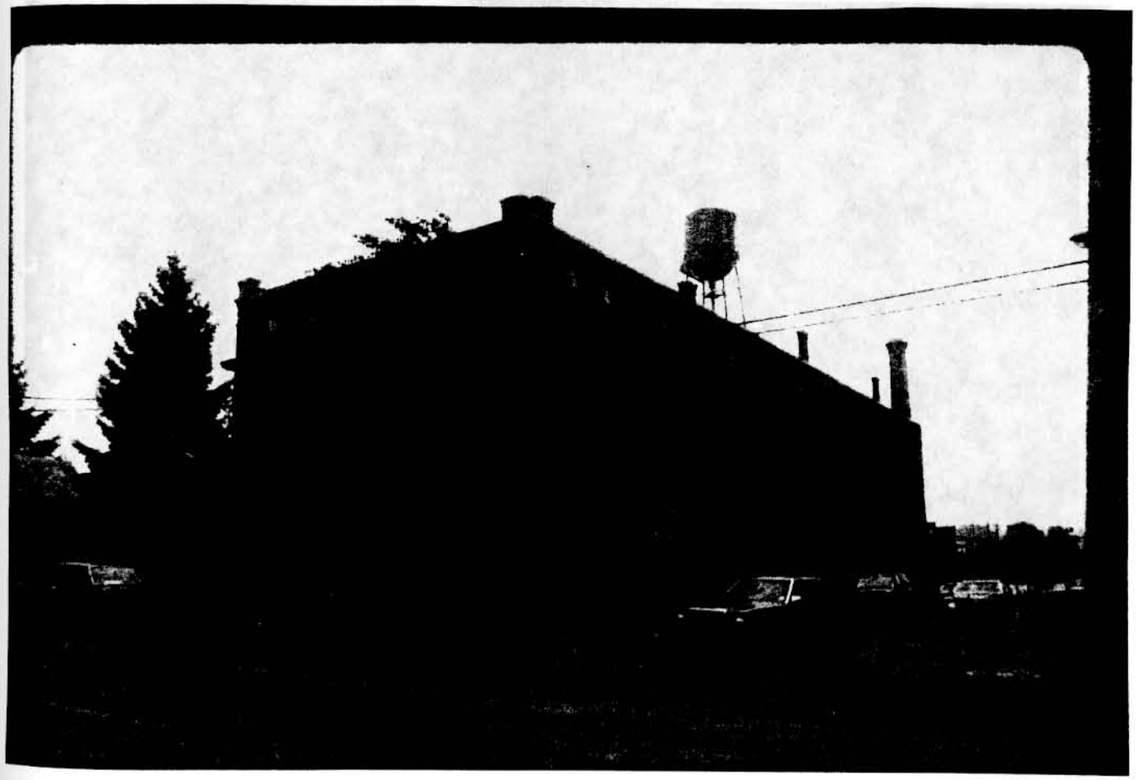


Figure 3.29. *[Source: Photo taken by author, Nov. 1991]*

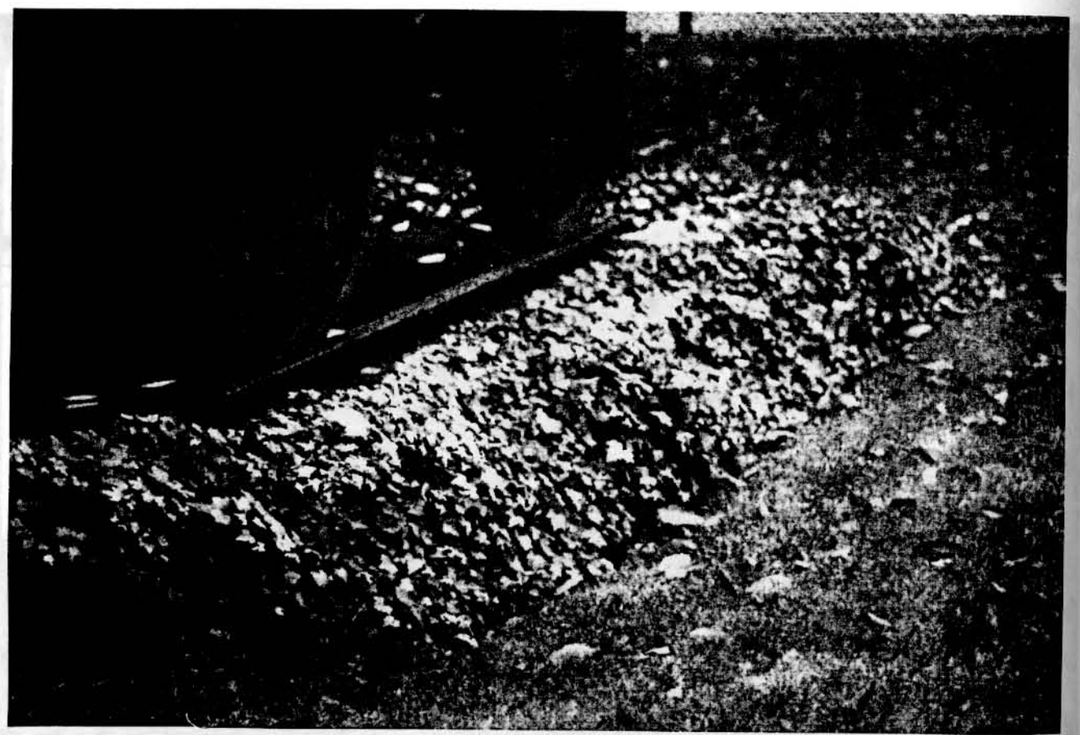


Figure 3.30. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.31. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.32. *[Source: Photo taken by author, Nov. 1991]*

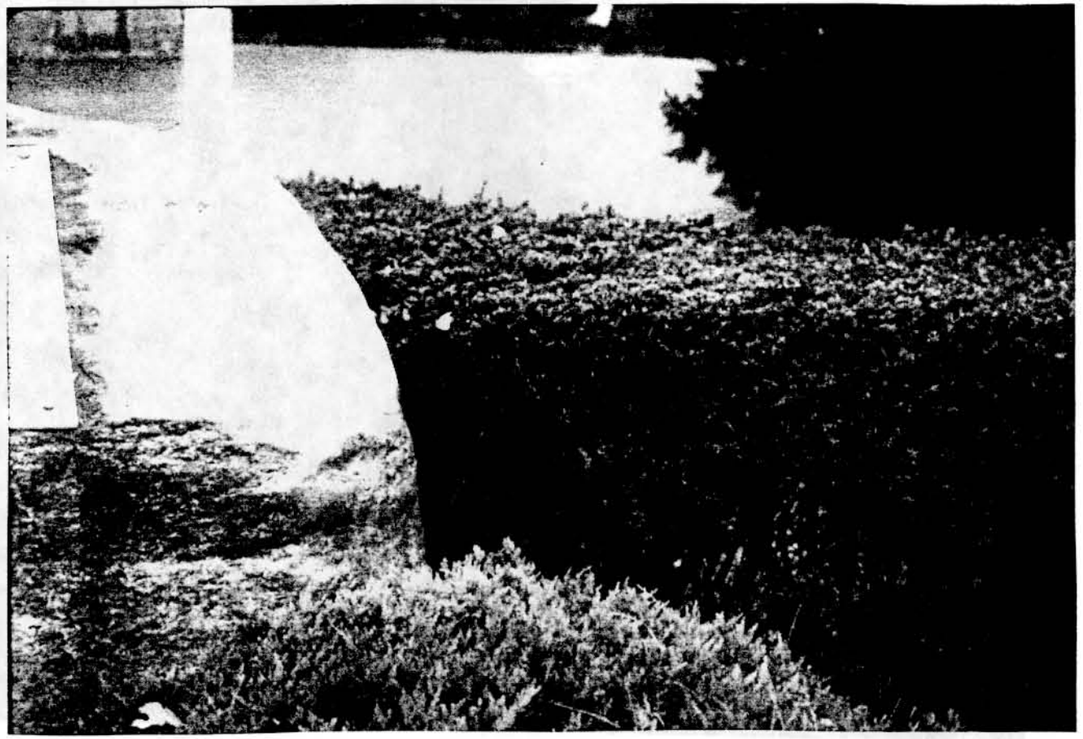


Figure 3.33. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.34. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.35.

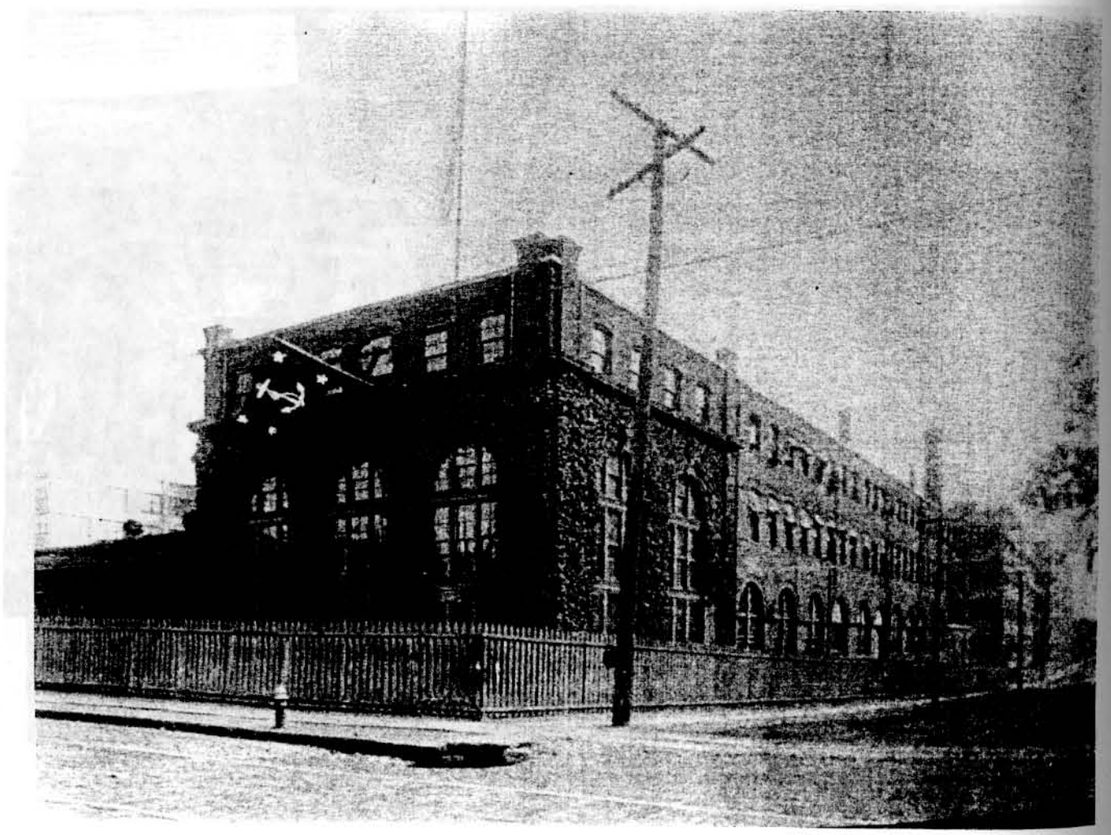
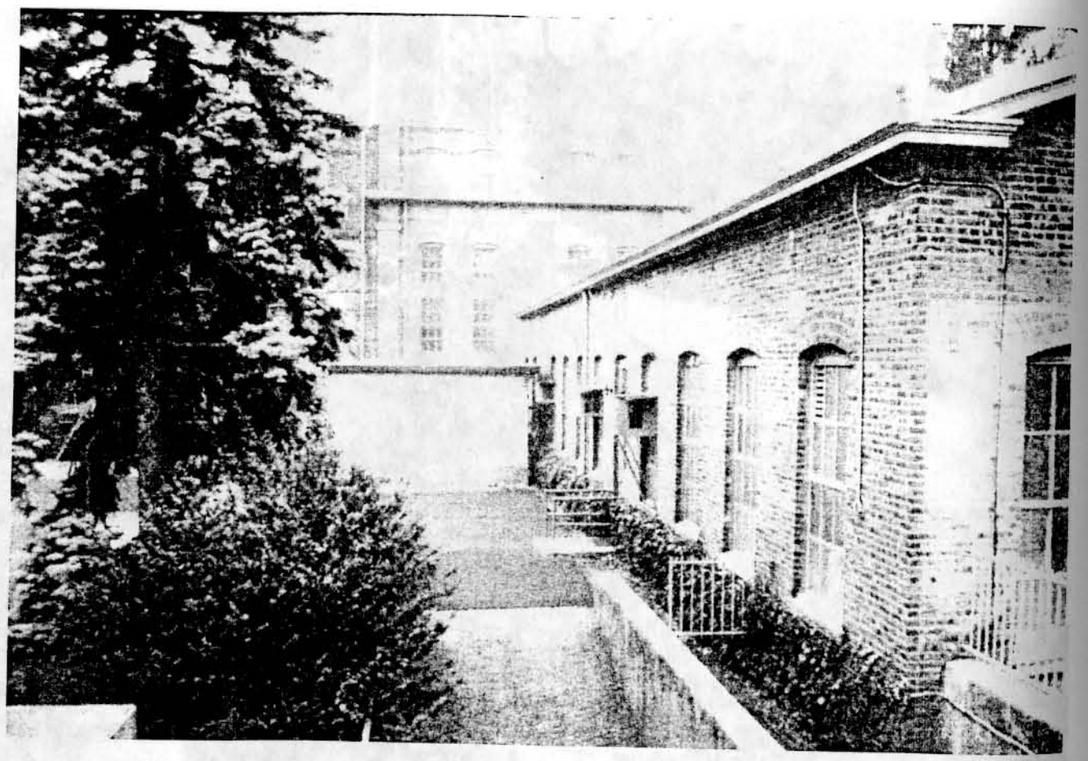


Figure 3.36.

Figure 3.37. [Source: Photo taken by author, Nov. 1991]



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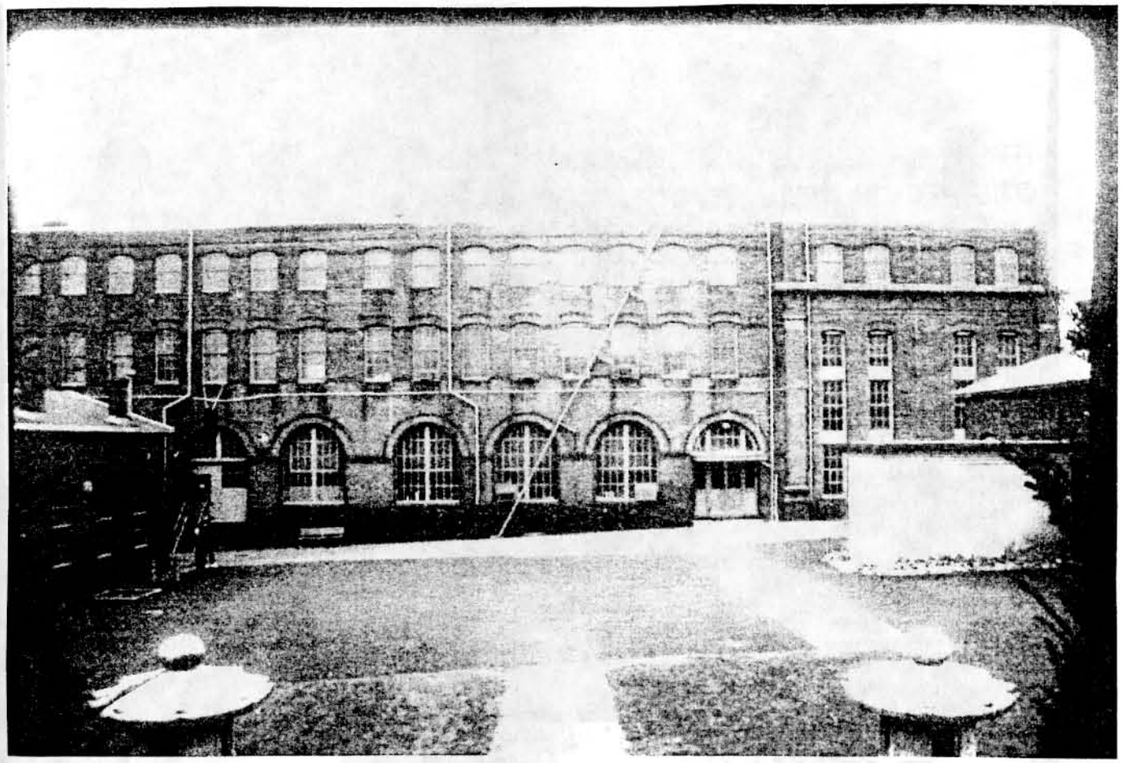

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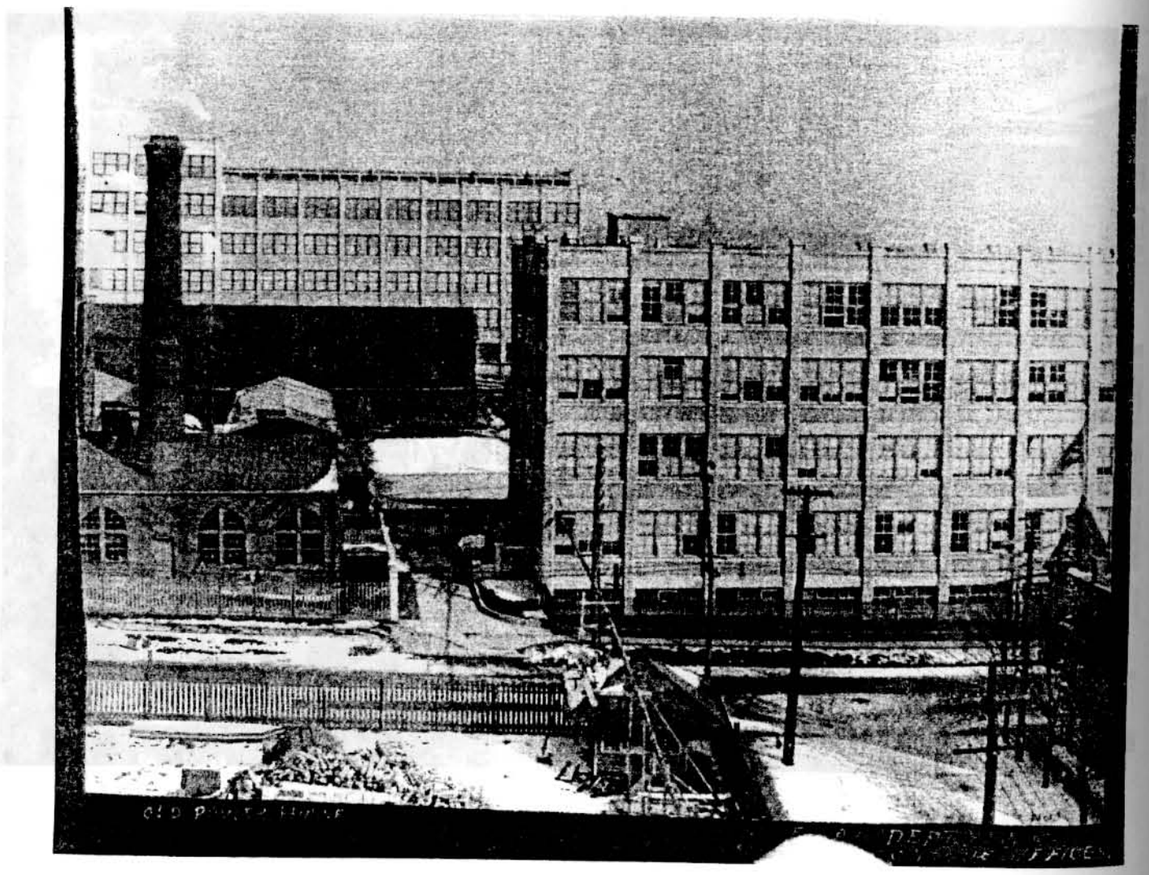
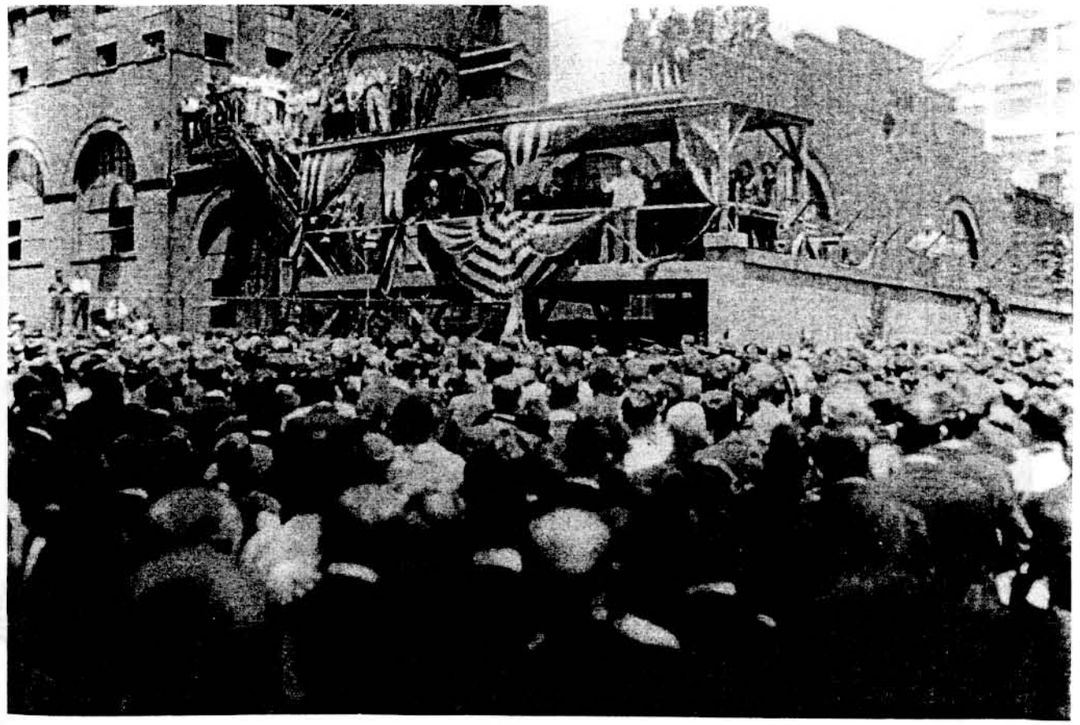


Figure 3.40.



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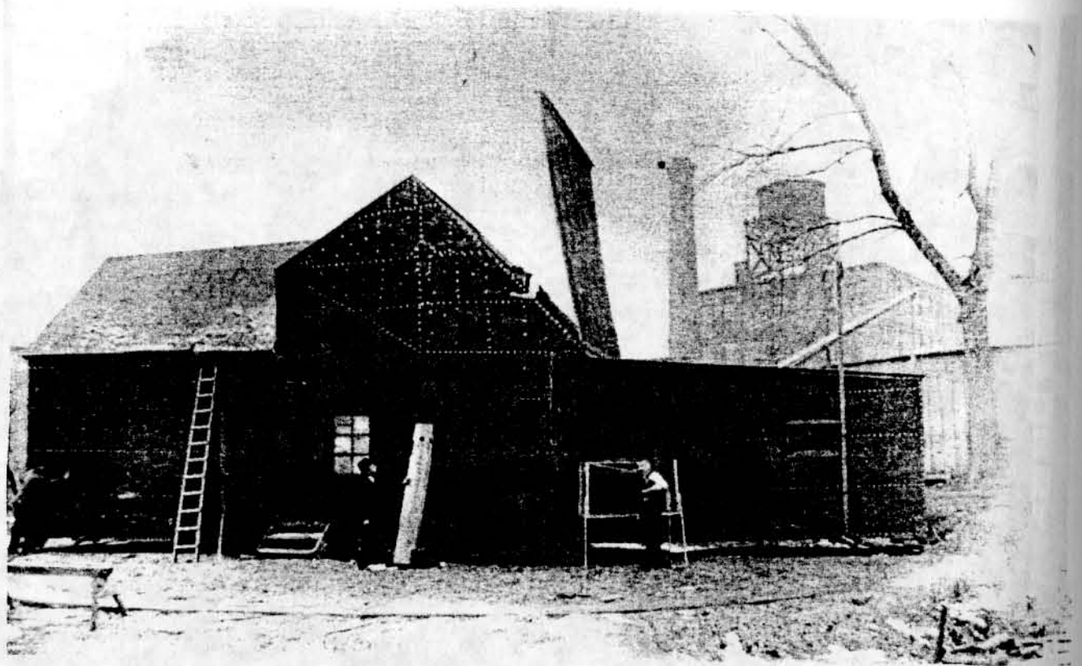

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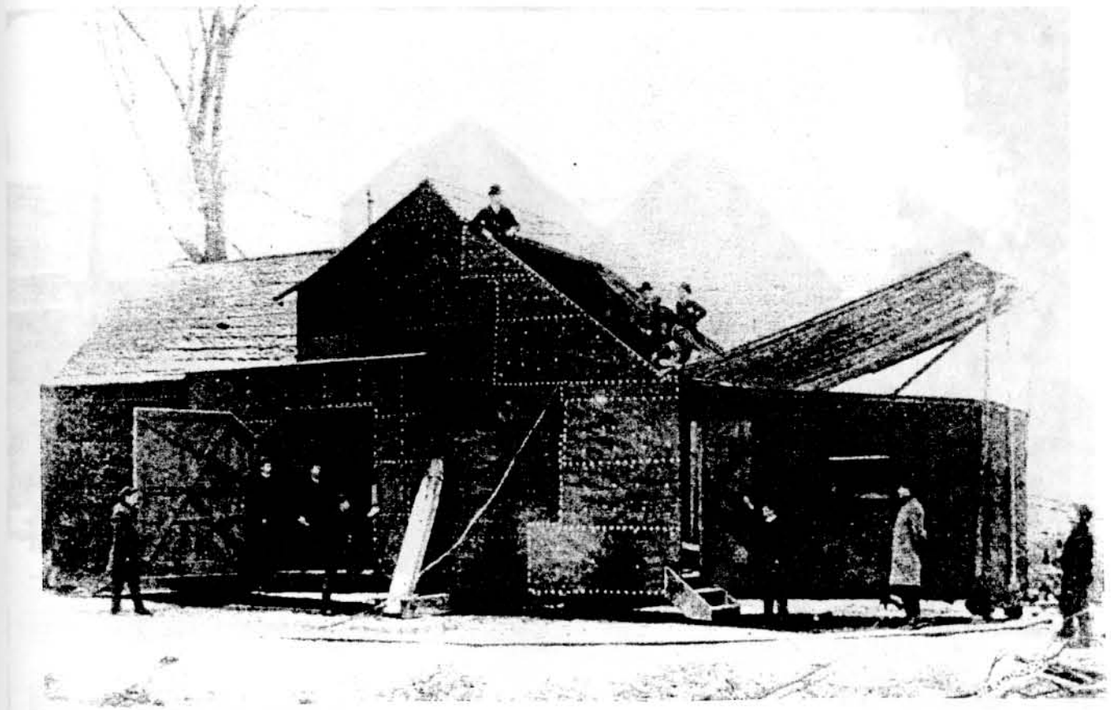

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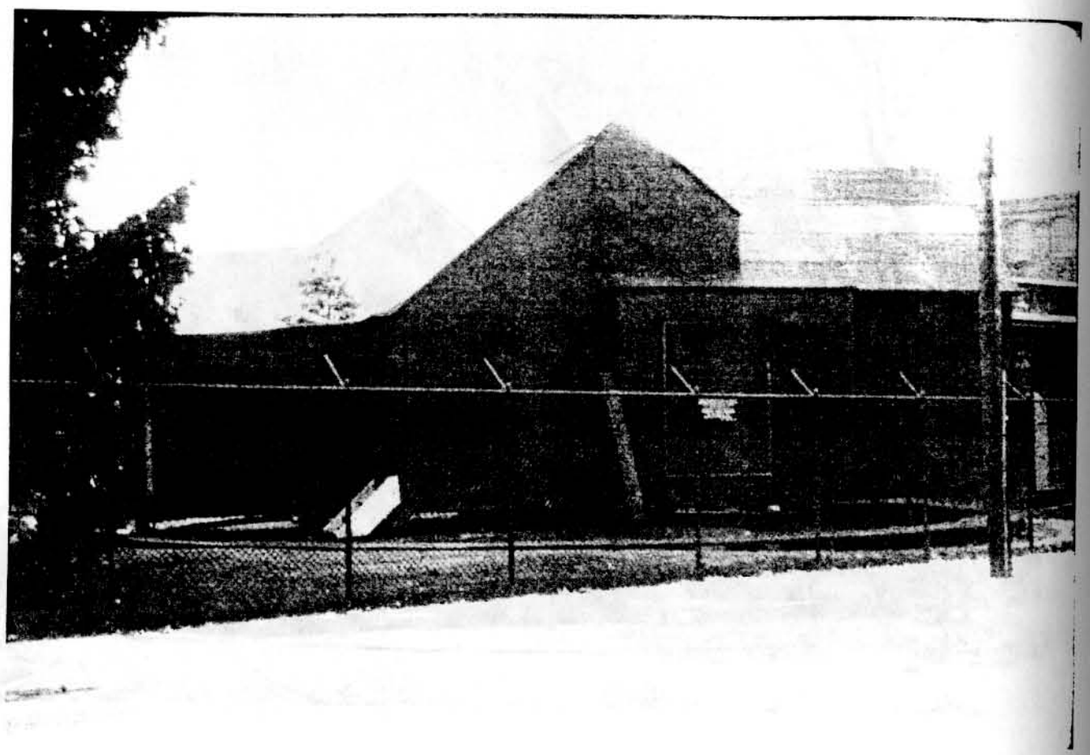


Figure 3.45. *[Source: Photo taken by author, Nov. 1991]*

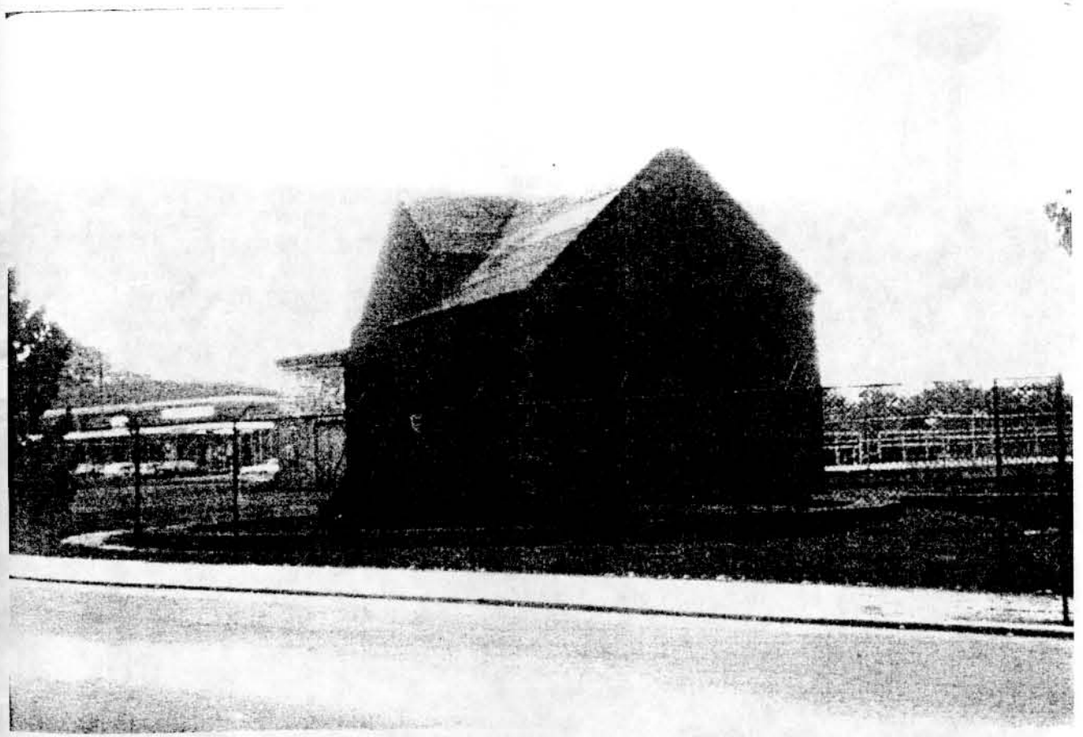


Figure 3.46. *[Source: Photo taken by author, Nov. 1991]*

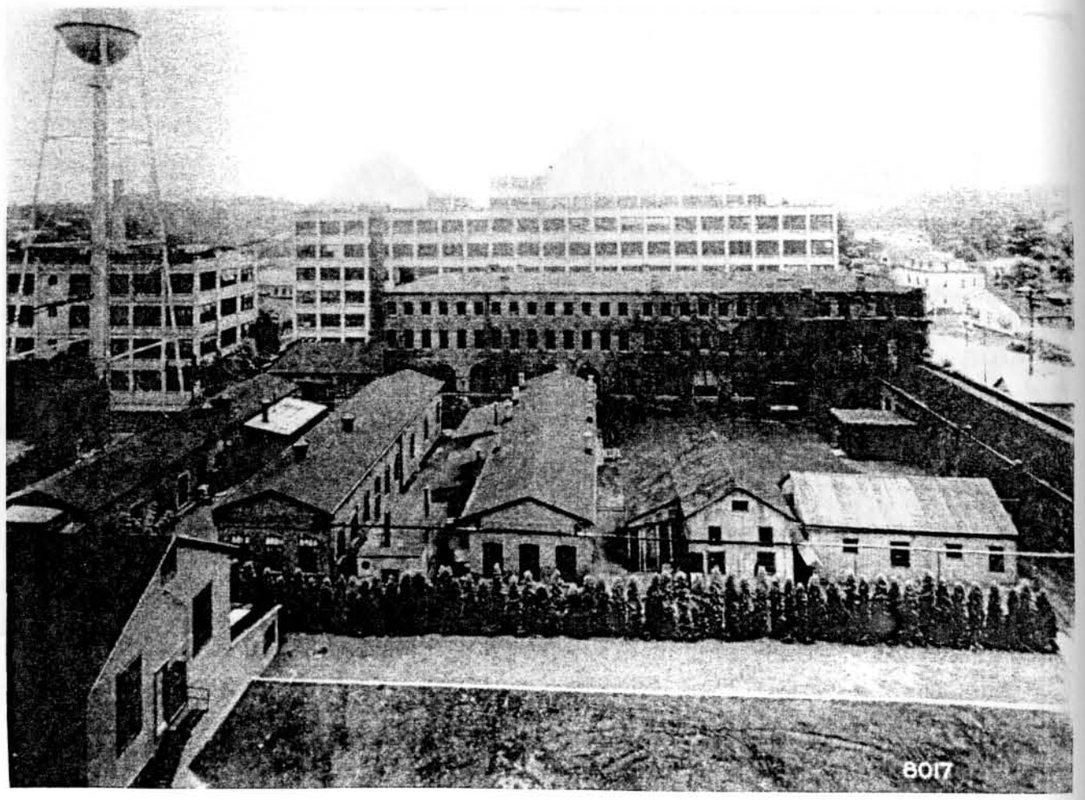
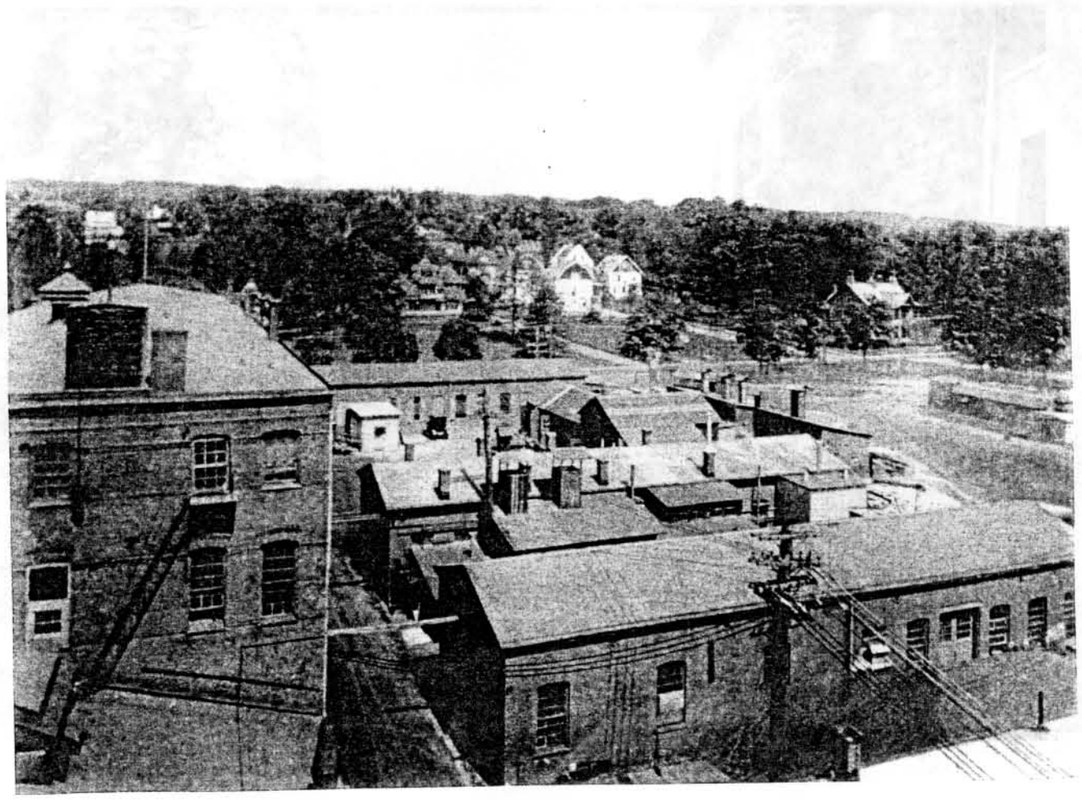


Figure 3.47.



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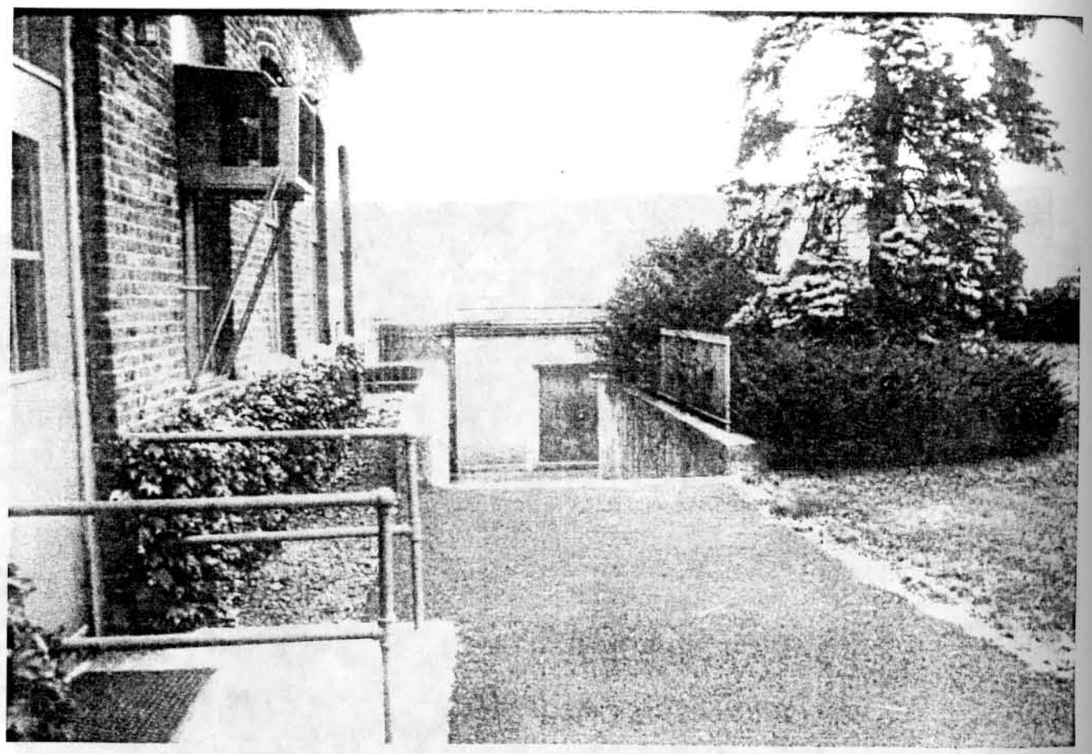


Figure 3.49. *[Source: Photo taken by author, Nov. 1991]*

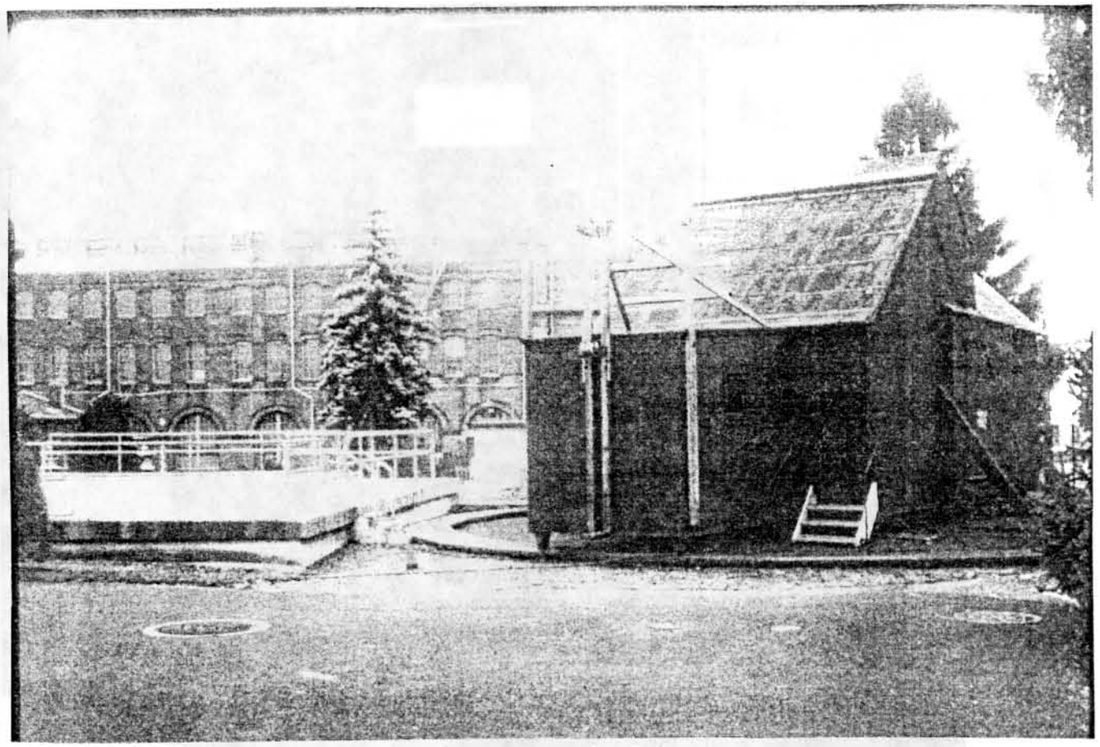


Figure 3.50. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.51. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.52. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.53.

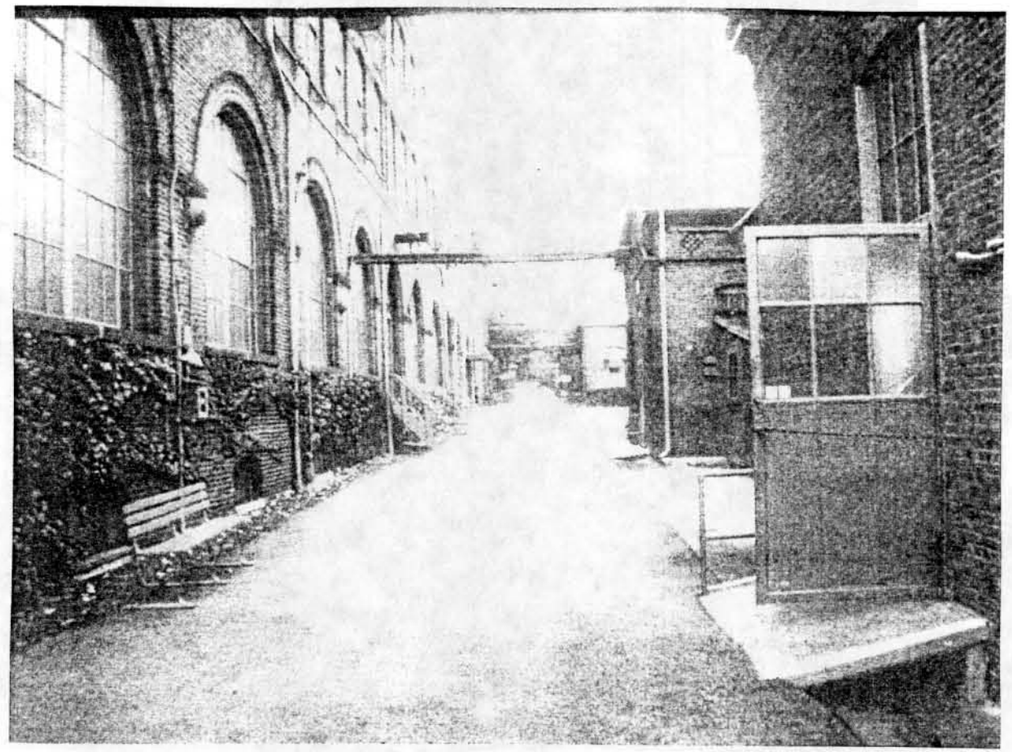
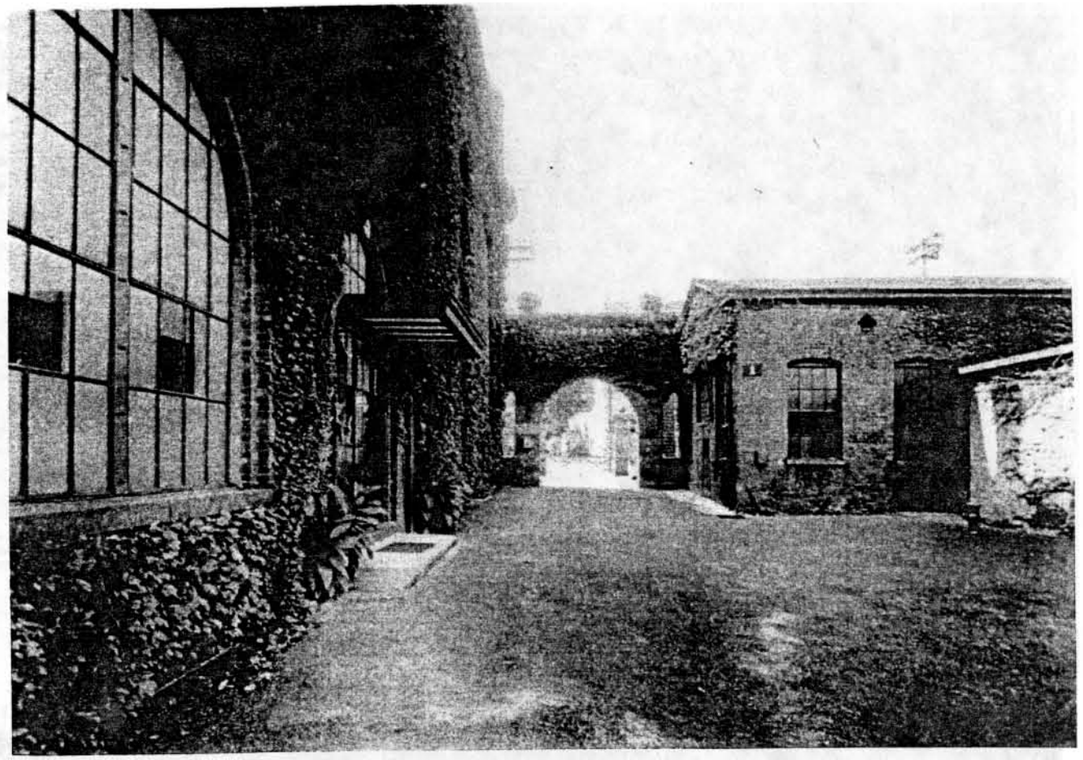


Figure 3.54. *[Source: Photo taken by author, Nov. 1991]*

Figure 3.55.



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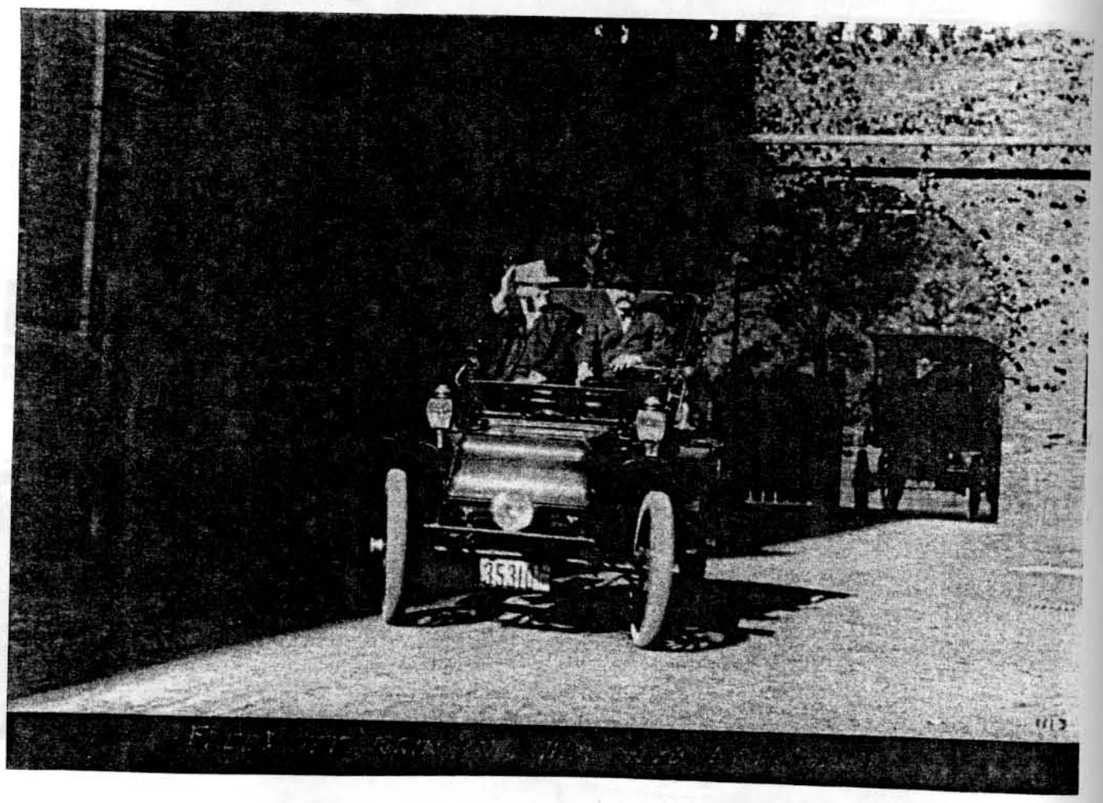

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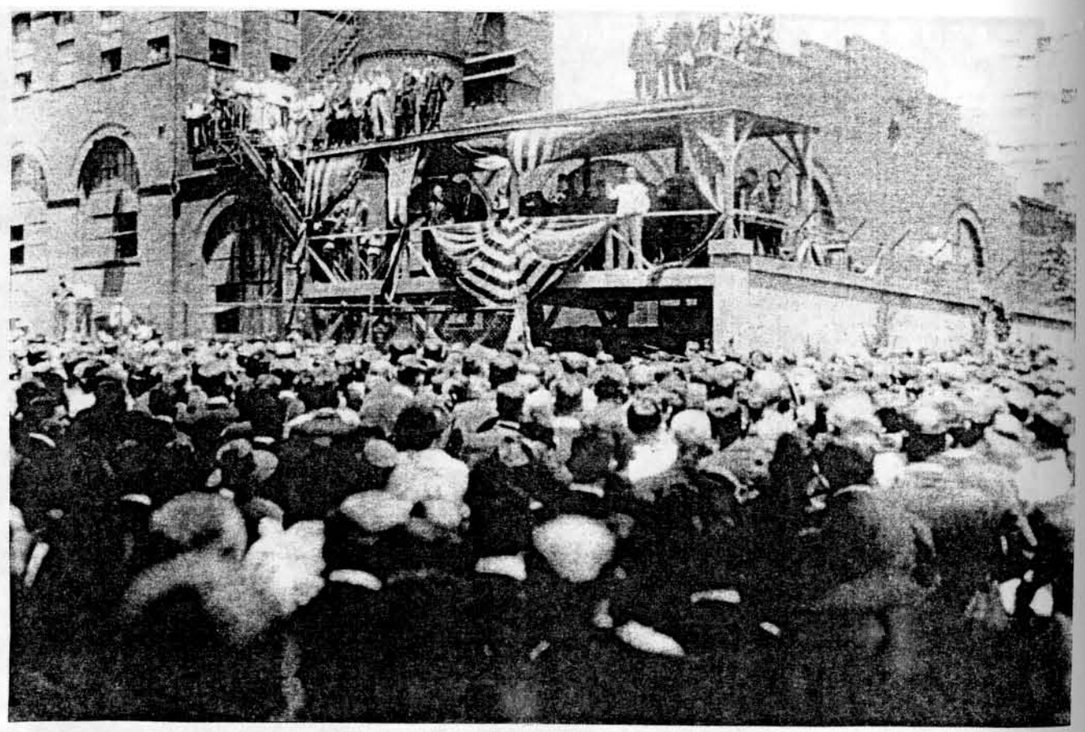
Figure 3.58.



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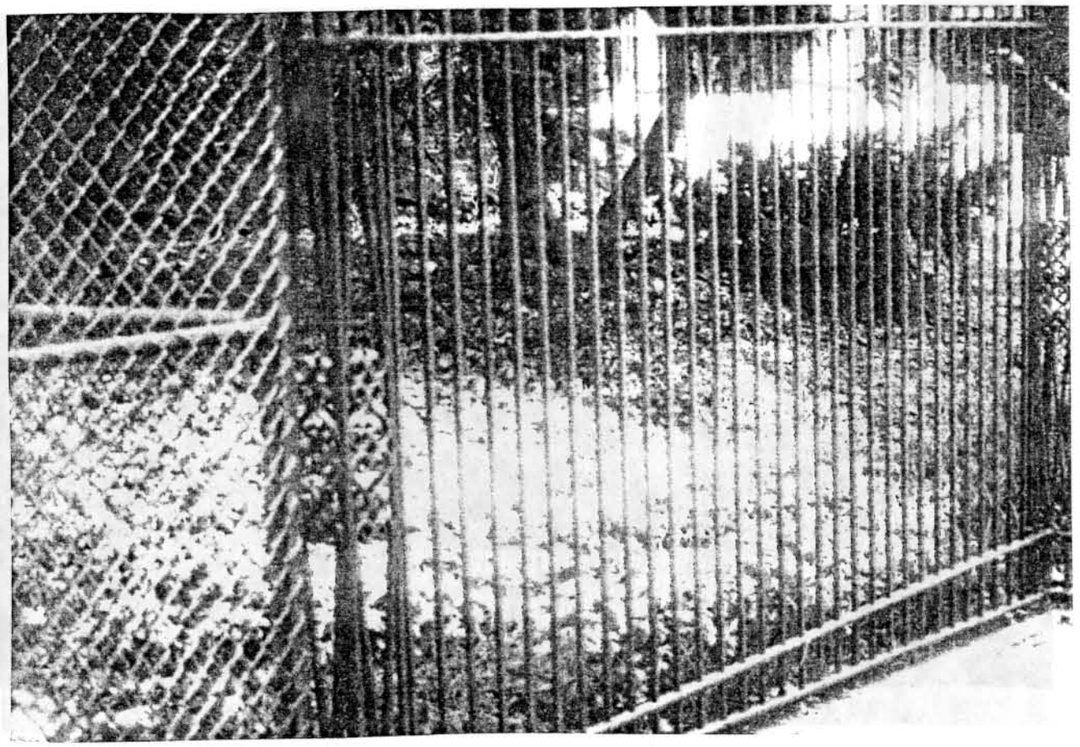


Figure 3.60. [Source: Photo taken by author, Nov. 1991]

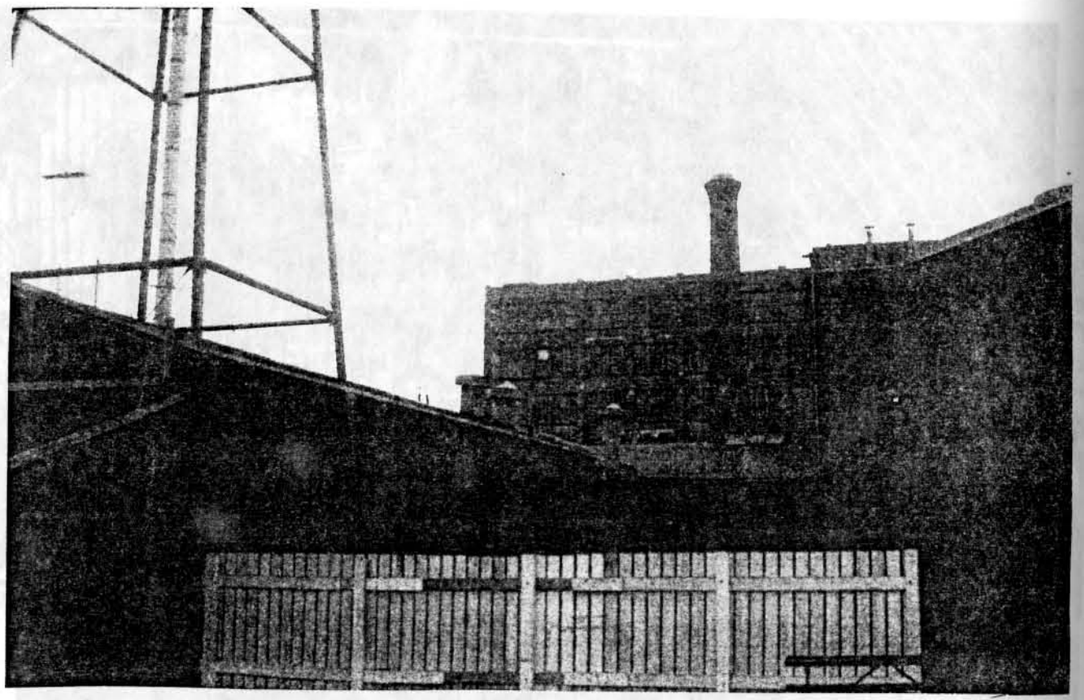


Figure 3.61. *[Source: Photo taken by author, Nov. 1991]*

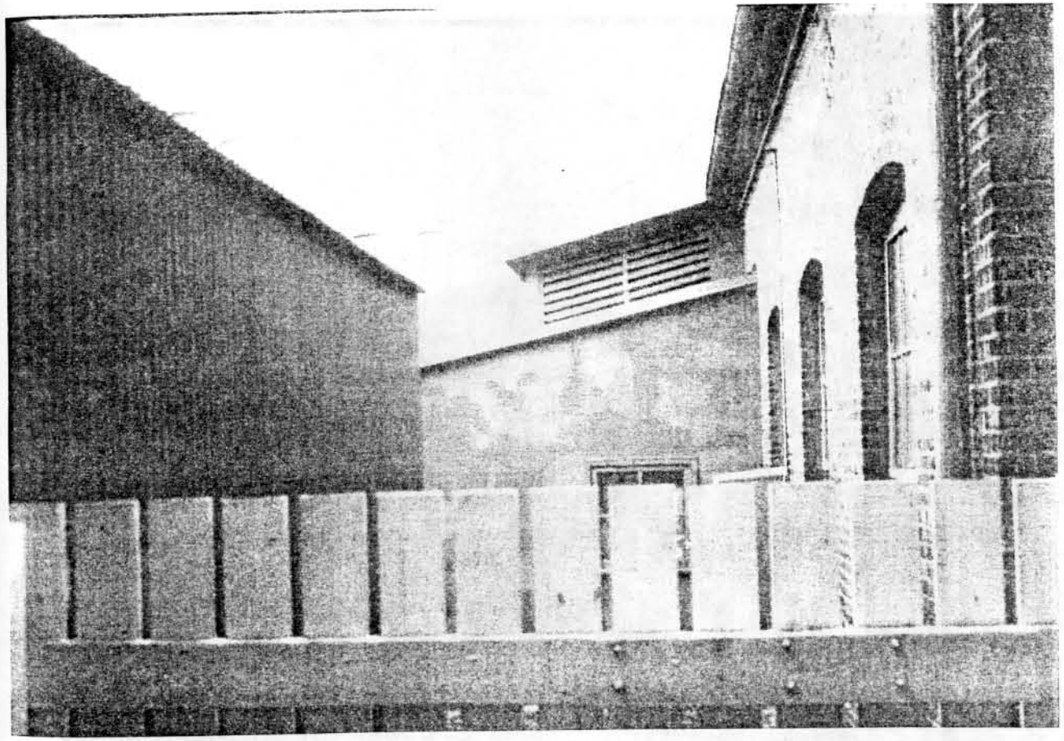


Figure 3.62. *[Source: Photo taken by author, Nov. 1991]*

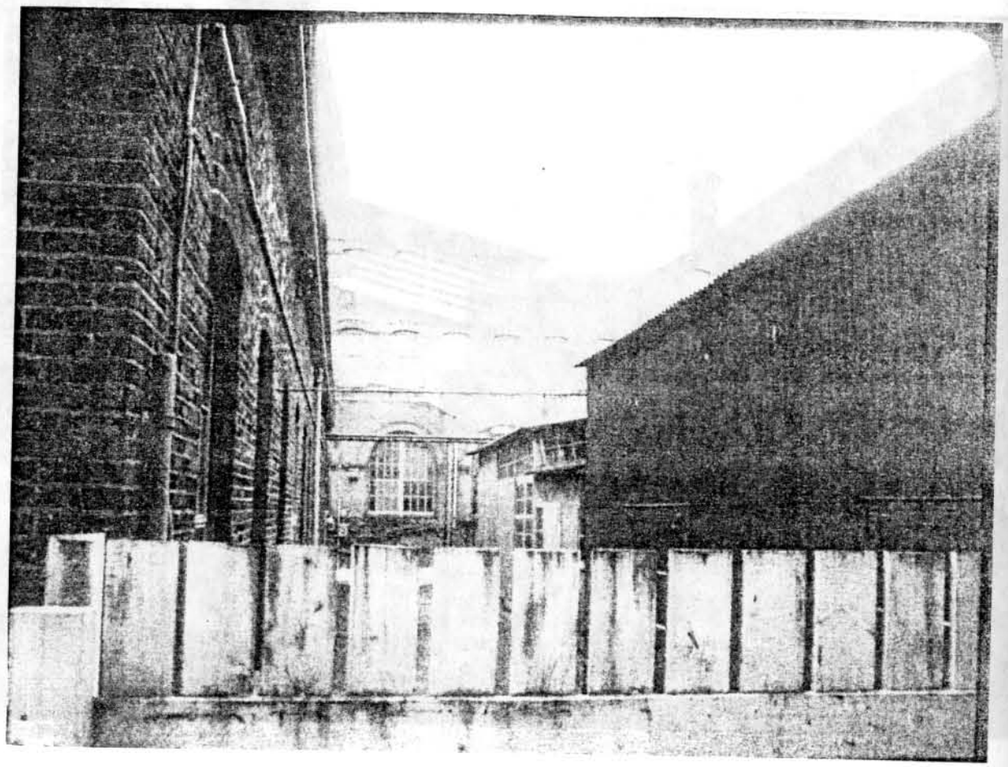
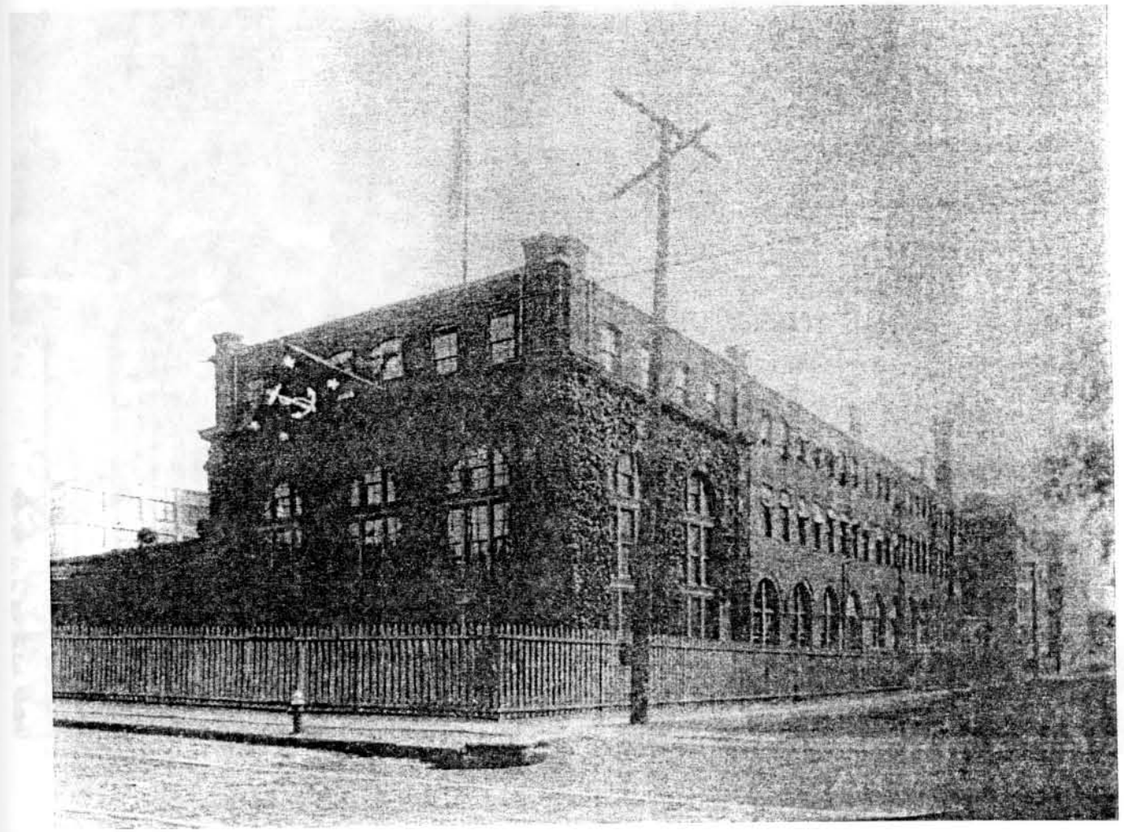


Figure 3.63. [Source: Photo taken by author, Nov. 1991]



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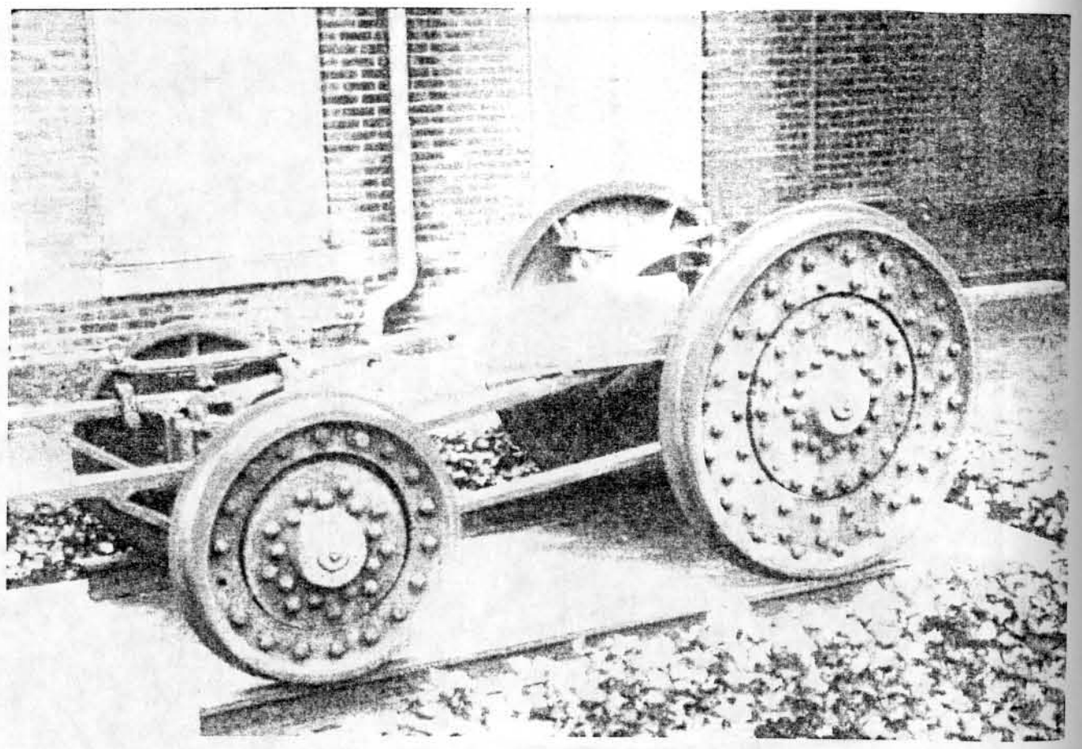

Figure 3.65. [Source: Photo taken by author, Nov. 1991]

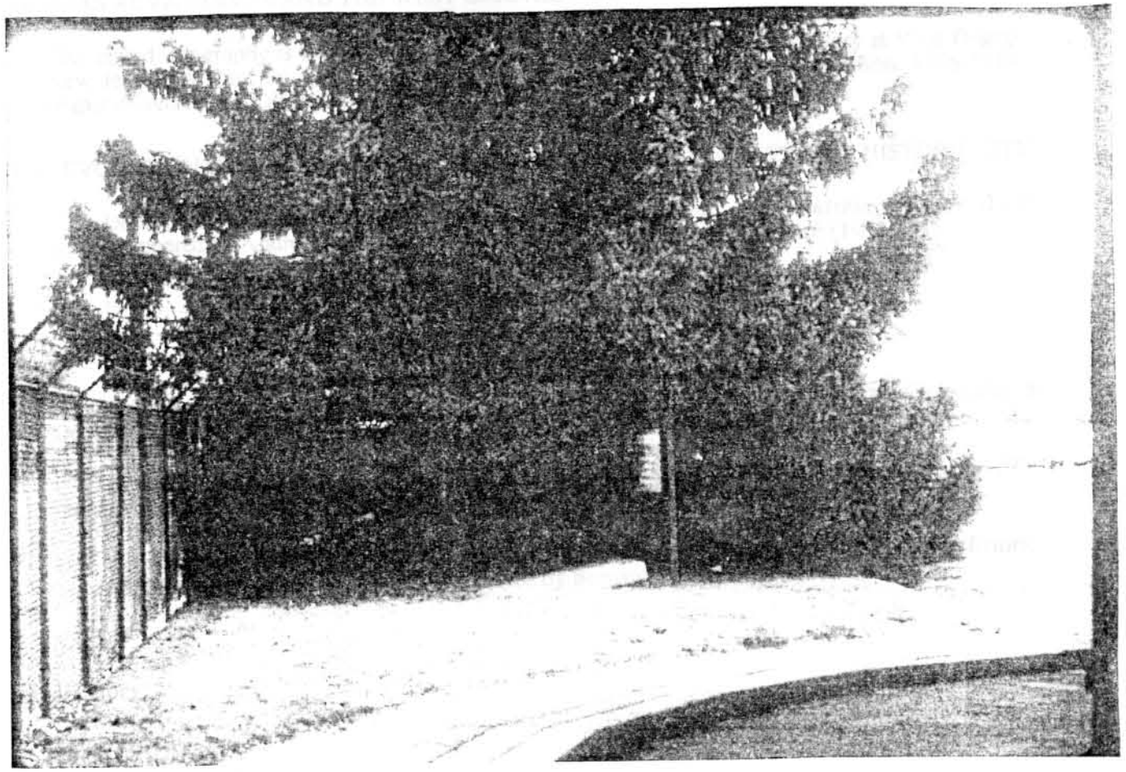

Figure 3.66. [Source: Photo taken by author, Nov. 1991]

ENDNOTES

Introduction

THOMAS ALVA EDISON AND THE WEST ORANGE PLANT

1 This edited biography is from, Bernard W. Carlson, "Thomas Edison's Laboratory at West Orange, New Jersey: A Case Study in Using Craft Knowledge for Technological Invention, 1886-1888" (Paper delivered at a Centennial Symposium, West Orange, N.J., April 25,1987).

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THOMAS ALVA EDISON STEWARDSHIP: 1900-1914

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132 Plate 1, Plates of the West Orange plant (Given to Edison as a birthday present), 1917, Building No. 12, Edison National Historic Site Archives, West Orange, New Jersey.

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THOMAS ALVA EDISON STEWARDSHIP: 1915-1931

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APPENDIX A

Introduction:

The following reproductions are part of a series of photographs taken of the Edison Laboratories in 1939. These photographs are part of a preservation plan initiated by Charles Edison shortly after Edison's death. They illustrate the exterior conditions of the Edison Laboratories during T.A.E. Inc.'s Stewardship of the site. At the beginning of the series is a reproduction of a photograph that illustrates, through the use of a map of the site, the exact locations from which the photographs were taken.

ALDEN STREET
LAKESIDE AVENUE
MAIN STREET
EDISONIA TERRACE
CAT. #547
19
21
39
24
22
25
32
4
6
3
7
2
5
11
10
8
1
9
23
33
R001
R002
R003
R004
R005
R006
R007
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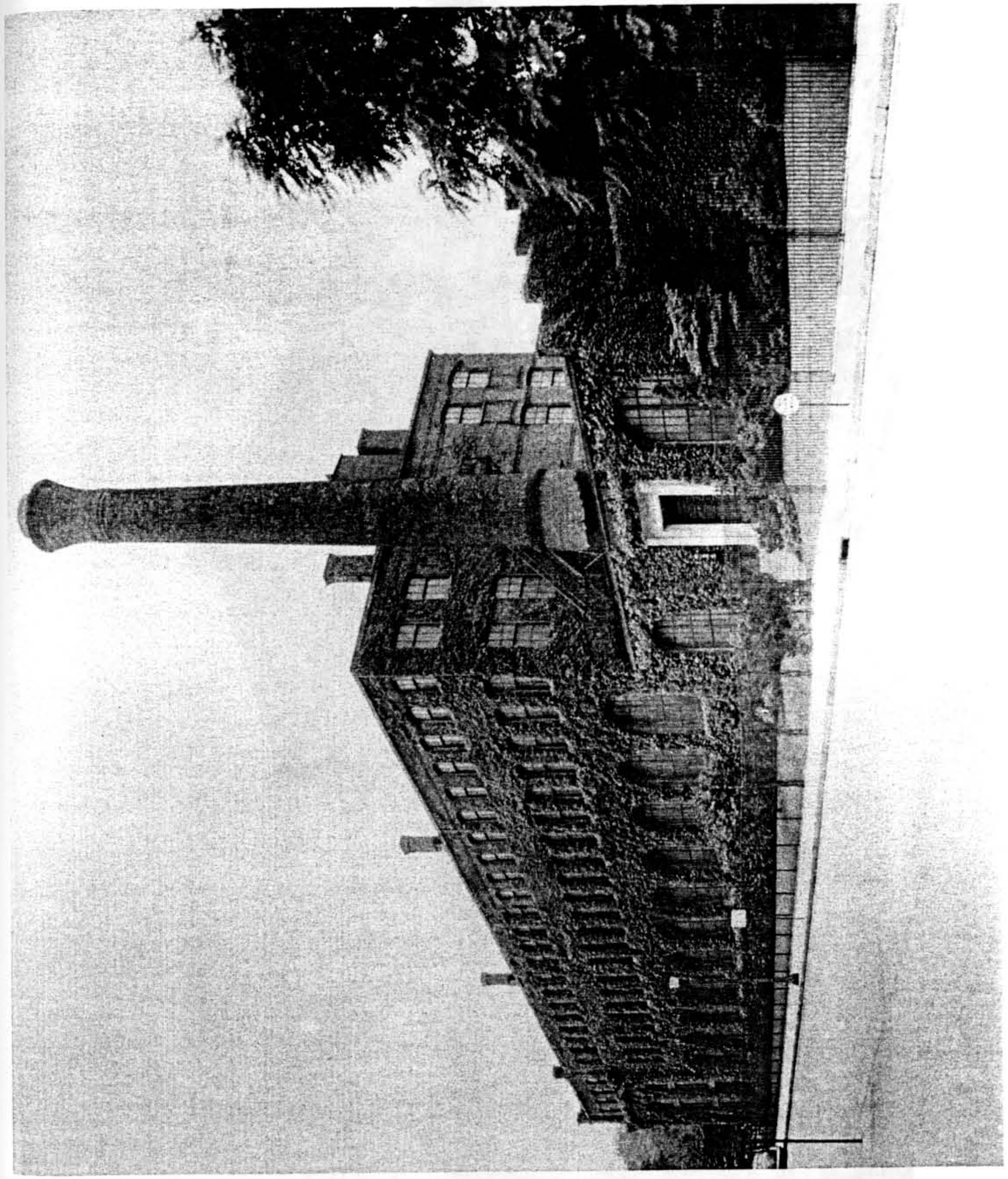
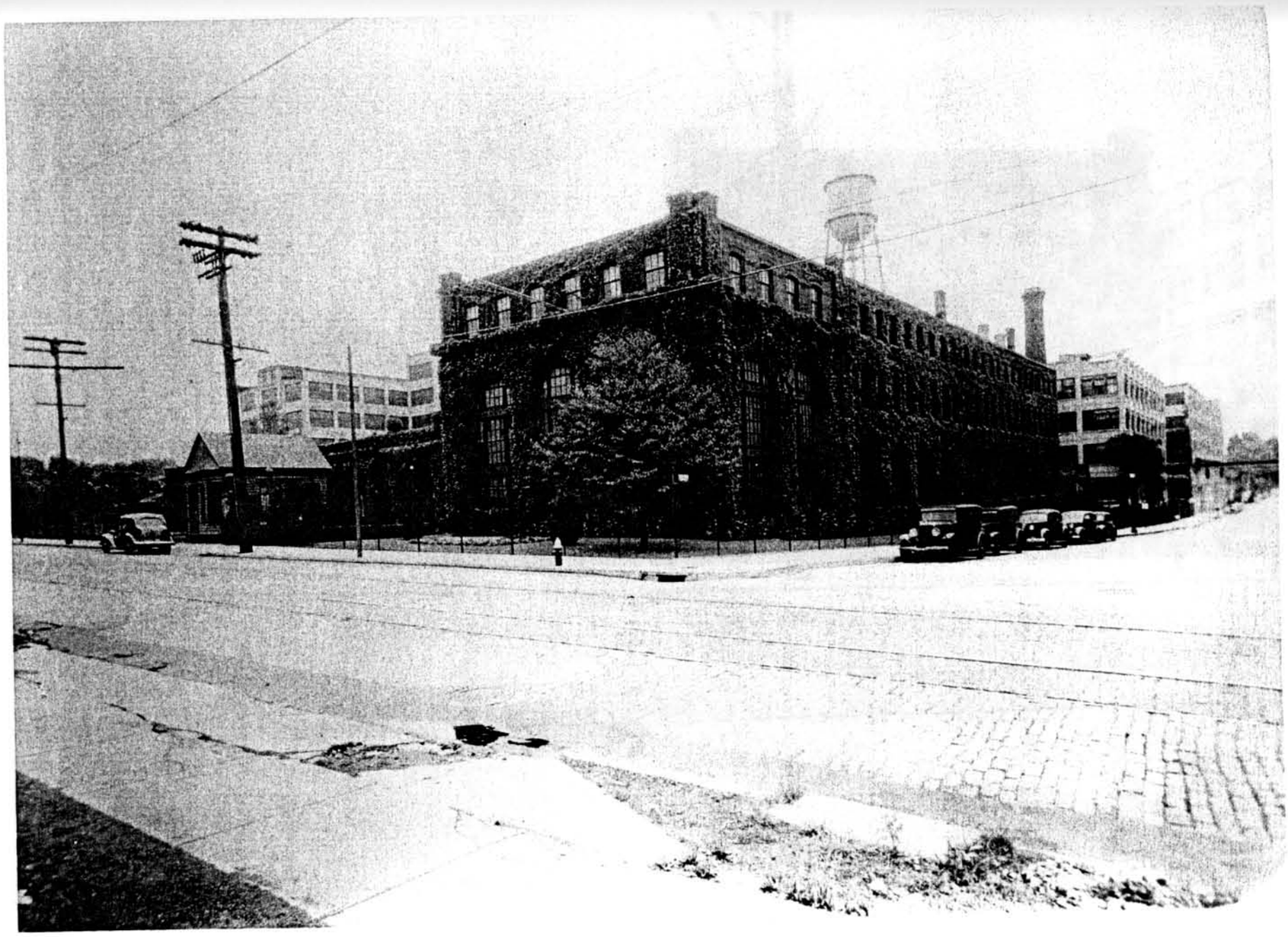
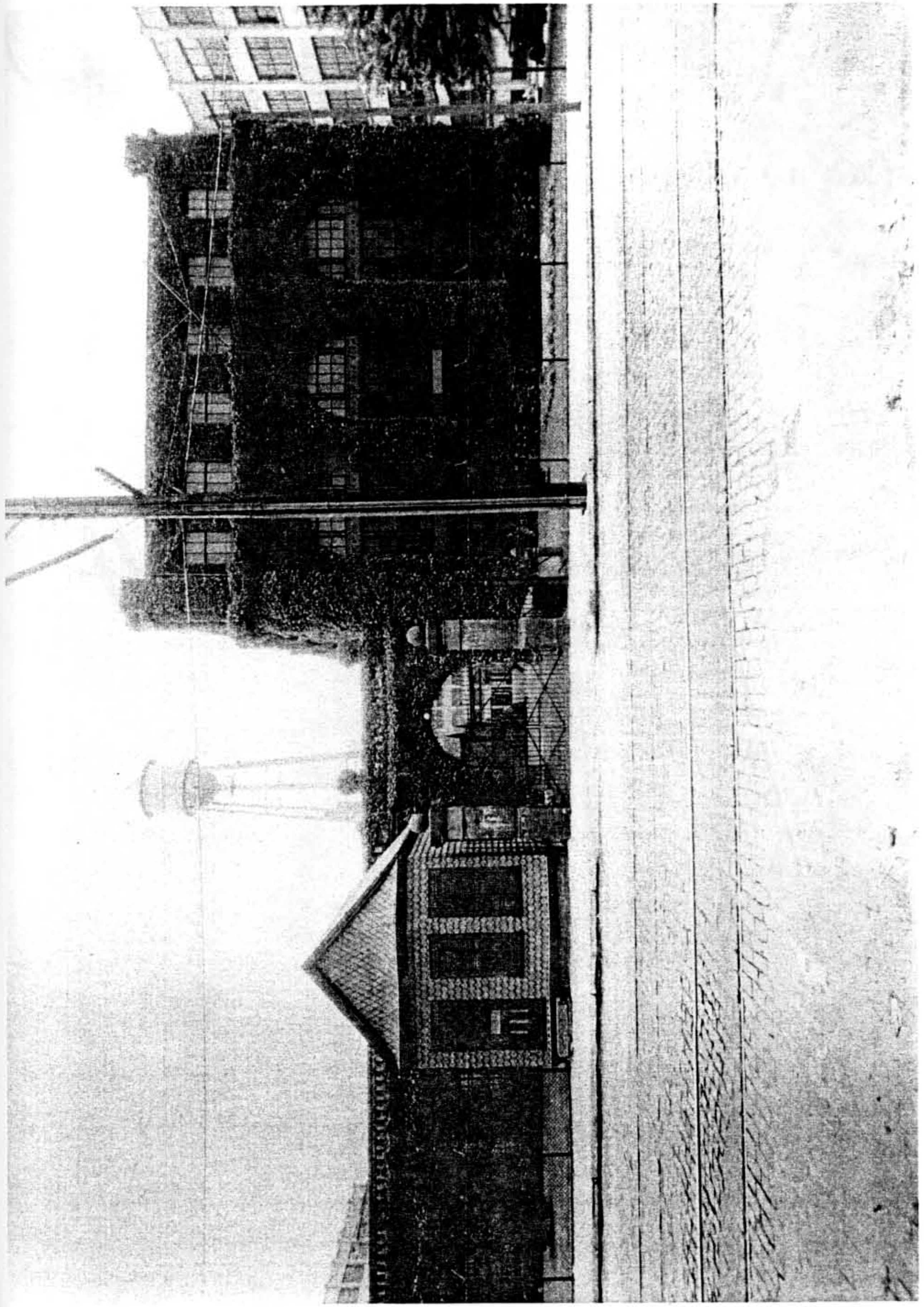
SCALE IN FEET
0 10 20 30 40 50 100







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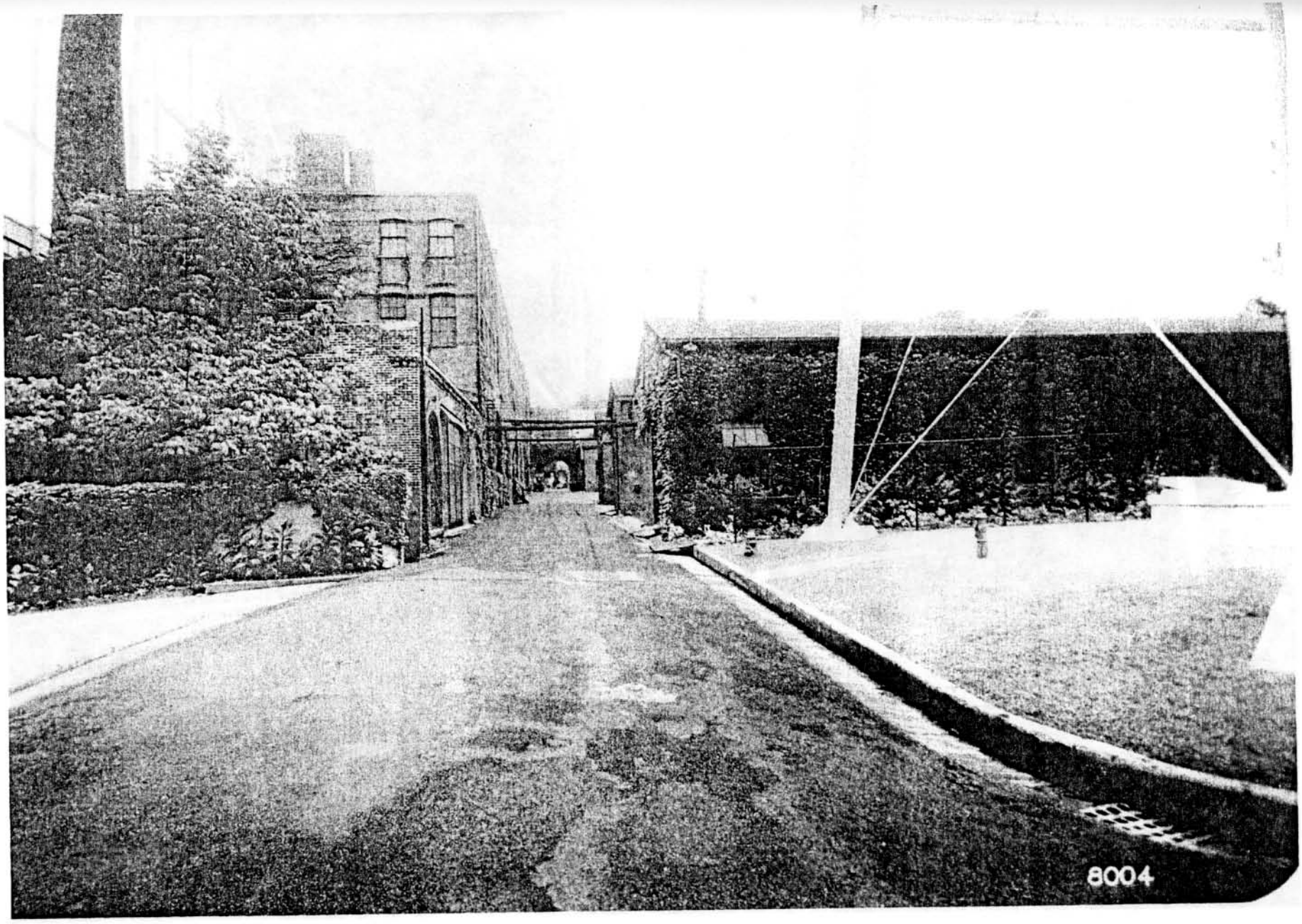
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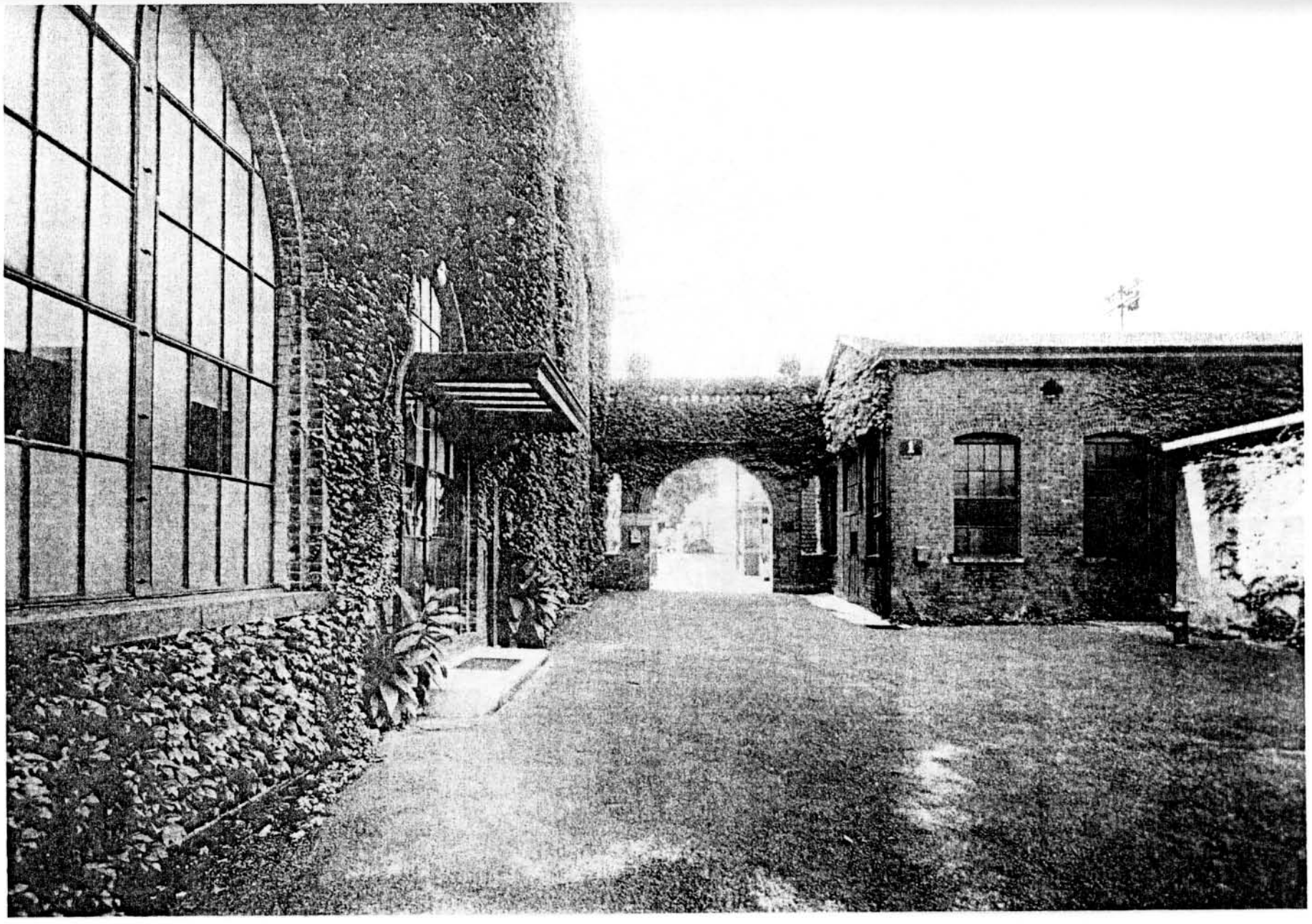

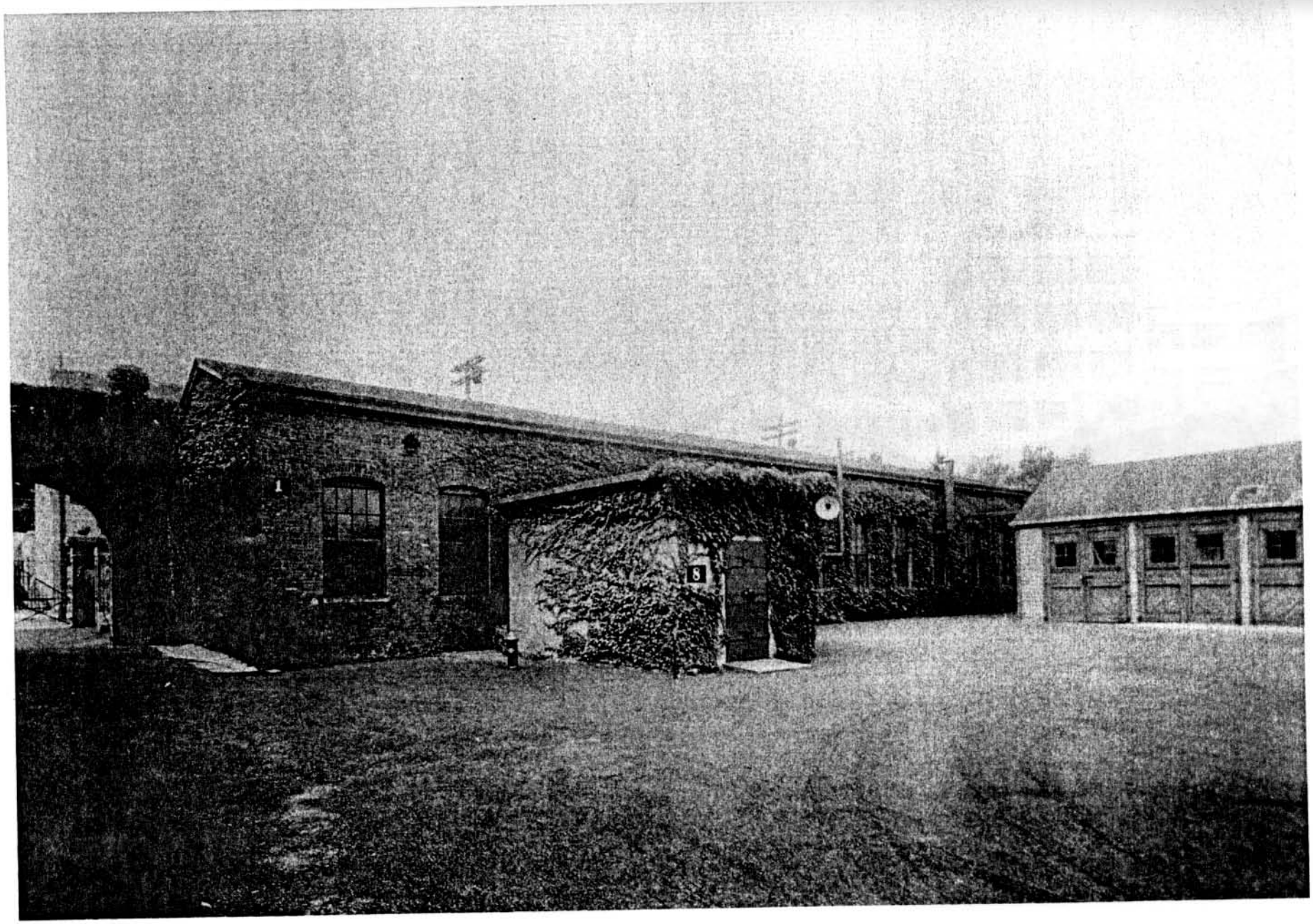
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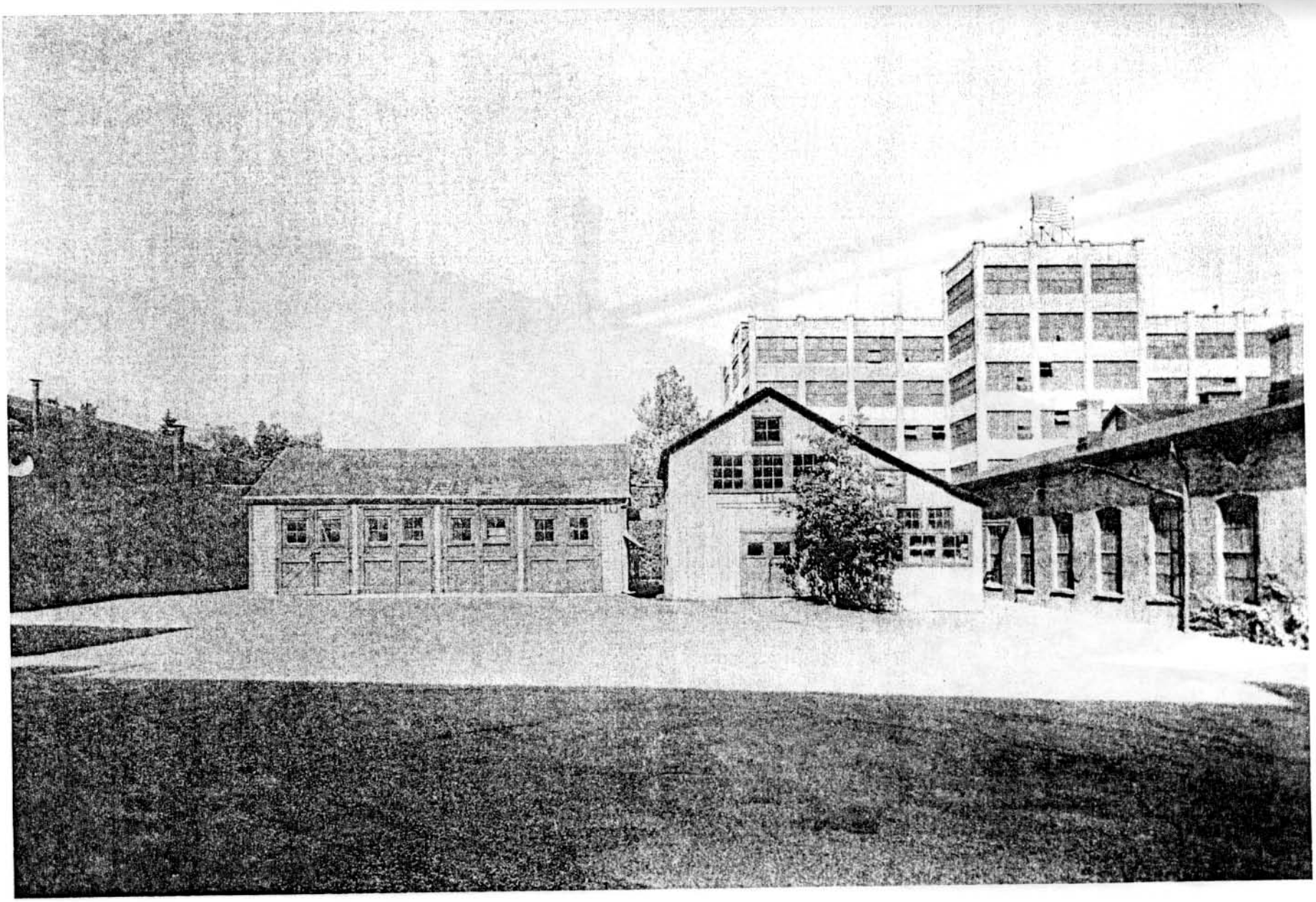

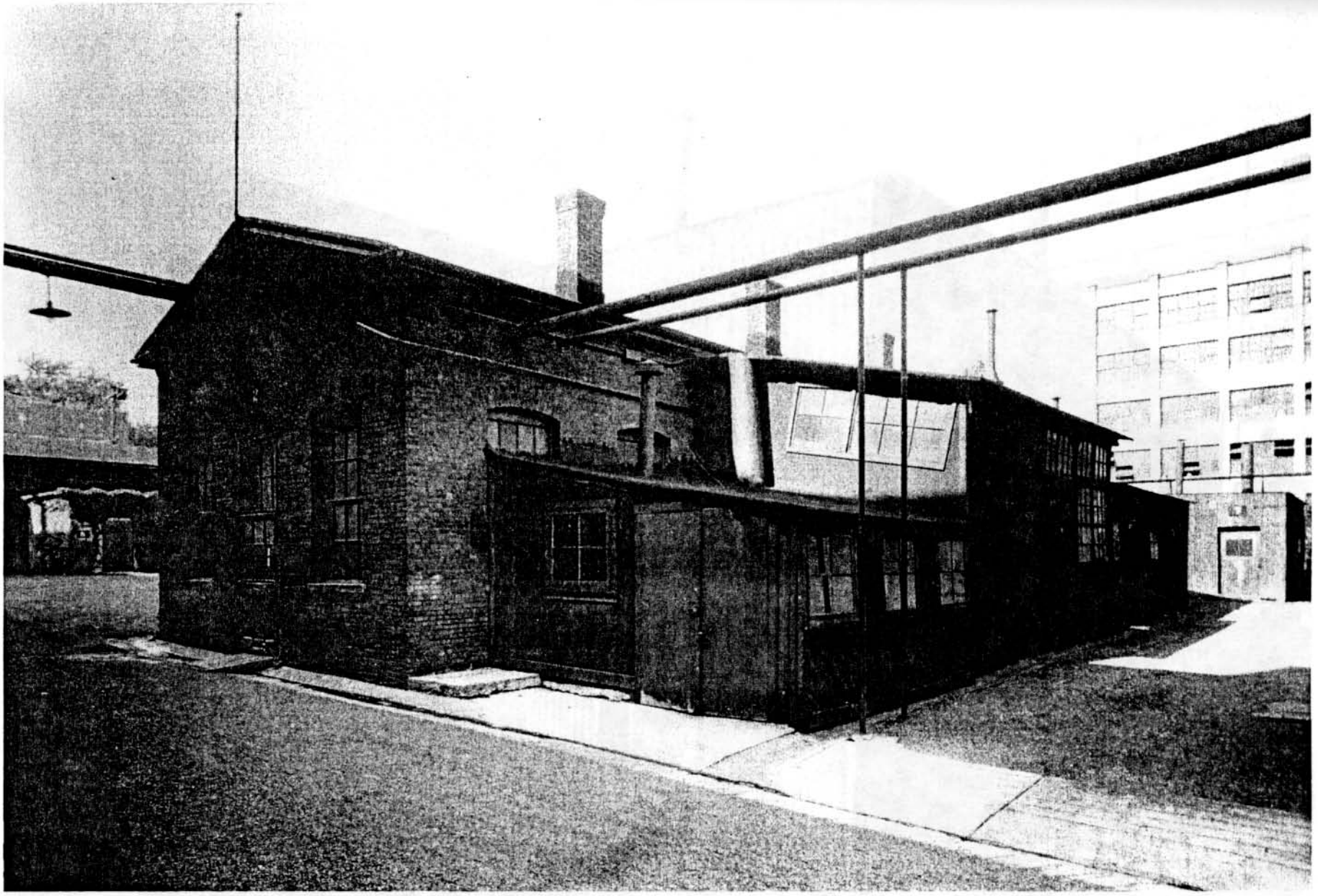

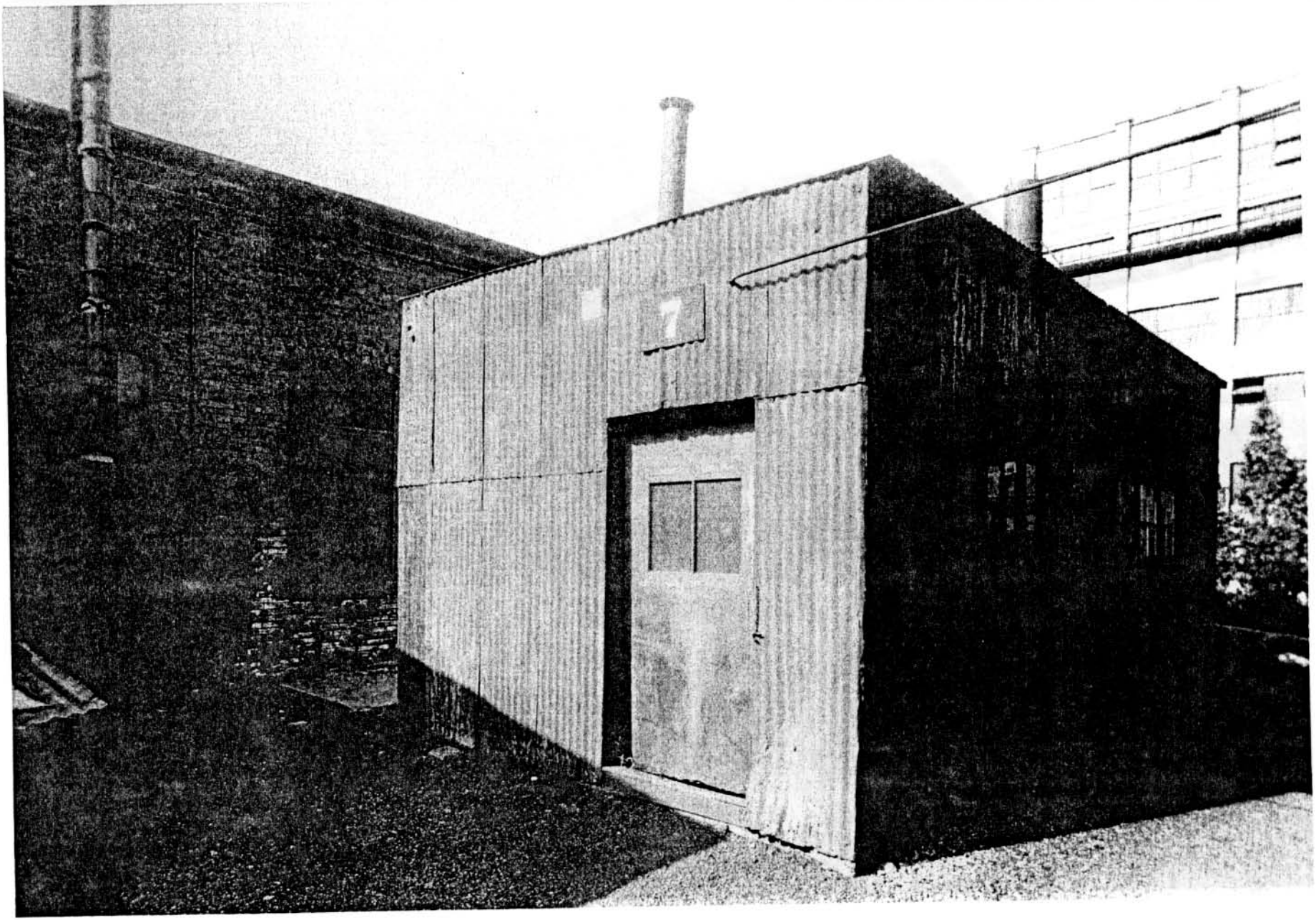
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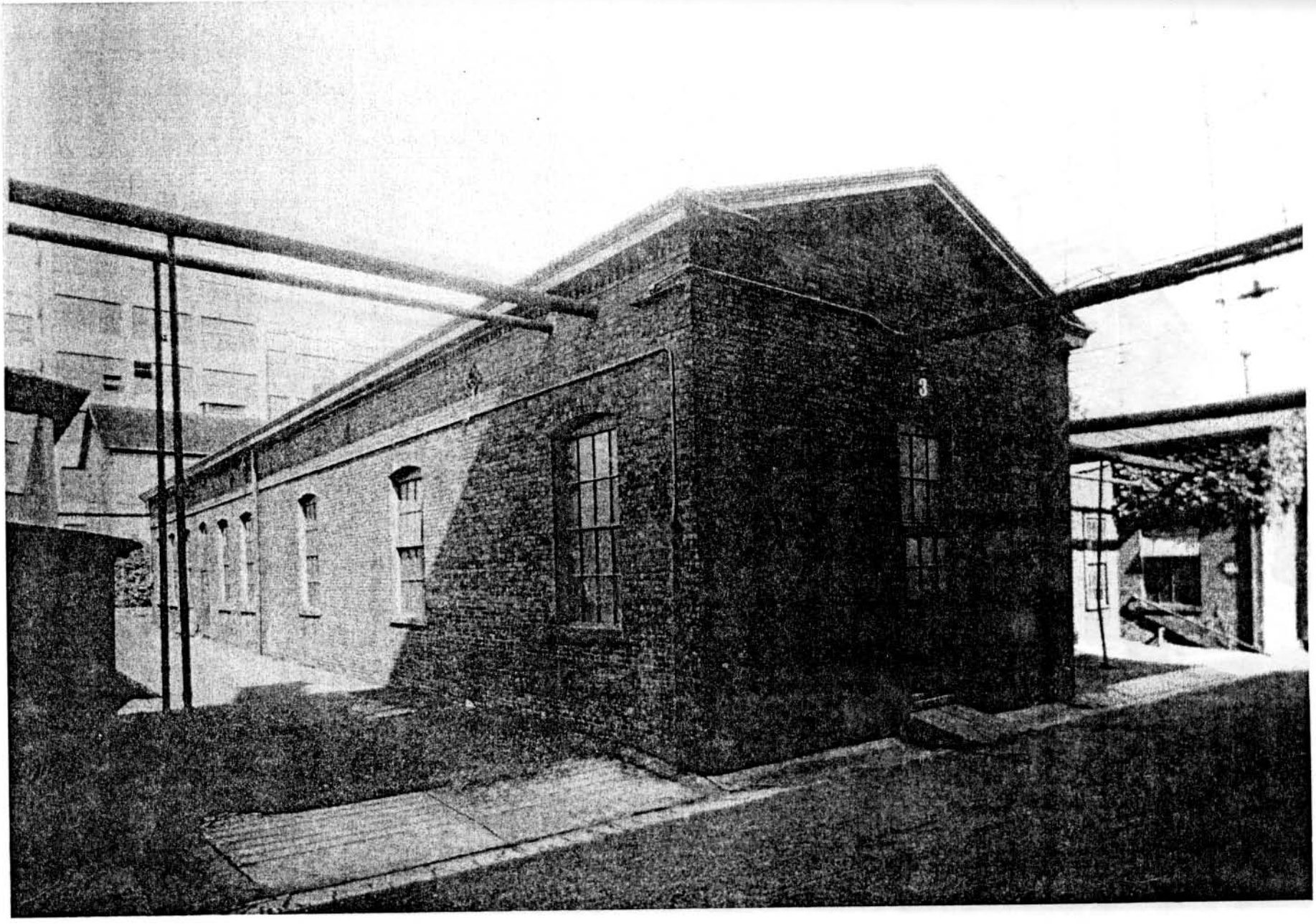
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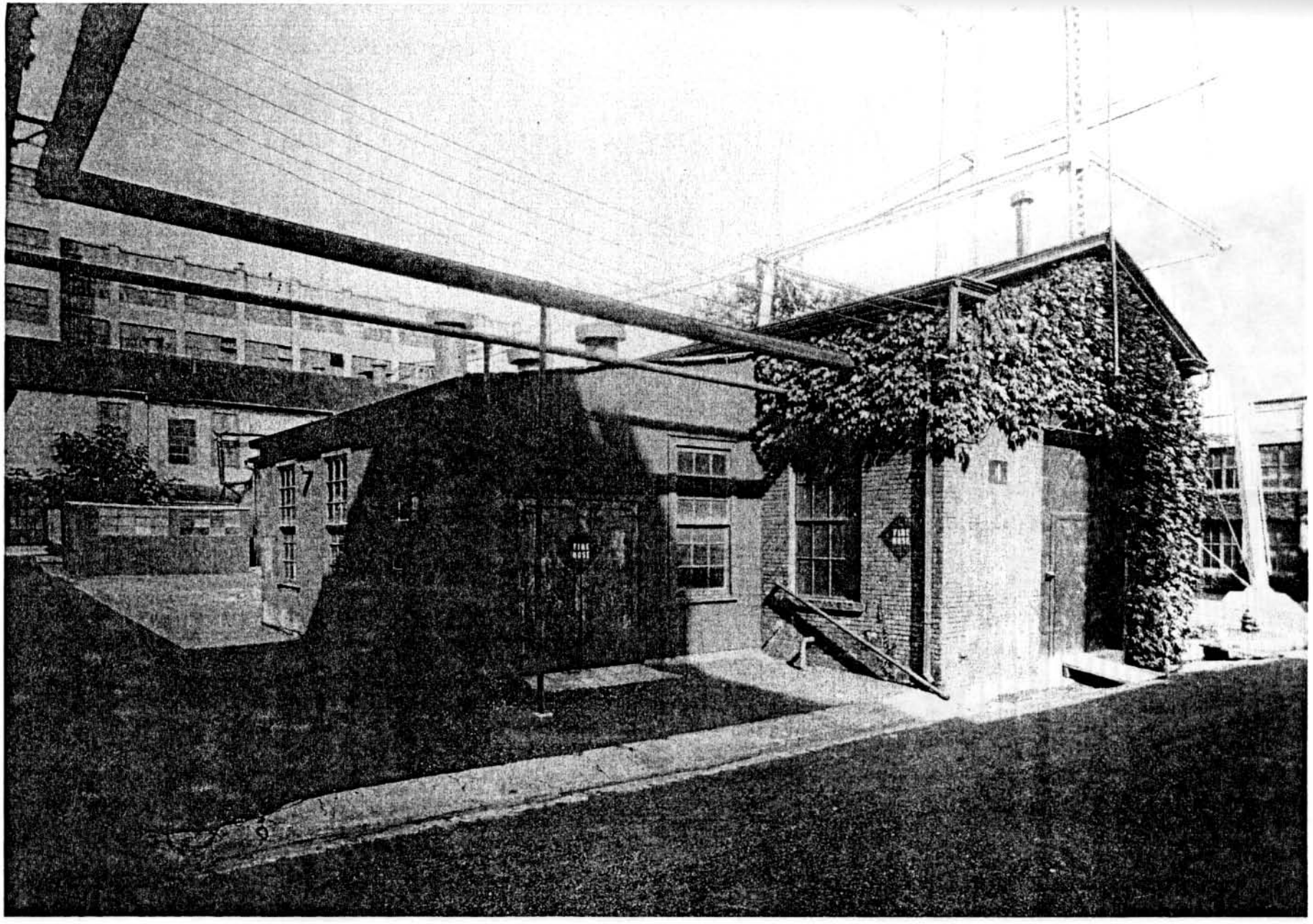
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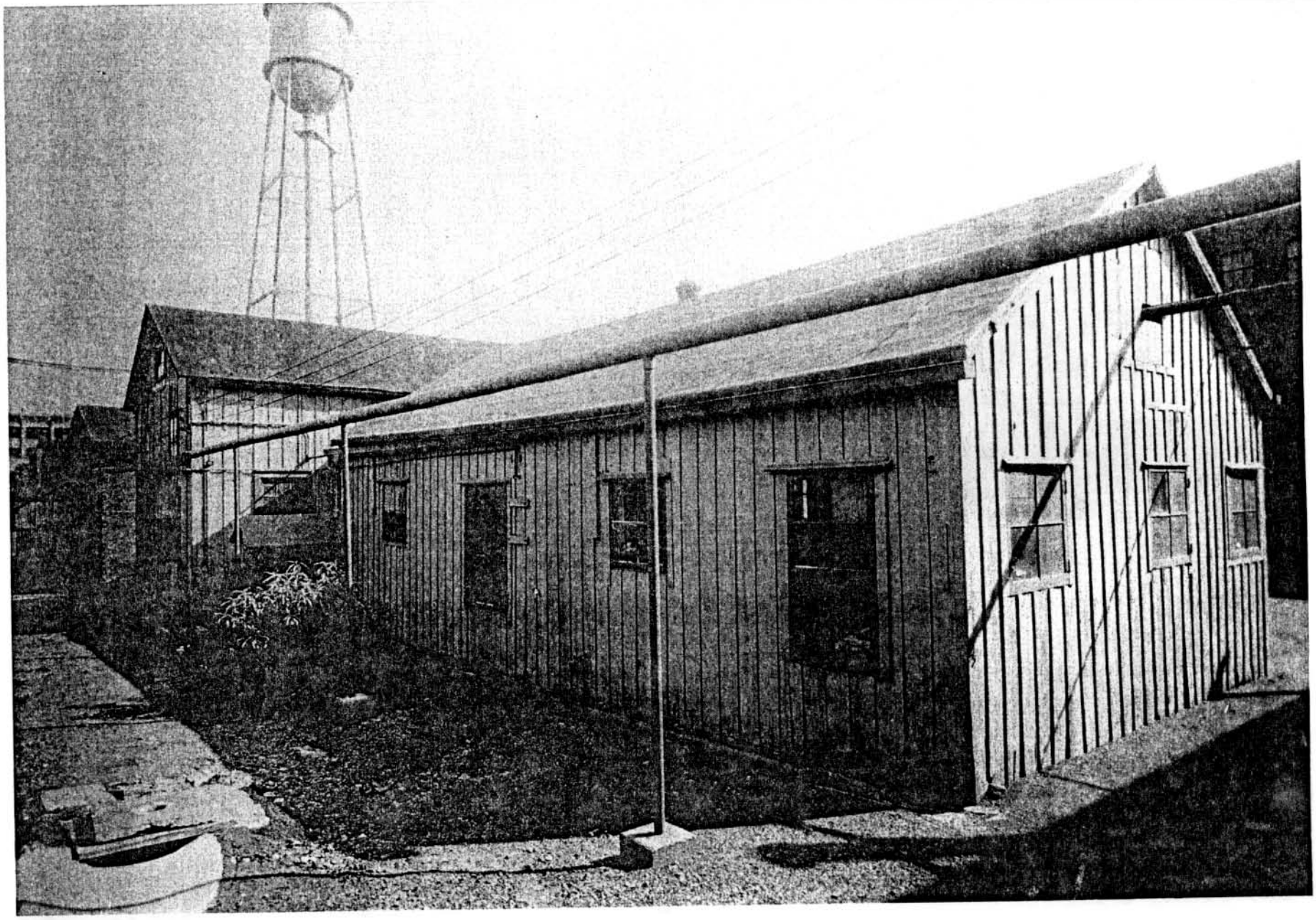

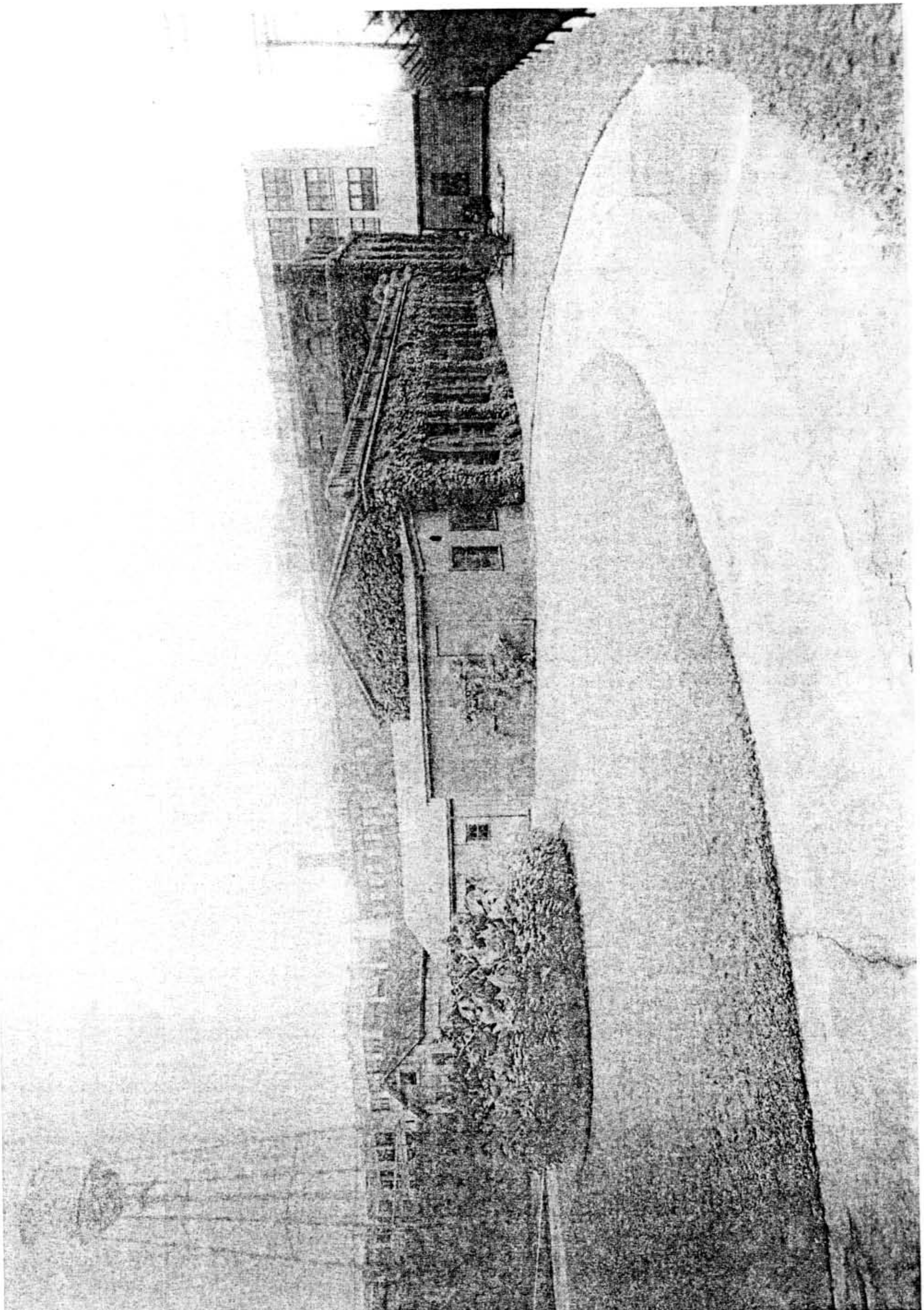

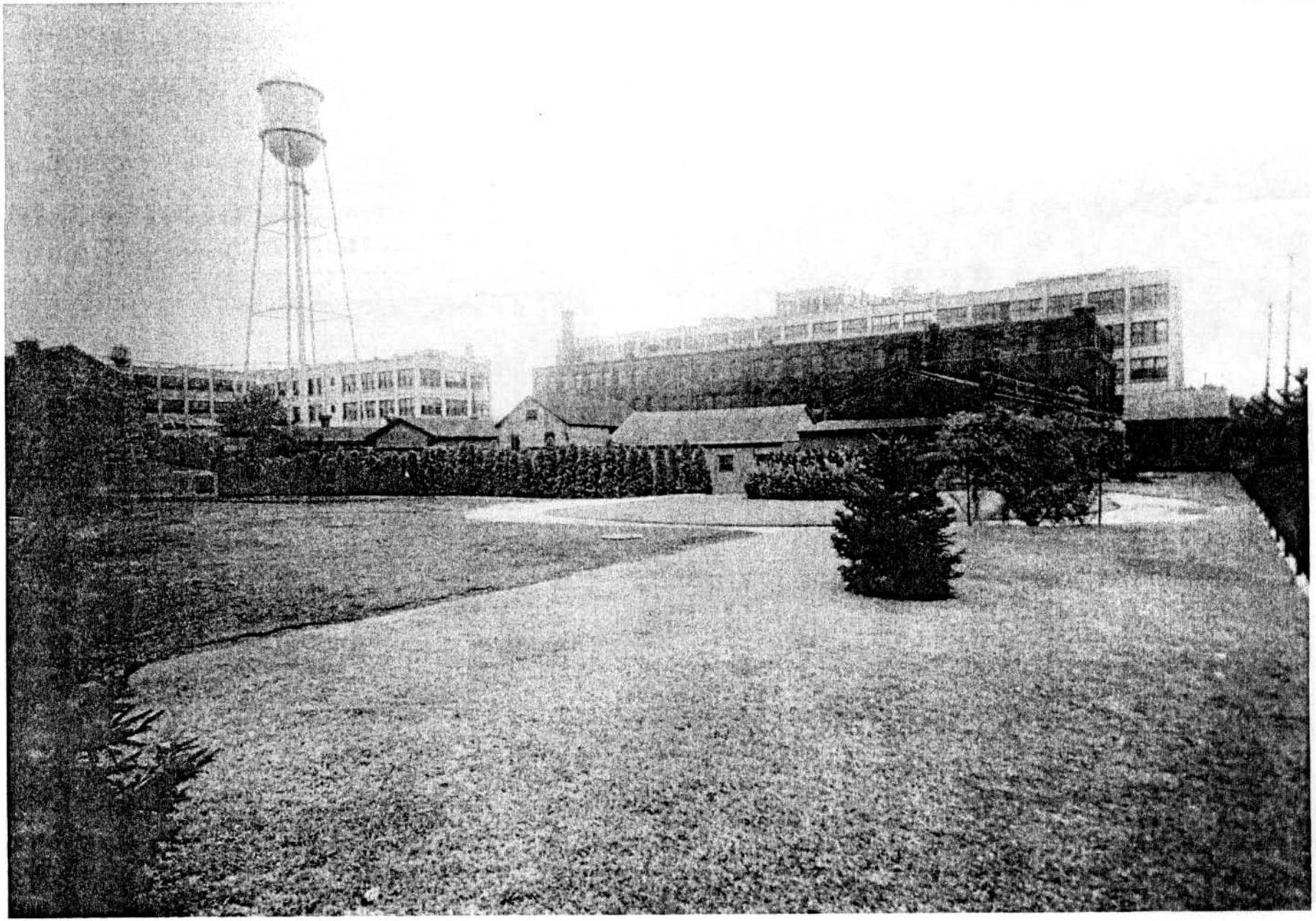

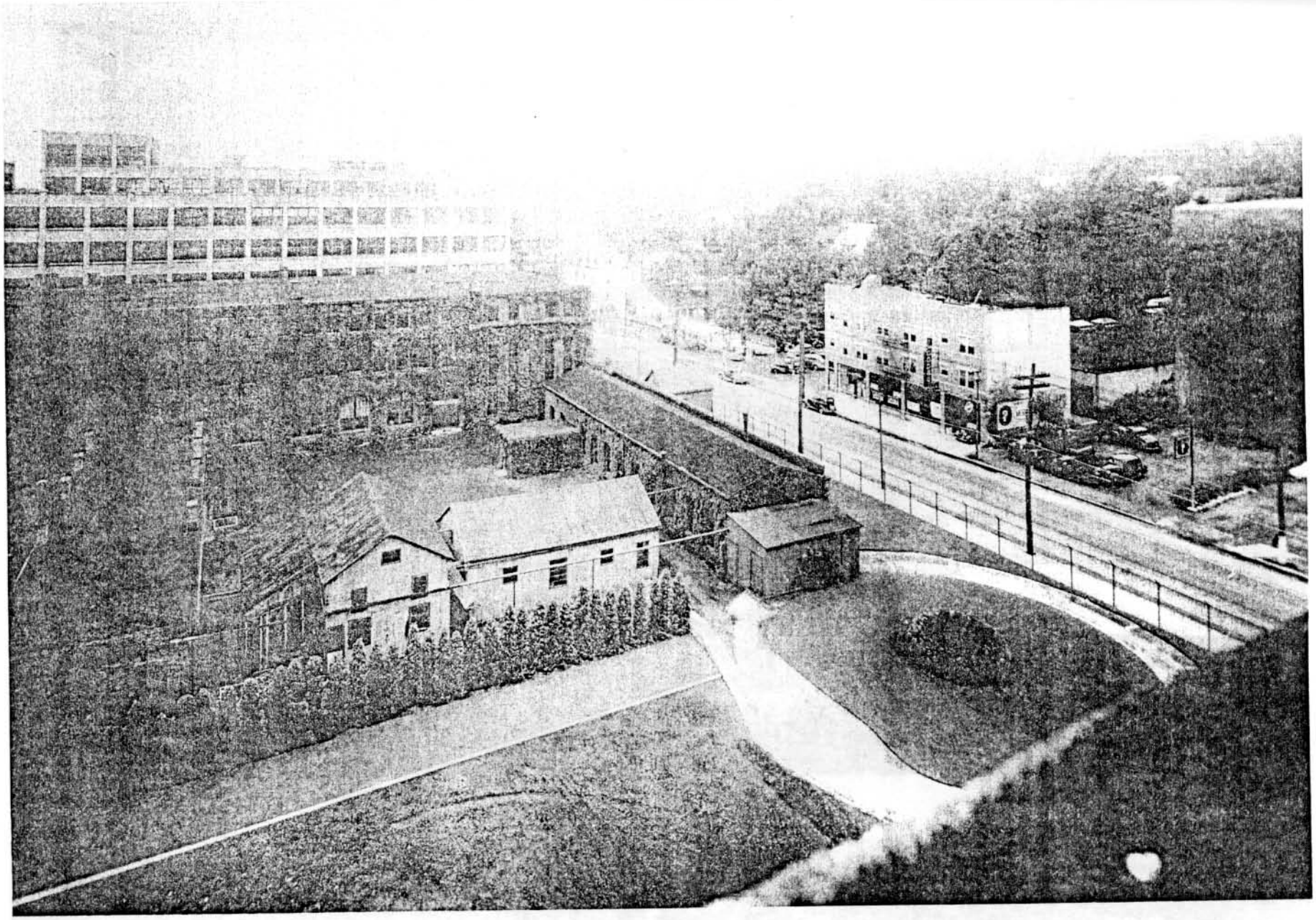

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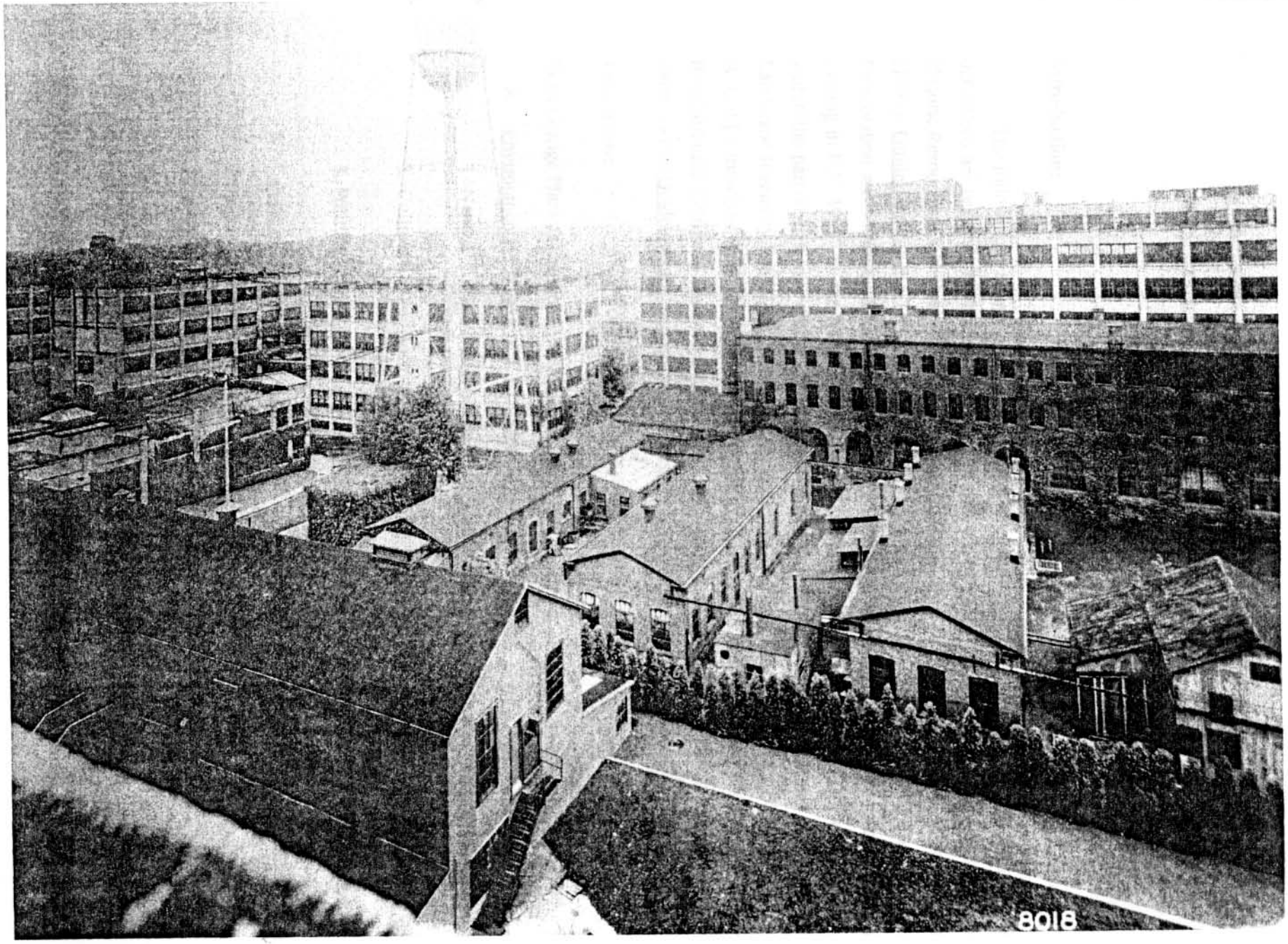
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APPENDIX B

Introduction:

The following is a copy of the landscape category definitions used through out the report. These definitions are based on the combination of three references: "The Physical Treatment of Cultural and Historic Resources: Guidelines for Rehabilitating Designed Historic Landscapes," by Chris Capella Peters (1990); Guidelines for the Treatment of Historic Landscapes (Draft), by the National Park Service Preservation Assistance Division; and the "Cultural Landscape Inventory Draft User Manual for Field Testing in F.Y. 1992" by the National Park Service Historic Architecture Division. The letter notation within the parenthesis following each category indicates its source: [C.L.I.] - indicates that "Cultural Landscape Inventory Draft User Manual for Field Testing in F.Y. 1992" is the source of the definition; [C.C.P.] - indicates that "The Physical Treatment of Cultural and Historic Resources: Guidelines for Rehabilitating Designed Historic Landscapes" is the source of the definition; [N.P.S. Guidelines] - indicates that Guidelines for the Treatment of Historic Landscapes (Draft) is the source of the definition.

Definitions:

West Orange Plant description

A. Environmental Context: [C.L.I.] - external influences

   1. Natural (i.e., Natural influences within West Orange plant that affected the West Orange plant)

   2. Cultural (i.e., Sociocultural influences within West Orange that affected the West Orange plant.)

   3. Political (i.e., Business related influences within Edison's companies that affected the West Orange plant.)

B. Landscape site /setting: [C.C.P] - the most immediate physical and visual context for a designed historic landscape, with site relating to a resource's current legal property limits and setting to its historic property limits.

   1. General Land Use [C.L.I.]

• ARCHIVE FILE •

FILE NUMBER: A (A:1887-1910;B:1910-1914;C:1914-1931;D:1932-1956;E:1963-)

CITATION OF SOURCE:

AUTHOR : ______ **DESIGNATION:** VOUCHER SERIES

TITLE OF MANUSCRIPT: MARCH-MAY 1888 / AUG-OCT 1888 / JAN-FEB 1889

DEPOSITORY: ENHS

DESIRED CITATION: ______

BOX NUMBER: 261-590 / 916-1127 / 1141-1461 **FILE NUMBER:** ______

NOTES:

Description of Source:	Category / Notes:
RECEIPT	LANDSCAPE FEATURE
1888 P.D. FAIRCHILD & CO	. FENCE WORK
# 565	
"	. REFERENCE TO "TELESCOPE BLDG."
	. DID ROOFING.
#?	. LANDSCAPE STRUCTURE
P.D. FAIRCHILD & CO	. REFERENCE TO "DOOR FOR BLACKSMITH SHOP"
# 543	. LANDSCAPE STRUCTURE
[illegible] & MORRIS	. REFERENCE TO "TELESCOPE ROOM" - CASTINGS
#1163	. LANDSCAPE FEATURE SEPT 1888
WILLIAMS & [illegible]	. PICKET FENCE WAS CONSTRUCTED
#44	
WILLIAM FINLAYSON	. LANDSCAPE STRUCTURE
	. MASON WORK WAS COMPLETED FOR "NEW BLDG." "BUILDING 6" JAN 5TH 1889 (26.00)
#71	
N.Y. [illegible] CO.	. LANDSCAPE STRUCTURE
	. LOOKING FOR "ORE MILLING ROOM AT LABORATORY VALLEY ROAD, W ORANGE" 66"/10 X 32 [illegible] JAN 19, 1889
#91	. LANDSCAPE STRUCTURE
SWAIN & JONES	- LUMBER FOR "NEW BUILDING" DEC 28, 1888 LARGE LOAD FOLLOW UP DELIV 29, 31; 2,3,5,9

C.L.R.:Edison National Historic Site **PHOTO DOCUMENTATION**

LANDSCAPE CATEGORIES: West Orange Plant - Environmental Context (Natural, Cultural, Political), Landscape Site/Setting, Response to Natural Features, Spatial Organization. Edison Laboratories - Landscape Site/Setting, Landform, Vegetation, Buildings/ Structures (Site Engineering Systems), Mechanical Systems, Circulation, Views/ Vistas, Furnishings & Objects.

File Number: B.6 (A:1887-1899; B:1900-1914; C:1915-1931; D:1932-1955; E:1956-)

Citation of Photo Source:

Album Number: #10 Author of Album: _____

Photo Number: _____ Negative Number: 4816:5

Photo Location: E.N.H.S. ARCHIVES Year of Photo: 1911

Notes:

Category:	Notes:
ENVIRONMENTAL CONTEXT	• NO STREET TREES ALONG LAKESIDE AVE.
	• SMALL WOODEN BLDG. ERECTED IN BATTERY STORAGE YARD
	• SCRAP IRON PILED NEXT TO IT
	• CONCRETE SIDEWALK ENDS AT OLD SOUTHERN FACADE ENTRANCE
	• YET PATH STILL LEADS TO ENTRANCE
	• FORESTED HILLSIDE TO WEST OF EDISON LAB.
BUILDINGS & STRUCT.	• FLAGPOLE ERECTED ON TOP OF 5. (ABOVE LIBRARY)
FURNISHINGS & OBJECTS	• SMALL STORAGE (OUTSIDE) W. OF POWER HOUSE ENTRANCE
	• (COAL ?) GRAVELLY MATERIAL

APPENDIX D

Introduction:

The following is a copy of 1992 amenmemts made to The Secretary of Interior's Standards for the Treatment of Historic Properties (Draft).

Preservation *is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.*

Standards for Preservation

1. A property shall be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property shall be protected and, if necessary, stabilized until additional work may be undertaken.

2. The historic character of a property shall be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features shall be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

6. The existing condition of historic features shall be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material shall match the old in composition, design, color, and texture.

7. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.

8. Archeological resources shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.

Rehabilitation *is defined as the act or process of making possible an efficient compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.*

Standards for Rehabilitation

1. A property shall be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

2. The historic character of a property shall be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, shall not be undertaken.

4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and, where possible, materials. Replacement of missing features shall be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.

8. Archeological resources shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and shall be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The Secretary of the Interior's Standards for the Treatment of Historic Properties, Rev. 1992

Restoration *is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.*

Standards for Restoration

1. A property shall be used as it was historically or be given a new use which interprets the property and its restoration period.

2. Materials and features from the restoration period shall be retained and preserved. The removal of materials or alteration of features, spaces, and spatial relationships that characterize the period shall be not be undertaken.

3. Each property shall be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate and conserve materials and features from the restoration period shall be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Materials, features, spaces, and finishes that characterize other historical periods shall be documented prior to their alteration or removal.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize the restoration period shall be preserved.

6. Deteriorated features from the restoration period shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and, where possible, materials.

7. Replacement of missing features from the restoration period shall be substantiated by documentary and physical evidence. A false sense of history shall not be created by adding conjectural features, features from other properties, or by combining features that never existed together historically.

8. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.

9. Archeological resources affected by a project shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.

10. Designs that were never executed historically shall not be constructed.

The Secretary of the Interior's Standards for the Treatment of Historic Properties, Rev. 1992

Reconstruction *is defined as the act of process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.*

Standards for Reconstruction

1. Reconstruction shall be used to depict vanished or non-surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.

2. Reconstruction of a landscape, building, structure, or object in its historic location shall be preceded by a thorough archeological investigation to identify and evaluate those features and artifacts which are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures shall be undertaken.

3. Reconstruction shall include measures to preserve any remaining historic materials, features, and spatial relationships.

4. Reconstruction shall be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property shall re-create the appearance of the non-surviving historic property in materials, design, color, and texture.

5. A reconstruction shall be clearly identified as a contemporary re-creation.

6. Designs that were never executed historically shall not be constructed.

APPENDIX E

Primary References:

Map of Property Owned by Thomas A. Edison Inc. and the Edison Phonograph Works In Orange and West Orange, 1911, Map File, Edison National Historic Site Archives, West Orange, New Jersey.

Map, "West Orange Plant," 1917, Map File, Edison National Historic Site Archives, West Orange New Jersey.

Survey map by Williams and Collins, 1955, Map File, Edison National Historic Site Archives, West Orange, New Jersey.

Map of Edison Companies Water Supply System, 1914, Map File, Edison National Historic Site Archives, West Orange, New Jersey.

Map File, Edison National Historic Site Archives, West Orange New Jersey.

Photograph Album #10, Photograph Album File, Edison National Historic Site Archives, West Orange New Jersey.

Photograph Album #12, Photograph Album File, Edison National Historic Site Archives, West Orange New Jersey.

Photograph Album #16, Photograph Album File, Edison National Historic Site Archives, West Orange New Jersey.

Photograph Album #42, Photograph Album File, Edison National Historic Site Archives, West Orange New Jersey.

Photograph Album #43, Photograph Album File, Edison National Historic Site Archives, West Orange New Jersey.

8x10 Photograph File, Edison National Historic Site Archives, West Orange New Jersey.

Oversize Photograph File, Edison National Historic Site Archives, West Orange New Jersey.

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U.S. Department of Interior. *Final Master Plan: Edison National Historic Site/New Jersey, 1977*, The master plan was prepared by Meir Sofair for the National Park Service, Department of Interior. April 1977.

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