THE CHICAGO THEATRE
175 North State Street
Chicago
Cook County
Illinois

HABS No. IL-1195

HABS
ILL
16-CHIG,
165-

WRITTEN HISTORICAL & DESCRIPTIVE DATA
REDUCED COPIES OF MEASURED DRAWINGS
PHOTOGRAPHS

THE HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
U.S. Department of Interior
1849 C Street, NW
Washington, D.C. 20240

HISTORIC AMERICAN BUILDINGS SURVEY
THE CHICAGO THEATRE
HABS No. IL-1195

HABS
ILL
16-CHIG,
165-

Location: 175 North State Street
Chicago, Cook County, Illinois

Quad: Chicago Loop Quadrangle, Illinois - Cook County

UTM: 16.447930.4637025

Dates of Construction: 1920 to 1921

Architects: Cornelius W. Rapp and George L. Rapp

Engineers: Lieberman, Klein, and Heim

Builder: The contractor for the building was Paschen Brothers.[1] Limited documentation suggests that the vertical sign was fabricated and installed by the Thomas Cusack Company.

Present Owner: Chicago Theatre Restoration Associates

Present Occupant: Chicago Theatre Restoration Associates

Present Use: Legitimate stage theater

Significance: Constructed in 1921 and designed by picture palace architects C.W. & Geo. L. Rapp, the Chicago Theatre is one of the few remaining theaters in operation in the central area of downtown Chicago known as "the Loop." The building is located on State Street, the main shopping street in the Loop. The street facade features a brightly colored marquee and vertical sign. The vertical sign, with illuminated channel letters spelling "CHICAGO," is a landmark on State Street and a symbol of the City of Chicago. It is one of the few remaining original exposed lamp electric signs still in use in the United States. The sign was constructed mainly of materials common for the period. Early in the sign's existence, the letters "CHICAGO" were replaced with porcelain enamel-coated sheet metal, an early use of this material. The sign's lighting originally featured a four-trough border of chaser lights that cascaded in a swirl pattern. Changes in its 75 year history have included abandoning the chaser lighting during World War II and changing the color scheme after the war. The top of the sign featured illuminated or painted letters with the names of the theaters owners which read in succession Balaban & Katz, ABC-Great States, and Plitt, with the present day configuration heralding the building as "THE" Chicago Theatre.

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[1] Theater History. *The Chicago Theatre.* [The Chicago Theatre], n.d.

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Date:

Date of documentation, 15 September 1996
Completion of documentation, 15 October 1997

PART I: HISTORICAL INFORMATION

A. Physical History

1. Dates of erection

The theater was built between late 1920 and late 1921. The theater opened on 26 October 1921.[2]

2. The Architects: C.W & Geo. L. Rapp

The firm of C.W. & Geo. L. Rapp designed the Chicago Theatre building.

a. **Cornelius Ward Rapp** was born in Carbondale, Illinois, in 1861. The son of an architect/carpenter, he first gained building experience by working for his father. He established his own architectural practice in Chicago in 1891. C.W. Rapp visited Paris early in his architectural career, introducing himself to French architectural elements such as the triumphal arch, the monumental staircase, and the grand column-lined lobby that would dominate his later works. In 1906, his younger brother George Leslie Rapp joined C.W. Rapp, forming C.W. & Geo. Rapp.[3] C.W. Rapp already had some experience with theater design and this area of practice grew under the new partnership. C.W. Rapp continued to practice in the firm until his death in 1927.[4]

b. **George Leslie Rapp** was born 1878 in Carbondale, Illinois and graduated from the University of Illinois in 1899. During his education, he studied in Paris. George Rapp's first job was in Chicago with Edmund Krause, who was then preparing plans for the Majestic Theater. In 1906, he joined his older brother and established the joint firm C.W. & Geo. L. Rapp. After the death of his brother in 1927, George changed the name of the firm to C.W. & Geo. L. Rapp, Inc., and continued to practice in the firm until his death in 1942.[5]

c. **The firm of C.W. & Geo. L. Rapp** was formed by the partnership of the two Rapp brothers in 1906. An early office for the firm was located in the Chicago Title & Trust Building in Chicago. Known for their elaborate theaters, both partners had previous experience in theater design, but it was not until their association with the film theater partnership of Balaban and Katz that they gained notoriety. Work with Balaban and Katz began in 1917 with the Central Park in Chicago and continued

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2 Ibid.

3 Joseph M. Valerio, *Movie Palaces: Renaissance and Reuse* (New York: Educational Facilities Laboratories Division, Academy of Educational Development, 1982), 31-33; C.W. Rapp to Joseph DuciBella, Chicago, Illinois, 5 July 1977, 1.

4 Richard W. Longstreth and Steven Levin. s.v. Rapp and Rapp. In *MacMillan Encyclopedia of Architects*, Volume 3, Adolf K. Placzek, Editor-in-Chief. (New York: The Free Press, Division of MacMillan Publishing Company, Inc. 1982), 532.

5 *Ibid.*; C.W. Rapp, *A Brief Rapp and Rapp History* (Chicago: n.p., 1977), 1.

after B&K's merger with Paramount-Publix Theaters in 1925.[6] A limited chronology of C.W. & Geo. L. Rapp's theater work includes the following:[7]

1910 Majestic Theater, Dubuque, Iowa
1915 Al Ringling Memorial Theater, Baraboo, Wisconsin
1917 Central Park, Chicago
1918 Palace, Cleveland, Ohio
1919 Riviera, Chicago
1921 Chicago Theater, Chicago
1921 Tivoli Theater, Chicago
1925 Uptown Theater, Chicago
1926 Bismarck Hotel and Palace Theater, Chicago
1926 Michigan, Detroit, Michigan
1926 Norshore, Chicago
1926 Oriental Theater, Chicago
1926 Paramount Theater, New York City
1926 Rialto Square, Joliet, Illinois
1926 Shea's Buffalo, Buffalo, New York
1929 Loews Kings Theater, Brooklyn, New York
1931 Paramount Theater, Aurora, Illinois

Between 1920 and 1931 the firms staff numbered 150 people.[8] Around this time the main offices moved to the State-Lake Building in Chicago. Additional offices were located in New York City for Paramount theaters there and in Brooklyn. When Balaban and Katz merged with Paramount in 1926, Sam Katz became head of Publix-Paramount operations. He chose the Rapps to work on many Publix-Paramount theaters from New York to Portland, Oregon. The Rapps became known as the most important and influential American theater architects of the period.[9] They designed more than 400 theaters in the 1920s, typically in Eighteenth and Nineteenth Century French classical-inspired style with lavish interiors. As stated by C.W. Rapp, grandnephew to the Rapp brothers, the theaters were practical as well as beautiful:

> R&R s major accomplishment was melding the classic principles of design with practical mechanical requirements. C.W. conceived the now common practice of sloping theater floors to maximize visibility, [eliminating] the need for balcony pillars and vertical supports by placing horizontal steel girders within the structures.[10]

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6 *MacMillan Encyclopedia of Architects*, s.v. Rapp and Rapp, 532.

7 Chronology compiled from David Naylor, *American Picture Palaces: The Architectural Fantasy* (New York: Van Norstrand Reinhold Co., 1981), 43; *MacMillan Encyclopedia of Architects*, s.v. Rapp and Rapp, 532; Joseph Valerio, *Movie Palaces: Renaissance and Reuse* (New York: Educational Facilities Laboratories Division, Academy for Educational Development, 1982), 33; and David Naylor, *Great American Movie Theaters* (Washington D.C.: The Preservation Press, 1987), 216-217.

8 C.W. Rapp to Joseph DuciBella; C.W. Rapp, A Rapp and Rapp History,, 1.

9 *MacMillan Encyclopedia of Architects*, s.v. Rapp and Rapp, 532.

10 C.W. Rapp, A Brief Rapp and Rapp History, 5.

C.W. & Geo. L. Rapp also designed several significant non-theater buildings, including the Corn Palace in Mitchell, South Dakota; the National Press Building in Washington, D.C.; the Bismarck Hotel in Chicago; and the Balaban family mausoleum in Waldheim Cemetery in Chicago. As the Great Depression years of the 1930s slowed new construction, work of the firm diversified. Large movie palaces were no longer built, but smaller theaters such as the Aurora Paramount, Luna, Will Rogers, Thodes, and Cine were constructed. The firm was reorganized in 1942.[11]

d. **Rapp & Rapp, Architects** was formed in 1942, after the death of George Leslie Rapp, by his nephew Mason G. Rapp. He reorganized the firm by establishing a partnership with Charles A. McCarthy, head of the firm's drafting department, and D.H. Brush, Jr., head of construction and field supervision as well as preparation of contracts and specifications. Both had joined the firm in the years following World War I. The successful attempt to diversify their work during the 1930s led to projects in the 1940s that included banks, automobile showrooms, office buildings, churches, and numerous apartment buildings. Their theater renovation projects included the Chicago Theatre in 1953, as well as converting theaters for Cinema. The firm closed in 1965, although Mason Rapp continued as a private architectural consultant until his death in 1978.[12]

e. **Daniel P. Coffey & Associates, Ltd.**, was formed in 1984.[13] At the time of the Chicago Theatre restoration in 1986, Daniel P. Coffey & Associates had offices at 343 South Dearborn Street. The firm was commissioned by a limited partnership, Chicago Theatre Restoration Associates, formed by attorney Marshall Holleb with consultants Margery and Suhail al Chalabi to renovate the Chicago Theatre, along with adjoining Page Brothers Building to the north of the theatre entrance. (Information on the restoration is described below.)

3. **Original and Subsequent Owners, Occupants, Uses:**

a. **Balaban & Katz**

Barney Balaban, born in 1887, was the eldest of eight children in the Balaban family. In 1908, he was chief clerk of the Western Cold Storage Company when he left that business to join his brothers in the operation of the Kedzie Theater. One of Barney's contributions to the subsequently formed Balaban & Katz partnership was the introduction of air-conditioning for theaters in 1917.[14] After Paramount

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11 Ibid., 3.

12 Ibid., 4.

13 Michael Youngman, etal., *ArchiPages* (Timonium, Maryland: Dawson Publications, Inc., 1996), 74.

14 Gene Arneel, Obituary for Barney Balaban, *Variety,* Volume 262, No. 4, 10 March 1971. The introduction of this development evolved from Barney Balaban's experience working as chief clerk at the Western Cold Storage Company.

acquired Balaban and Katz in 1929,[15] he became its president and served from 1936 to 1964.[16] It was under Balaban that Paramount split into two companies for production-distribution and exhibition.[17] Balaban became the president of the production-distribution division. Barney Balaban died on 7 March 1971.[18]

Abraham J. Balaban was born in Chicago in 1889.[19] From his early days as a "slide singer,"[20] A.J. Balaban developed into one of the leading theater impresarios in Chicago. With his brothers Barney and John, A.J. Balaban leased the Kedzie Theater in 1908.[21] The following year he purchased the Circle Theater with his brother Barney.[22] In partnership with Barney and Sam Katz, A.J. built and operated some of the largest picture palaces in Chicago. In 1932 he retired to Geneva, Switzerland, returning to the United States in 1937 to oversee the construction of the Esquire Theatre in Chicago. In 1942, at the request of 20th Century Fox, he became executive director of the Roxy Theatre in New York City, a position he held for nine and a half years. He died on 1 November 1962.[23]

Sam Katz was born in 1892 in Russia. Prior to his career as a theater owner, he worked as a clerk in a law office by day and helped his father, Morris Katz, run theaters at night. By the time he was 17 years old, Katz owned three theaters. In 1914, Sam Katz met Barney Balaban, and formed the partnership of Balaban & Katz. Katz left in 1925 to join Paramount as executive in charge of theaters, later becoming vice-president of Paramount-Publix. He resigned from Paramount-Publix in 1932. From 1932 to 1936 he headed his own company, Producing Artists. He was a vice president of Metro-Goldwyn-Mayer from 1936 to 1949. Katz was married to the Balaban brothers' sister Ida. He died on 12 January 1961.[24]

The partnership of **Balaban & Katz** was formed in 1916 and consisted of A.J. and Barney Balaban and Sam and Morris Katz. Sam Katz met Barney Balaban in 1914

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15 Carrie Balaban, *Continuous Performance: The Story of A.J. Balaban As Told To His Wife* (New York: G. P. Putnam Sons, 1942), 107.

16 Arneel, Obituary for Barney Balaban, *Variety*.

17 During the mid-1930s, a Supreme Court-mandated settlement of a Department of Justice anti-trust action called for film studios to divest themselves of their theaters.

18 Arneel, Obituary for Barney Balaban, *Variety*.

19 Balaban, *Continuous Performance*, 1.

20 A slide singer was a singer accompanying projected still images of domestic life or romantic scenes as an additional entertainment in nickelodeons.

21 Balaban, *Continuous Performance*, 18.

22 Ibid., 29.

23 Ibid., 107.

24 Obituary for Sam Katz, *Variety*, Vol. 221, No. 8, 18 January 1961, 70.

and the two became friends. Balaban pitched his ideas to Katz for a 5,000 seat "Presentation House with pictures and flesh."[25] Their first theater together was the Central Park in Chicago, designed by C.W. & Geo. L. Rapp. Subsequent Balaban & Katz theaters included the Riviera, Tivoli, Chicago, Uptown, Roosevelt, McVickers, Oriental, and Paradise. The Tivoli was the first 4,000 seat motion picture theatre.[26] Paramount acquired Balaban & Katz in 1929 as a subsidiary.[27] In 1940, Balaban & Katz were granted Chicago's first television license by the Federal Communications Commission, establishing WBKB-TV.[28] Balaban & Katz continued to operate movie theaters, including the Chicago Theatre until ABC-Great States purchased it. At the time of A.J. Balaban's death in 1962, two additional Balaban brothers, Harry and Elmer, were operating the H&E theater chain in Chicago.[29]

b. ABC-Great States, Inc.

ABC-Great States, Inc. was the Midwest theater division of ABC Films (see Henry G. Plitt below). In 1969, Balaban & Katz theaters (including the Chicago Theatre) were sold to the American Broadcasting Company.[30] Henry G. Plitt headed the new theater chain.

Henry G. Plitt was born in 1919.[31] After passing the New York State Bar, Plitt joined the U.S. Army Air Corps just before the start of World War II. During his years in the armed forces, he earned four purple hearts, as well as Bronze and Silver stars. After the war, Plitt joined Paramount Theaters, and after acquisition by Paramount, rose to be president of ABC Films from 1958 to 1965. Plitt then took charge of ABC's northern theater circuit that included the Balaban & Katz theaters as of 1969 (afterwards known as ABC-Great States). Plitt Theaters, Inc. was formed in 1974. Plitt died on 26 January 1993.[32]

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25 Balaban, *Continuous Performance*, 41.

26 Ibid., 53.

27 Arneel, Obituary for A.J. Balaban, *Variety*.

28 Daniel Rosenheim, "The Wonderful, Wonderful World of Henry G. Plitt," *Chicago Sun-Times*, May 13, 1984.

29 Arneel, Obituary for A.J. Balaban, *Variety*.

30 Donald K. Lamp and John L. Corliss, National Register of Historic Places Inventory, Nomination Form. (N.p., July 1978), Item 8, page 1.

31 Burt A. Folkart, "Henry G. Plitt, Developed National Chain of Movie Theatres," *Los Angeles Times*, 27 January 1993.

32 Ibid.

c. Plitt Theaters, Inc.

In 1974, Henry Plitt founded **Plitt Theaters, Inc.**, by purchasing 124 theaters (including the Chicago Theatre) in the Midwest from ABC-Great States for $25 million.[33] By 1984, Plitt controlled about 600 theaters in the United States, 80 in the Chicago area alone, making it the fourth largest theater company in the United States and the largest privately owned theater company in the world.[34] However, Plitt closed or sold money losing theaters while developing complexes of multi-plex theaters in growth areas such a suburban shopping malls. The Chicago Theatre was closed due to lack of business on 19 September 1985.[35] Plitt Theaters, Inc., was sold in late 1985 to the Cineplex Odeon Corporation.[36]

d. Chicago Theatre Restoration Associates

Following the closing of the Chicago Theatre by Plitt, **Chicago Theatre Restoration Associates** was formed as a limited partnership including attorney Marshall M. Holleb with Margery and Suhail al Chalabi. Marshall M. Holleb, senior partner in the law firm of Holleb & Coff, was a graduate of Harvard Law School. Margery al Chalabi was a consultant in economic development. This partnership received investments from Federal funding, including a $2.5 million Federal grant and a $12.5 million federal mortgage, and Rodman & Renshaw, which put together a syndicate of 141 limited partners who invested $10 million.[37] Plitt Theaters sold the building to Chicago Theatre Restoration Associates for $11,575,000.[38] The firm of Daniel P. Coffey Associates was the architect-of-record for the theater renovation. Chicago Theatre Productions acquired the theater's lease and reopened it on 10 September 1986.[39]

Following financial troubles, the City of Chicago reached an agreement with Chicago Theatre Restoration Associates in 1994 whereby the theatre was to be operated by a not-for-profit group of directors, the **Civic Preservation Foundation**, and the founding partners of Chicago Theatre Restoration Associates became limited partners.[40]

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33 Gene Siskel, "Now Playing: Plitt Theaters, Starring Henry Plitt with a Cast of Thousands...of Seats," *Chicago Sun Times*, 2 June 1974.

34 Rosenheim, "The Wonderful World of Henry Plitt."

35 "Theater History," *The Chicago Theatre* (N.p., n.d.).

36 P.J. Bednarski and Jerry C. Davis, "Plitt To Be Sold," *Chicago Sun-Times*, August 16, 1985.

37 "Saving the Chicago Theatre Saviors," *Chicago Tribune*, section 1, 8 January 1993.

38 "Chicago Theatre Sale Finalized," *North Loop News*, 7 November 1985.

39 Robert Hener, "The Restoration," *The Reader*, 5 September 1986, 8.

40 "Amazing Chicago Theater Shirks Bankruptcy," *The North Loop News* , 20 October 1994.

Currently, the Chicago Theatre is operated by the **Civic Preservation Foundation**, a not-for-profit corporation with day-to-day operations managed by the Theatre Management Corporation.

4. Original Plans and Construction; Additions and Alterations

a. Chronology of the Theatre

On the original construction drawings prepared by C.W. & Geo. L. Rapp and dated 4 August 1920, the building was called the Capitol Theatre.[41] It opened on Wednesday, 26 October 1921, as the Chicago Theatre, with the film The Sign on the Door starring Norma Talmadge. The evening's entertainment included organist Jesse Crawford and a 50-piece orchestra. Admission was 25 cents until 1 p.m., 35 cents in the afternoon, and 50 cents after 6 p.m.[42]

The building has had two major interior renovations and one restoration since its construction. In 1932, as the city prepared for the Century of Progress Exhibition, the entire theatre was redecorated in a new color scheme and new drapery and carpeting. No major structural alterations were made at this time.[43] Between 1949 and 1952, the interior French Rococo Renaissance decor was altered. Rapp and Rapp were the architects for these renovations to the interior, including new light fixtures and chandeliers in 1950s-style modern and new furniture. The outer lobby was refloored in terrazzo and a false ceiling constructed over the inner lobby, which obscured ornamental plaster. The box office was rebuilt in bronze and stainless steel and new bronze entrance doors were installed. More extensive floor plan changes were made to the Lower Promenade, with the remodeling of the powder rooms. In other spaces, the ornament was painted over, covering gilded and polychromed surfaces.[44]

After the theater was purchased by ABC-Great States in 1969, volunteers started undoing some of the 1950s remodeling by removing drapery from lobbies as well as repainting and gilding ornamental plaster, all at no expense to the owners of the theatre.[45] Also during the 1970s, volunteers Chicago Area Theatre Organ Enthusiasts restored the theater's Wurlitzer organ, which was rededicated in 1974.[46]

Prior to the 1970s, new motion pictures were shown in the Loop first and then the suburban areas. With the growth of suburban movie theaters in shopping centers in

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41 A copy of the original drawings are in the collection of the Chicago Historical Society.

42 "Theater History," *The Chicago Theatre*.

43 Peter R. Miller, "The Chicago Story," *Chicago Theatre: A Sixtieth Anniversary Salute*, Annual No. 8, 1981, 12-13.

44 Ibid.

45 Ibid., 15.

46 Hener, "The Restoration," 23.

the 1970s, business in downtown Chicago dwindled, leading to cuts in staff and maintenance. The Chicago Theatre was among those that suffered. Plitt, who had purchased the theater in 1974, attempted to obtain a demolition permit from the city in December 1982. Despite opposition from the owner on 6 December 1982, the Commission on Chicago Historical and Architectural Landmarks recommended to the City Council of Chicago that the Chicago Theatre, including the marquee and sign, be designated as a Chicago Landmark.[47] Plitt's request for a demolition permit that was subsequently denied and he sued the city for inverse condemnation in January 1983.[48]

In 1986, The Chicago Theatre was restored along with the adjoining Page Brothers Building.[49] (See Chicago Theatre Restoration Associates, above.) The restoration included building cleaning; repainting and repair of the exterior marquee; repainting, gilding, plastering, and redraping. Replacement of the 1950s light fixtures and chandeliers with ones salvaged from the Fox and Erlanger Theaters in Philadelphia was also performed. Other renovation work included carpeting of the interior public spaces; new auditorium seats and lavatory facilities; a new sound system; stage rigging; stage lighting; and dressing room fixtures. The budget for the renovation was $8.9 million.[50] Consulting engineers with Daniel P. Coffey & Associates included Environmental Systems Design, Inc., for mechanical and electrical work, and Don Belford & Associates for structural engineering.

b. Chronology of the Marquee and Vertical Sign

The exterior signage on the Chicago Theatre consists of the marquee, forming a canopy over the sidewalk, and the vertical sign spelling out the name CHICAGO. Based on available documentation, it is not known who designed, manufactured, and installed the vertical sign. The original drawings show the first shallow marquee. No vertical sign is shown on the original drawings, but does appear in an early photograph circa 1921 or 1922.[51] There were 4,350 incandescent lamps (for a total of 161 kilowatts) on the vertical sign, original marquee, and building (outlining the corners, triumphal arch, and other ornamental features) and was included in references on large electrical advertising displays.[52]

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47 Commission on Chicago Historical and Architectural Landmarks, Docket No. 82-8, 16 December 1982.

48 Cheryl J. Lewin and Kathryn E. McGill, *Fact Sheet - Chicago Theatre Timeline* (The Chicago Theatre, n.d.), 2

49 The Page Brothers Building, dating from 1872 by John Mills Van Osdel is the city's only surviving structure with a cast iron front, located on the Lake Street (north) elevation. The building originally had five stories with a 6th story and a more ornate State Street elevation added in a 1902 remodeling designed by Hill & Woltersdorf

50 Paul Gapp, "Rebirth of a Legend," *Chicago Tribune*, sec 13, 31 August 1986, 18.

51 This photograph is included *Beautiful Theaters - Will Yours Be One?* (New York: National Terra Cotta Society, 1925). The photograph can be dated to 1921 or 1922 because it shows the original marquee.

52 C. A. Atherton, *Electrical Advertising* (Cincinnati: The Signs of Times Publishing Company, 1925), 174. 174.

The White Way Company of Chicago maintains that it was responsible for the construction of the vertical sign.[53] The company was chargeable for its maintenance, as well as alterations made to the marquee described below. However, the vertical sign was in place by 1922 and the White Way Electric Sign Service Company was not founded until 1924 or 1925.[54] The name White Way came from the "Great White Way," a nickname for Broadway in New York City. Thomas F. Flannery, Sr., founded the White Way Company (as it is known today). Flannery was born on 2 October 1892 in Ireland[55] and died in Chicago on 15 November 1962.[56] He came to the United States when he was 12.[57] After graduating from Holy Name School in Chicago, he trained as an electrician.

Flannery had worked for the Thomas Cusack Company of Chicago from 1912 to 1925.[58] The Thomas Cusack Company was one of the largest sign and advertising companies in the country in the early 1900s. Thomas Cusack was born in Ireland in 1858 and was educated at St. Xavier's College in New York State.[59] Active in politics, he served as a representative from the Fourth Congressional District of Illinois. In the early 1910s, Thomas Cusack Company sued the City of Chicago over ordinances that limited the construction of billboards, a case that went to the Illinois Supreme Court.[60] Thomas Cusack Company had offices at 3712 West Harrison, and shops at 515 North Loomis.[61] Cusack (who died in November 1926[62]) sold the company in 1924, the same year that White Way was founded, leading to the possibility that Flannery bought the electric sign portion of Cusack's business. White Way was originally located at 1935 North Larrabee, later moving to their present location at 1317 North Clybourn.

With regard to the Chicago Theatre vertical sign, it is possible that the Thomas Cusack Company was the actual fabricator of the sign (with Thomas Flannery as

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53 Bob Flannery, interview by Jeffrey Koerber, Chicago, Illinois, 23 October 1996.

54 The 1924 founding date is given in "Marquee Lights City's White Way," *Chicago American.* 31 October 1955. The 1925 founding date is given in *Who's Who in Chicago and Illinois*. (Chicago: The A.N. Marquis Company, 1950), 197.

55 *Who's Who in Chicago and Illinois*, (Chicago: The A. N. Marquis Company, 1950), 197.

56 Obituary for Thomas Francis Flannery, *Chicago Tribune*, 15 November 1962.

57 "Marquee Lights City's White Way," *Chicago American*, 31 October 1955.

58 *Who's Who in Chicago and Illinois*, 197.

59 *Prominent Democrats of Illinois* (Chicago: Democrat Publishing Company, 1899), 348.

60 *Thomas Cusack Company v. The City of Chicago,* 126 Illinois Supreme Court, 1916.

61 *Polk's Directory of Chicago* (Chicago: R. L. Polk & Company, 1928), 3089.

62 Obituary for Thomas Cusack, *Chicago Tribune*, 21 November 1926.

foremen of the Cusack shop).[63] However, in the early 1920s, Flexlume, Li-Mi-Nus, Inc., and Chicago Electric Sign Company, as well as a half dozen other sign manufacturers, were listed in the Chicago directory, allowing for the possibility of other manufacturers being responsible. White Way does not have any documentation on the vertical sign.

Typically, the design process for signs and marquees in the 1920s was through sketches or rendering of the signage proposed for the building. In the case of the Chicago Theatre, Balaban & Katz may have determined some of the requirements for the sign with the manufacturer. Components were usually fabricated in the shop and assembled on the building. Formal shop drawings were usually not used.[64]

The original low, shallow marquee was replaced around 1922 or 1923 by a larger more elaborate one that featured flashing pinwheels, swirls, and garlands of colored lights.[65] It had a larger, more elaborate display area, with room on the west (State Street) elevation for two lines of feature lettering and a double border of incandescent lamps forming a linear pattern. Three lines of lettering and a similar border on the sideboard panels were present on the north and south elevations.[66] Both the north/south and west marquees pediments with "swirls and pinwheels," and the name "CHICAGO" spelled out horizontally across the front in channel letters, combined with the "Y" insignia from the City of Chicago coat of arms. The "Y" symbolizes the branches of the Chicago River that divide the downtown areas of the city.

As shown in early photographs of the theatre,[67] the paint on the vertical sign featured a stippled or mottled pattern on the sheet metal panels around the letters "CHICAGO." Information on the paint colors found on the sign at the time of documentation is recorded in the measured drawings for this documentation. Originally, the colors on the sign were dark blues and light greens, with white in the chaser troughs.

In 1937, the marquee was slightly altered with larger display areas on the sideboard panels.[68] This consisted of panels for more text display but these panels were not

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63 *Polk's Directory of Chicago* (Chicago: R. L. Polk & Company, 1923), 2043. Flannery is listed in the Chicago directory as a foreman.

64 Bob Flannery interview by Jeffrey Koerber. It is not known if C.W. & Geo. L. Rapp were involved in the design process, but given their participation with later renovation efforts it seem likely. The curvilinear design of the top and bottom of the vertical sign echoes the triumphal arch of the main facade.

65 Miller, "The Chicago Story," 7. A photograph of this marquee is in the archival photographic record (IL-1195-15).

66 Five lines of text appear on the south elevation in the nighttime illuminated view from in the archival photographic record (IL-1195-16), indicating a possible later modification.

67 *Beautiful Theaters - Will Yours Be One?* (New York: National Terra Cotta Society, 1925). A photograph of this marquee is in the archival photographic record (IL-1195-15).

68 Miller, "The Chicago Story," 5. A photograph of this marquee is in the archival photographic record (IL-1195-18).

integrated into the overall design of the marquee. A photograph from this period also shows on the vertical sign a wide vertical painted stripe on the sheet metal panels around the letters "CHICAGO."

The lamps in the four tracks of chasers on the vertical sign were abandoned during World War II, either due to the costly maintenance required to replace lamps or to save on energy costs.[69] For the maintenance staff to replace the approximately 2,000 bulbs, it was necessary to erect a suspended rope scaffold or to climb the ladder rungs located on the east and west sides of the sign. The exact date for abandoning the chasers is not known, but postwar photographs from circa 1948 show that the lamps were no longer in place.[70]

The marquee was altered again circa 1948.[71] The pediment on the west elevation was replaced, featuring larger channel letters with the name "CHICAGO" with a new "Y" logo. The altered pediment had somewhat streamlined swirl patterns. The sideboard panels reached their greatest size. The border of the sideboard panels as well as the long west elevation panel consisted of channels emulating a twisted rope pattern. Photographs from 1948[72] show the sideboard and west elevation panels to have individual letters that were possibly illuminated. By 1963[73] these were replaced with letters mounted to luminous panels illuminated with fluorescent lamps. Although the colors of the vertical sign are not discernible in the 1948 black and white photograph, they have the same relative contrast as later color photographs from 1963 and 1973, indicating that the present white, yellow, orange, and red color scheme was in place.

With the purchase of the Balaban & Katz theater chain by ABC-Great States in 1969, the name of the former owners was removed and replaced with "ABC-GREAT STATES" illuminated in new neon flat painted letters. These alterations included removal of the old channel letters and the original crest-work at the very top, and addition of a semi-circular panel at the peak of the entablature.[74] When Plitt purchased the theater in 1974, the neon lettering "ABC-GREAT STATES" was removed, the holes in the sheet metal face panel covered over, and the name

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69 Jeff Hamand interview by Jeff Koerber, Chicago, Illinois, 3 September, 1996. A less likely reason for abandoning the chaser lighting was wartime blackout procedures to prevent enemy bombers from locating the city. According to Ben M. Hall, The Crown Jewel, *A Pictorial Survey Marquees* (Notre Dame, Indiana: Theatre Historical Society, 1980) "Out in Chicago where tracer lights transform the Loop into a twinkling fairyland at night, the marvelous marquee of the Chicago Theatre still stops traffic, and one can almost forgive the incursion of fluorescent with plastic on the side panels because the rest is so grand. An attempt was made a few years ago to re-lamp the towering vertical sign, but evidently the several miles of new wiring required was beyond the budget of ABC-Great States, heirs to the Balaban and Katz empire."

70 Miller, "The Chicago Story," 6.

71 Ibid., 7. A photograph of this marquee is in the archival photographic record (IL-1195-19).

72 A photograph of this marquee is in the archival photographic record (IL-1195-19).

73 A photograph of this marquee is in the archival photographic record (IL-1195-20).

74 A photograph of these alterations to the vertical sign is in the archival photographic record (IL-1195-21).

"PLITT" painted onto the sheet metal face panel. Also added was a letter "C" with the "Y" from the city insignia (and the marquee) included as background within the semi-circular top of the sign.[75]

During the 1986 restoration the sign and marquee were repainted. Eight to twelve layers of paint were scraped off and 100 gallons of new paint were applied.[76] The sideboard panels on the marquee were reduced in height.[77]

In 1996, engineering investigations performed by the Wiss, Janney, Elstner Associates, Inc. (WJE), and S.P. Asrow Associates, Ltd. (Asrow), determined that many of the main structural members of the vertical sign were corroded and the structural integrity of the sign was compromised. After Asrow explored options for repair and replacement, the Chicago Theatre decided that replacement was the most cost-effective route. The Landmarks Preservation Council of Illinois (LPCI), a not-for-profit preservation advocacy group, recommend that Historic American Building Survey documentation project be performed of the original vertical sign to insure that the replacement sign matched the original in dimensions and in appearance.[78]

The original vertical sign was removed in four sections from the building on 27 and 28 September 1996. It was moved to the storage yard of W.E. O'Neil Construction in Stickney, Illinois, near Chicago's Midway Airport. Keiffer & Company of Sheboygan, Wisconsin fabricated the replacement vertical sign and installed it the week of 17 November 1996. The new sign is constructed with a structural steel frame, an aluminum secondary frame and aluminum cladding. An acrylic polyurethane paint coating was used on the aluminum cladding. The top of the sign was reconstructed to the original appearance, based on historic photographs and fragments of ornament found in the interior of the one of the sections of the original sign.[79] The original cast zinc ornament was replicated in cast aluminum. The new sign features four tracks of chaser lights, which run in a pattern similar to the original configuration. Colors for the new sign were matched to those visible on the original sign at the time of its removal. The entablature, which had displayed "BALABAN & KATZ" originally, was left blank.

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75 A photograph of these alterations to the vertical sign is in the archival photographic record (IL-1195-22).

76 Hener, "The Restoration," 27.

77 A photograph of these alterations to the vertical sign is in the archival photographic record (IL-1195-1 through IL-1195-5).

78 LPCI held a facade easement on the building, whereby the Chicago Theatre received tax benefits in exchange for LPCI reviewing changes to the building exterior.

79 During the modifications to the top of the sign after the building was purchased by ABC-Great States, fragments of ornament must have been allowed to fall into the sign instead of removal from the site. This was fortunate, as historic photographs did not adequately show the design of this ornamentation.

B. Historical Context

1. Introduction

Inventions of Thomas Alva Edison[80] led to the development of the film theater, as well as the illumination of the vertical sign. Known as the "wizard of Menlo Park," Edison and his assistants by 1878 had developed the mimeograph, the phonograph, as well as refinements to the telegraphs in his New Jersey laboratory. In that year, Edison embarked on the search for a practical incandescent lamp. After the successful invention and exploitation of the lamp through the development of an electrical power service system, Edison would eventually develop the motion picture and later experiment with the adaptation of sound recording devices synchronized with the moving image.

The Chicago Theatre (along with the vertical sign and marquee) was built at a time when several materials began to have widespread use in building construction for the first time. Besides the structural steel of the supporting frame, galvanized sheet metal and porcelain enamel-coated sheet metal was used in the construction of the vertical sign. Many changes were made to the vertical sign over its service life. Color schemes were changed. Patterned incandescent lighting was abandoned. Neon was installed and later abandoned. Finally, decades of neglect led to the necessity for repair or replacement.

2. General History of Film

Background

The experience of cinema had several antecedents: the magic lantern, the panorama and the diorama. E.G. Robertson developed the magic lantern, also called the phantasmagoria, in Paris in the late 1700s.[81] At one end of a darkened rectangular room was a fabric screen soaked in starch and gum arabic to make it translucent. A lantern would be shown through the screen to create the illusion of ghostly images to frighten the audience.

Robert Barker, a Scottish artist and inventor, developed the panorama in 1788.[82] This form of entertainment consisted of a series of paintings rolled on a curved surface with the audience sitting in a central position. Leicester Square in London was the site of an early panorama, with a series of three auditoriums, opened in 1793. The panorama presented contemporary scenes including public ceremonials, battles, and landscapes. The diorama became the next form of public spectacle, combining effects from the panorama and the magic lantern. Louis Daguerre opened the first diorama in Paris in 1822, with the

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80 Thomas Alva Edison was born 11 February 1847, in Milan, Ohio, and died 18 October 1931, in West Orange, New Jersey. He began his career as a telegraph operator, eventually developing and patenting several devices related to the telegraph. His first laboratory for inventions was in Newark, New Jersey, where among his patents was the mimeograph machine. After moving the laboratory and his assistants to Menlo Park, New Jersey, in 1876, his most important inventions were developed in what was then an isolated setting. The incandescent lamp and related hardware and power systems, the phonograph, and an improved telephone were among his patents. From 1887 until his death, Edison and his assistants worked from laboratories in West Orange, New Jersey, where the motion picture, the alkaline storage battery, and numerous chemical advances were developed.

81 Dennis Sharp, *The Picture Palace* (New York: Frederick A. Praeger, 1969), 13.

82 Ibid., 14.

auditorium revolving around the scenery and the spectator viewing through an opening in the auditorium wall.[83]

Development of Photography

Film evolved from the medium of photography. The early development of photography begins with the *camera obscura.* This device, with an inverted image, is projected through a very small hole or oculus, was used in the later Middle Ages in Europe as a means of viewing solar eclipses. The Dutch physician and mathematician Reiner Gemma Frisius first showed a camera obscura in *De radio astronomico et geometrico liber* (1545). The Italian physician Girolamo Cardano subsequently improved the image from a camera obscura with the addition of a bi-convex lens in 1550.[84]

It was not until 1725 that Johann Heinrich Schulze, professor of anatomy at the University of Altdorf near Nuremberg, observed the darkening of silver salts when they were exposed to light.[85] Through later developments, such as the experiments of Thomas Wedgwood to fix the images of the *camera obscura* on silver nitrate in the latter 1700s, the combination of the optical recording equipment and capturing medium was attempted.[86] Nicephore Niepce, using a pewter plate as the capturing medium, took the first successful photograph in 1826 with a camera fabricated by the Parisian optician Charles Chevalier.[87]

Louis Jacques Mande Daguerre produced the next development in photography in 1837, by shortening the length of exposure from several hours to 20 to 30 minutes.[88] Daguerre attempts to market his invention (called *daguerreotype*) failed, although the name stuck. In 1839, the English astronomer Sir John Herschel coined the term "to photograph," concurrently with the German astronomer Madler who utilized the term "photographie."[89]

The time required for exposures became shorter with the introduction of the wet collodion process developed in 1851 by Frederick Scott Archer.[90] In Archer's process, a film collodion containing potassium iodide was poured onto a glass plate, the plate was dipped in a bath of silver nitrate solution, and immediately exposed to light in the camera. Development followed in pyrogallic acid or ferrous sulphate, followed by fixing in hyposulfite of soda or potassium cyanide. Although far more complicated than with the daguerreotype, increased sensitivity was a compensation because exposures between 2

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83 Ibid., 18.

84 Helmut Gernsheim and Alison Gernsheim, *A Concise History of Photography* (New York: Grosset and Dunlop), 10-11.

85 Ibid., 16.

86 Ibid., 17.

87 Ibid., 20.

88 Ibid., 22.

89 Ibid., 27.

90 Ibid., 32.

seconds and 1-1/2 minutes were possible. Dr. Richard Leach Maddox, an English medical doctor, developed a gelatin of silver bromide emulsion in 1871.[91] Further improvements in the ensuing decade led to the introduction of rapid gelatin dry plates which could be mass produced, freeing the photographer of the necessity of producing photographic plates.

Leon Warnerke initiated the concept of the photographic emulsion being applied to a flexible film support, and rolled on a spool in 1875 in London by using treated paper.[92] Celluloid had been developed in 1861, and in 1888 John Carbutt, an English immigrant to the United States, predated George Eastman by one year in the use of film emulsion on celluloid. However, by 1902 the Eastman Kodak Company was producing 80 to 90 percent of the world's film.[93]

Development of Moving Pictures

The idea of moving pictures dates back to the zoetrope and other similar mechanisms, where a series of still images are viewed sequentially in rapid succession. Thomas Alva Edison and his associate William K. Dickson developed the Kinetoscope in 1889. The Kinetoscope evolved into the peephole machine, with an upright box containing a forty to fifty foot endless band of film. The viewer looked into a magnifying lens at the image on the film. The first peephole show parlor was opened in Chicago in May 1894.[94]

Due to public demand for moving pictures, the next step in the process was the development of projection equipment for the films produced for the Kinetoscope. One early device was the Kinodrome, developed by George K. Spoor of Chicago, which used the high intensity light of a calcium lamp and optical glass lens. (Auguste Lumiere in France was developing a similar system at about the same time.) Spoors National Film Renting Company rented to vaudeville houses for use on his projectors. Edison had also developed a system for projecting films with the Vitascope, first used at Koster & Bials Music Hall at Herald Square, New York, on 23 April 1896.[95] Others in the business of developing projected moving images included William N. Selig, of Chicago. He was manufacturing the Selig Standard Camera, the Selig Polyscope (a projector), and making commercial films for use in the Polyscope by 1896.[96]

In 1907, George K. Spoor teamed up with G.M. Anderson to form the Peerless Film Manufacturing Company, which later became Essanay. Essanay produced both industrial films and short dramas. Their stars included Wallace Beery, Gloria Swanson, Ben Turpin,

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91 Ibid., 35.

92 Ian Jeffrey, *Photography: A Concise History* (New York: Oxford University Press, 1981), 241-2.

93 Gernsheim, *A Concise History of Photography*, 36.

94 Sharp, *The Picture Palace*, 24.

95 Ben M. Hall, *The Best Remaining Seats: The Story of the Golden Age* (New York: Clarkson N. Potter, 1961), 12-13.

96 Commission on Chicago Historical and Architectural Landmarks, *The Chicago Theatre*, 11 September 1978, 2.

and Charlie Chaplin. Essanay and other major film studios[97] briefly made Chicago the center of the industry. By 1915, these studios had relocated to California to take advantage of the more dependable climate.[98]

The type of film stories produced for nickelodeons quickly became more complex. By the early 1910s, filmmakers began to produce "photoplays" with well-developed stories.[99] Early attempts at true synchronized sound motion picture date back to 1906, when Eugene Augustin Lauste developed the Photocinematophone in England.[100] In this system sound waves recorded by a rudimentary microphone were recorded into a sound track of varying density on the edge of the film. The projector contained a selenium cell, which reacted to light rays passing through the sound track. Although Lauste's system was a commercial failure, this is basically the same principle in universal use today. The only element missing was electric amplification for the sound.

With the Cameraphone of 1910, Edison coupled the projector to a phonograph behind the screen by means of a wire belt.[101] The sound recording was produced first followed by the artist photographed pantomiming the words until a passable synchronization was achieved. Edison followed the Cameraphone with the New Kinetophone in 1913, which was premiered at four theaters in New York during that year.

The evolution of talking pictures evolved over the succeeding decades. In 1923, Dr. Lee De Forest developed his "audion amplifier," a similar film process to Lauste's Photocinematophone. De Forest's process, called phonofilm, premiered on 15 April 1923 at the Rivoli Theater in New York. Bell Telephone Laboratories with their manufacturing division, Western Electric, developed a new process in 1925. This used sound recorded on sixteen inch discs and synchronized to the moving film image. Interest from the film studios was limited, but in 1926 Warner Brothers moved ahead with a project using the new process, renamed Vitaphone.[102] The film, *Don Juan*, had been made as a silent film and music and sound effects were added. Other studios tried to invest in Warner Brothers' Vitaphone process. William Fox brought a rival process, Tri-Ergon, to the United States from Germany. It was similar to De Forest's Photofilm. A third process was funded by Fox, which became Movietone. Movietone had the advantage of recording the sound onto the film in the camera, as opposed to a separate disc system.

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97 Other studios established in Chicago included Selig, American Film Manufacturing Company, Ebony Film Corporation (the first African American-owned and operated film studio), and Independent Motion Pictures (later known as Universal Pictures).

98 Frank Segers, "Bye, Bye, Balaban & Katz, Bye, Bye," *Film Comment*, October 1984. Other sources also credit the move of the film industry to California to the competitors of Edison who were seeking to escape patent infringement lawsuits. Southern California was far away from east coast-based Edison operations, making it difficult for process servers. The border with Mexico was an escape route for potential defendants. See Kelly C. Anderson, *The Importance of Thomas Edison* (San Diego: Lucent Books, 1994), 86-88.

99 David Naylor, *Great American Movie Theaters* (Washington D.C.: The Preservation Press, 1987), 15.

100 Hall, *The Best Remaining Seats*, 243.

101 Ibid., 243.

102 Ibid., 244.

Sound added a new dimension to film. The cost for theaters to convert to talkies prevented some theater owners from immediately switching over. It could cost $10,000 for a theater to install the Western Electric system, and an additional $3,000 to modify projectors for the Vitaphone and Movietone processes.[103] Some chains of theaters, such as Paramount-Publix,[104] made unilateral decisions that all theaters in their chains would convert. In 1928, Sam Katz in *Publix Opinion* stated that "STUPENDOUS SOUND-SHOWS NOW PUT EVERY PUBLIX THEATRE IN DE LUXE CLASS."[105]

3. Development of Motion Picture Theaters

The nickelodeon was an early venue in which an audience could view motion pictures. Nickelodeons were configured as a rectangular room with a screen at one end (similar to the magic lantern). Existing storefronts were often converted. The typical film was a ten minute silent melodrama accompanied by piano. The set-up for a nickelodeon could even be ordered from the Sears, Roebuck and Company catalogue. Chicago's city directory had listed one nickelodeon in 1902, but 606 nickelodeons by 1913.[106] Business grew so much for some nickelodeons that larger facilities were soon needed. Vaudeville houses were frequently adapted for the showing of films along with their regular live acts.

"Movie Madness" pervaded society and by the start of the middle teens, it was estimated that 25,000 picture theaters were in operation with an average daily attendance of six million people.[107] Larger theaters were planned for the showing of motion pictures alone without vaudeville acts. The first major luxury picture theater, The Regent, opened in 1913 in New York.[108] It was after World War I that theaters built primarily to showcase silent motion pictures were opened in any great number. However vaudeville remained popular, and theaters were equipped with stage equipment as well as a screen and projectors.

By the middle 1920s, the opulent picture palace was part of America's culture, with theater grand openings and movie premieres drawing large crowds. Major and medium sized cities could had ten or more movie theaters. The styles for the larger houses varied but were generally exotic, with East Indian, Dutch, Siamese, Tudor and Mayan mixed with Italian baroque and French Second Empire. Many of the architects who designed the first picture palaces were born or trained in Europe. Thomas W. Lamb, architect of theaters in New York and the Northeast, was born in Scotland and his designs reflected the English Adamesque style. B. Marcus Pritecas designed in the Beaux-Arts style for the Pantages chain centered around Seattle. C.W. & Geo. L. Rapp, Inc. of Chicago practiced a variety of

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103 Ibid., 250.

104 By 1929, Balaban & Katz was a subsidiary of Paramount-Publix. See Gene Arneel, Obituary for A.J. Balaban, *Variety*.

105 Hall, *The Best Remaining Seats*, 252.

106 Commission on Chicago Historical and Architectural Landmarks, *The Chicago Theatre*, 3.

107 Sharp, *The Picture Palace*, 70.

108 Ibid., 73.

styles, developing designs from George L. Rapp's years of study in Europe. He viewed theaters as "a shrine to democracy where the wealthy rub elbows with the poor."[109]

This period also saw the rise of the big Hollywood studios, with subsequent ownership of theater chains by these studios to insure wide distribution of their films. In an effort to outclass the competition, bigger and more opulent theaters were constructed. The chain of theaters operated by Marcus Loew played films made by Metro-Goldwyn-Mayer. Loew's primary architect was Thomas W. Lamb. United Artists Studios utilized the services of C. Howard Crane to design a theater in Los Angeles in 1928, and this design was later adapted for theaters in Chicago and Detroit.[110] Warner Brothers theaters in Philadelphia and Baltimore were designed by Hoffman and Henon. Balaban & Katz, whose architects were C.W. & Geo. L. Rapp, was acquired by Paramount Pictures in 1929. The Rapp brothers designed subsequent theaters for Paramount, including the flagship theater on Times Square in New York and theaters in Seattle and Portland. John Eberson, an architect born in Austria, designed over 500 theaters around the world. He is credited with developing atmospheric theaters that made patrons feel they were outside during a summer night, with twinkling stars and moving clouds. Chicago was the birthplace of another prominent theater architect, S. Charles Lee, whose motto was "The show starts on the sidewalk."[111] Lee (under his birth name of Simeon Charles Levi) apprenticed under the Rapp brothers early in the firm's existence, leaving soon after completion of the Chicago Theatre. Lee's practice was thereafter centered in California.

A reflection of Lee's motto is apparent in the facades of picture palaces, including the showy nighttime illumination:

> Theaters/picture palaces were built essentially to serve a purpose that was purely economic: attracting moviegoers to the box office. Their exteriors helped to fill this role, using forms and styles that made them stand out from their surroundings. A broad canopy marquee, often accompanied by a towering vertical sign, announced the buildings name and purpose. To make sure that nobody missed the message or the latest film, tracer and chaser lights were used to trim these often elaborate signs. Early nickelodeon theaters pioneered the use of outdoor electrical signage. Many of the early theaters outlined their arched and gabled facades with light bulbs. One nickelodeon even sported an electric butterfly. When the movies graduated from the nickelodeons to vaudeville halls, they took this ingenious use of nighttime illumination with them. Designers of new movie theaters built on the tradition, seeking to catch the eye of the potential patrons by outlining exteriors in stud lights and topping them with illuminated billboards as well as painting marquees in light.[112]

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109 Naylor, *American Picture Palaces*, 31.

110 Naylor, *Great American Movie Theaters*, 19.

111 Maggie Valentine, *The Show Starts on the Sidewalk: An Architectural History of the Movie Theatre, Starring S. Charles Lee* (New Haven, Connecticut: Yale University Press, 1994), 9.

112 Naylor, *Great American Movie Theaters*, 20.

Adler and Sullivan's 1886 Auditorium Building is one prominent example from the late 1800s where the then new incandescent lamp was featured as a central element of the theater's interior. The use of ornamental incandescent interior and exterior lighting increased over a 40 year period, when the marquee of the Orpheum Theater built in Chicago in 1926 was claimed to use more electric current than the Metropolitan Building office block in which it was housed.[113] Theater supply companies consulted to architects in the design and specification of specialty products and systems for this building type.

Patrons and staff found further amenities on the theater interiors. Lobby spaces were vividly decorated, with lounges designed to "keep the patron's mind off the fact that he is waiting."[114] Architects developed circulation patterns to ensure safety and convenience. The Tivoli Theater in Chicago, designed by Rapp & Rapp in 1921, was the first movie theater with a clearly charted traffic pattern. Theater backstage areas often included rigging and lighting for live performances. The orchestra pit could include an organ console that would raise and lower. A full complement of dressing rooms would be provided. Mechanical systems, especially for cooling, were some of the most advanced or revolutionary for the time.

Picture palaces continued to dominate popular entertainment until the advent of television, which, combined with the deterioration of the inner cities, led to lower attendance and dwindling profits for theater owners in cities. Demolition of larger theaters occurred in the 1950s and 1960s. Surviving theaters were either neglected or defaced by subdividing auditoriums.

With the rise of the preservation movement in the 1970s, and recognition of the significance of theaters, new life was breathed into the opulence of the picture palace in downtowns across the United States. Some returned to the showing of films, while many were adapted for use as live theater or concert halls. However, at present many are still empty and in danger of demolition.

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113 Naylor, *American Picture Palace*, 40.

114 Ibid., 36; quoted from E. C. A. Bullock of the firm of Rapp & Rapp

4. History of the Incandescent Lamp and Electric Power

The Development of the Incandescent Lamp

Many scientists and inventors preceded Edison in the development of the electric incandescent lamp.[115] One of Edison's predecessors was J.W. Starr, an American working in England. Although Starr's 1845 incandescent lamp was unsuccessful, it contained elements that were utilized in Edison's experiments and subsequent successful design. This included a filament using thin sheets of platinum (for which Starr later substituted rods of carbon), a glass tube with one end sealed to create a vacuum, and copper lead wires attached to the filament. Starr's lamp lacked qualities that allowed manufacture.[116] It was known that a wire could be heated to incandescence by passing sufficient electric current through it. The difficulty lay in producing an adequate vacuum and preventing the filament

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[115] The following table is adapted from *The Electric Lamp Industry: Technological Change and Economic Development 1800-1947* by Arthur A. Bright, Jr. This book published in New York by the MacMillan Company in 1949 from a study conducted for the Massachusetts Institute of Technology is quoted in Robert Friedel and Paul Israel, *Edison's Electric Light: Biography of An Invention* (New Brunswick, New Jersey: Rutgers University Press, 1986), 115.

Date	Inventor	Nationality	Element	Atmosphere
1838	Jobard	Belgium	carbon	vacuum
1840	Grove	English	platinum	air
1841	De Moleyns	English	carbon	vacuum
1845	Starr	American	platinum	air
			carbon	vacuum
1848	Staite	English	platinum/iridium	air
1849	Petrie	American	carbon	vacuum
1850	Shepard	American	iridium	air
1852	Roberts	English	carbon	vacuum
1856	de Changy	French	platinum	air
			carbon	vacuum
1858	Gardiner & Blossom	American	platinum	vacuum
1859	Farmer	American	platinum	air
1860	Swan	English	carbon	vacuum
1865	Adams	American	carbon	vacuum
1872	Lodyguine	Russian	carbon	vacuum
			carbon	nitrogen
1875	Kosloff	Russian	carbon	nitrogen
1876	Bouliguine	Russian	carbon	vacuum
1878	Fontaine	French	carbon	vacuum
1878	Lane-Fox	English	platinum/iridium	nitrogen
			platinum/iridium	air
			asbestos/carbon	nitrogen
1878	Sawyer	American	carbon	nitrogen
1878	Maxim	American	carbon	hydrocarbon
1878	Farmer	American	carbon	nitrogen
1879	Farmer	American	carbon	vacuum
1879	Swan	English	carbon	vacuum
1879	Edison	American	carbon	vacuum

[116] Cecil D. Elliot, *Technics and Architecture: The Development of Materials and Systems for Buildings* (Massachusetts: The MIT Press, 1992), 252. Page 262 of Elliot's book also contains a brief history of the patent lawsuits that Edison fought in the 1880s.

from burning out. Other early experiments utilized carbon and platinum for the wire filament. None of the experimental incandescent lamps prior to Edison's efforts were practical for widespread production.

Gas lighting was used in cities and towns, but this was hazardous due to asphyxiation and fires. Electric artificial illumination in the form of the arc lamp was in use in major cities in Europe and America by the time Edison began his experiments. Arc lamps functioned with two carbon electrodes placed one above the other, and as the tips of the electrodes were heated by electric current, a luminous (and noisy) arc formed between them. The arc lamp had limitations due to its intensely bright light, noise, and vapors and was limited to exterior uses or large interior spaces. The challenge of the incandescent lamp was to create an economical means of illumination for domestic as well as large scale commercial uses. The level of illumination had to be as bright as that provided by gas jets. The lamps also needed to have high electrical resistance in order to reduce the cost of copper wiring. These were the criteria that Edison sought to meet.

Edison had founded his laboratory in Menlo Park, New Jersey, in 1876 and after the development of several new inventions and products, he began the search for a practical incandescent lamp. On 16 September 1878 Edison announced that he not only planned the development of the incandescent lamp, but an entire infrastructure of power stations, fixtures, and other components necessary for the true practicality of it. Edison claimed that this would be accomplished in only six weeks.[117]

The Edison Electric Light Company was formed 15 October 1878, with a capital of $300,000.[118] Edison received half the shares of the company in return for developing the incandescent light system. To do this, he needed an infusion of capital from the new company's backers to expand his laboratory. His first patent, for a platinum filament lamp in a glass enclosure, was filed 5 October 1878.[119] This lamp was not very successful as it had a limited life. Further experiments followed using regulators to control the temperature of the filament along with a variety of filament materials. Another development was an improved parallel circuit, an advance over lamps wired in series where one burned-out lamp would prevent the entire string of lights from illuminating. This feature, known as subdividing electric current, was one of the most important advantages of Edison's system. A more efficient direct current (DC) generator was also developed with an efficiency of 90 percent.

The first successful lamp burned for 40 hours on 21 October 1879, using a carbonized cotton thread.[120] Carbonized paper filament lamps were also developed, and these were installed late in 1879 in residences and streets in Menlo Park.[121] A public demonstration at

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117 Edison's announcement caused the stocks for gas lighting companies to decline sharply, see Lewis, *The Incandescent Light*, (New York: Shorewood Publishers, Inc., 1961), 34.

118 Ibid., 37.

119 Ibid., 41.

120 Ibid., 54.

121 Arthur Bright, *The Electric Lamp Industry: Technological Change and Economical Development From 1800 to 1947* (New York: The MacMillan Company, 1944), 66.

Menlo Park of lamps using carbonized paper filaments followed on New Year's Eve, 1879, with about 80 lamps placed on poles. The power for this demonstration was generated by the first central power station, consisting of three six-kilowatt bipolar generators. More than 3,000 people, including several public officials from New York, attended this demonstration. Newspaper reports from the demonstration improved Edison's standing with investors, who had begun to lose faith after he was unable to deliver far all that he had promised in his initial announcement.

Edison further refined the incandescent lamp, developing filaments with fibers of bamboo and tropical grasses. Edison and his assistants looked at over 6000 species of plants for a filament. In its initial form for production in 1880, the filament was made from carbonized paper, although the lamps introduced two years later were made with carbonized bamboo filaments. In late 1880, the screw base for the incandescent bulb was developed.[122] Filament vaporization was a problem, as the interior of the bulb blackened early in the life of the lamp. However with occasional minor improvements, the carbonized bamboo filament lamps were used for approximately ten years.[123]

With the incandescent lamp at an acceptable level of development, Edison had to establish the manufacturing concerns for production. The first factory for lamps, started in 1880, was located at Menlo Park.[124] In that first year, 35,000 incandescent lamps were produced.[125] This factory was also the first to have incandescent lighting. These works were moved to Harrison, New Jersey in April of 1882. By August of that year, 150 employees were producing 1,200 lamps per day.[126] Other components, from sockets to generators, were manufactured in factories established by Edison. All of these factories became part of the Edison General Electric Company, which several years later became the General Electric Company. The first private residence to have incandescent lighting, other than those at Menlo Park, was the William H. Vanderbilt residence in New York in 1881.[127]

One of Edison's goals was to set up a large-scale demonstration by illuminating a section of New York City.[128] Toward this end, work started on the construction of a central station on

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122 Lewis, *The Incandescent Light*, 64.

123 Frank H. Bernhard, ed., *EMF Electrical Age to the United States* (New York: Arno Press, 1979), 413.

124 Lewis, *The Incandescent Light*, 65.

125 Abram John Foster, *The Coming of the Electrical Age to the United States* (New York: Arno Press, 1979), 87.

126 Bright, *The Electric-Lamp Industry*, 77.

127 Foster, *The Coming of the Electrical Age to the United States*, 108-109. This installation was somewhat less than successful. As Foster reports:

> In one large room of the Vanderbilt mansion there was cloth of gold material covering the walls in a manner similar to wall paper. When the current was turned on in that room, a short circuit caused lightning-like effects among the threads of gold in the cloth, which tore the cloth, and disfigured the wall. The Edison Company had to pay for the damage. Mrs. Vanderbilt objected to residing in the immediate vicinity of a steam engine and a boiler, carrying 120 pounds of steam pressure, or so near to the indispensable humming noise of the dynamo.

128 Before the New York central station was complete, an isolated lighting system was installed at the Hinds, Ketcham and Company of New York, with its own generator to power lamps. A separate company, The Edison Company for Isolated Lighting, was set up to meet the demand. By 1883, 334 isolated power stations were constructed

Pearl Street in New York in 1880. To run electric power to the demonstration neighborhood, Edison's lab developed a method of insulating underground power lines. The insulation consisted of asphaltum boiled in linseed oil, mixed with paraffin and beeswax. Demonstrations of the underground power system were conducted at Menlo Park, with a larger scale exhibit at the 1881 Paris Expositions, complete with generator and 1,000 lamps.[129] The Pearl Street station, complete with underground power supply for 400 lamps, initiated service on 4 September 1882. More than 5,000 lamps were illuminated by December of that year.[130]

"The Battle of the Systems," or "The War of the Currents"

With small isolated power stations satisfying the needs of industrial and commercial customers, construction of central power stations was initially slow. Early central station systems had limitations, due to their use of direct current generators. Because of the low voltage necessary for the proper functioning of Edison's incandescent lamps, direct current power transmission was limited to about one mile. In 1892, the Croatian-born Serbian Nikola Tesla pioneered the development of alternating current with the creation of a high-frequency alternator.[131] Alternating current functions by alternating direction of current flow at regularly occurring intervals as the dynamo generator operates. This method was more effective for transmitting power over long distances. Tesla's work led to the possibility of voltages ten times the level of Edison's direct current generators. Also, alternating current generators and transformers (which stepped the high voltage down to a level appropriate for domestic use) were more efficient than their direct current counterparts.[132]

Tesla joined Edison's laboratory, although Edison was skeptical of the younger man's theories of alternating current. Tesla worked for two years as an engineering troubleshooter traveling from one Edison installation to another.[133] After Tesla left Edison's laboratory, he eventually attracted the attention of George Westinghouse. Westinghouse had invented the railroad air brake and was building an electrical empire by purchasing other inventors' patents. He purchased the manufacturing rights to Tesla's alternating current motors and to

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and in operation. As central station systems were developed and installed throughout the country, demand ceased for isolated systems. See Robert Silverberg, *Light for the World: Edison and the Power Industry* (Princeton, New Jersey: Van Nostrand Company, Inc., 1967), 176 and Lewis, *The Incandescent Light*, p. 71.

129 Lewis, *The Incandescent Light*, 71.

130 Ibid., 74 and 78.

131 Rudi Stern, *Let There Be Neon* (New York: Harry N. Abrams, Inc., 1979), 16.

132 Direct current transformers did not exist at that time, and were not fully developed for use until the first part of the twentieth century; see Robert Conot, *A Streak of Luck* (New York: Seaview Books, 1979), 253. The difference between direct current and alternating current is in the generation, transmission, and components utilizing either current type. Direct current was conveyed at a low voltage due to the fact that it was used at low voltage. To increase the amount of transmitted current, the size of conducting wires had to be increased. If the transmission distance was increased, the size and cost of conducting wires became prohibitive. Alternating current could be readily transformed from high to low voltage with little loss of energy.

133 Neal Baldwin, *Edison Inventing the Century* (New York: Hyperion, 1995), 201.

the transformers fabricated by Massachusetts inventor William Stanley. Stanley also conducted experiments using alternating current power independent of Edison and Westinghouse. In a demonstration in March of 1886, Stanley transmitted alternating current power at high voltage, stepping it down at the receiving end.[134] Westinghouse purchased this patent as well, and over the next two years produced alternating current power systems for 130 municipalities.[135] Edison had based his entire system on direct current power, and he firmly believed that alternating current power was too dangerous for domestic use. Edison was determined to prove that alternating current power was unsafe. He sent pamphlets on the dangers of alternating current power to mayors and major businessmen in towns with over 5,000 inhabitants. A series of unfortunate incidents, involving experiments into the electrocution of animals and a botch of the first electrocution of a prisoner sentenced to death by that means, influenced the choice of alternating current power as the dominant power supply system by undermining Edison's credibility.[136]

In 1887 a group of Buffalo, New York businessmen offered a $100,000 prize for a way to harness Niagara Falls to provide electric power to the city.[137] Two year later a hydroelectric project utilizing Swiss made turbines was in the planing stages, and the choice of alternating current or direct current power needed to be made. The 20 mile distance between the falls and Buffalo necessitated the choice of alternating current power because less power was lost over the transmission distance. In addition to the technical requirements, public opinion was no longer against alternating current power. The contract for the Niagara Falls generators went to Westinghouse. Alternating current power had been established as the industry standard.[138]

The Development of the Power Industry in Chicago

Artificial electric illumination in Chicago dates to 1878, when the North Side Water Works was illuminated in arc lamps. In September 1879, arc lamps were installed in the Grand Pacific Hotel. Two years later incandescent lamps were installed at a mill of the United States Rolling Stock Company using an isolated power system. By 1884, 11 firms were meeting the demand for electric power in Chicago, with a total business of over $1,000,000. Four of these were native to the city (the remaining ones were branches of out of town companies). These four were the Van Depoele Electric Company in 1880, the Western Edison Company in 1882, the Sperry Electric Light, Motor, and Car Brake Company in 1883, and the Blair Electric Company in 1884. None of these firms endured beyond the 1880s.[139]

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134 Conot, *A Streak of Luck*, 253.

135 Ibid., 254.

136 See Conot, *A Streak of Luck*, for elaboration of this scenario.

137 Elliot, *Technics and Architecture*, 260.

138 In a final reflection of the temporary loss of prestige for Edison from the alternating current/direct current crisis, the Edison General Electric Company consolidated with the Thomson-Houston Company in 1892, becoming the General Electric Company. Significantly, Edison's name was left out of the newly formed company's name.

139 Bessie Louise Pierce, *A History of Chicago, Volume III, The Rise A Modern City 1871-1893* (Chicago: The University of Chicago Press, 1957), 225.

Development of a centralized electric power supply system in Chicago dates to 1887, with the merging of the Chicago Arc Light and Power Company and the Chicago Edison Company.[140] The first municipal electric lighting station began operation on Christmas Eve, 1887. The first station was in the basement of Chemical Engine Co. No. 1 at Clinton and Washington Streets. The equipment consisted of a 125 horsepower engine and four, 30 light low tension arc dynamos.[141] Chicago was the first major city to have its own electric lighting system. The Department of Electricity was formed on 24 January 1898. This move enabled the city to bring about improvements and extensions to the city's lighting system.[142]

The Incandescent Lamp from 1882 to 1921

A series of improvements to the incandescent lamp was introduced in the 40 years from 1882 to the construction of the Chicago Theatre. The greatest single advances were the development of the tungsten filament and the gas-filled lamp.[143] The incandescent lamp industry in the United States was the most advanced industry in developing standardized components and mass production. The General Electric Company introduced most of the technological advances inn lighting in this period.[144]

An example of standardization in the industry was the evolution of lamp bases. Each producer had originally developed his own design and interchangeability was not possible without adapters. The Edison screw base was one of up to 14 that were available in the nineties. In 1900, 70 percent of the lamps had screw bases, with other standard bases from Westinghouse, Thomson-Houston, and others.[145]

Sir Joseph Swan, a British inventor working on the incandescent lamp concurrently with Edison, initially developed squirted carbon filaments in the 1880s. They were produced by squirting a cellulose solution into a setting liquid. Another British inventor, Leigh S. Powell, produced an improved strong, structureless cellulose thread that could be shaped before carbonization as a filament. The squirt filaments were uniform in diameter, which meant the they burned more evenly with a prolonged life over bamboo filaments. Lamps with squirt filaments were introduced on the American market in 1894.[146]

Gem lamps, produced by the General Electric Company and introduced in 1905, were the next advance for the carbon filament. These lamps had a cellulose-carbonized filament that had material characteristics of a metal by exposing them to high heat in a furnace. (Gem

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140 Ibid.

141 *Twenty-Fifth Annual Report, Department of Gas and Electricity, City of Chicago*, 1921, 6.

142 *The Fifth Annual Report of the Department of Electricity, City of Chicago*, 1901, 33.

143 Lewis, *The Incandescent Lamp*, 87.

144 Bright, *The Electrical Lamp Industry*, 201-202.

145 Ibid., 203.

146 Elliot, *Techniques and Architecture*, 256.

stood for General Electric Metalized lamp.) The commercial introduction of tungsten filament lamps in 1907 superseded Gem lamps, which were no longer in general production after 1918.[147]

Tungsten, a metal with a high melting point and low electrical resistance (thus a good material for a filament), was known as a hard and brittle metal prior to 1906. In that year two Austrian chemists, Alexander Just and Franz Hanaman, developed a filament of pure tungsten for production. General Electric purchased the rights and put a tungsten lamp on the market in the United States in 1907.[148] The filament was produced by mixing a fine tungsten powder with sugar and gum arabic. Further development by William D. Coolidge of General Electric led to a filament made from drawn tungsten wire, which was commercially produced in 1911.[149] By 1921, tungsten filament lamps was the predominant type of incandescent lamp manufactured, with 154,971,269 units produced versus 5,998,497 units for carbon filament lamps.[150]

During this same forty-year period, improvements were made in the vacuum within incandescent lamps. The Sprengel air pump utilized drops of mercury in a tube, and took along air in passing through the tube. In the tube a small amount of phosphoric anhydride absorbed any moisture that might be present. Glass bulbs were fastened at the end of the tube, along which a barometer to measure pressure. The mercury vacuum pump was initially used in the production of lamps. In 1896, an Italian inventor and incandescent lamp manufacturer, Arturo Malignani, developed an improved vacuum pump.[151] General Electric purchased the United States patent rights. Its application shortened production time. Refinements of the Malignani pump process over the next decade brought improved results.

Early incandescent lamps blackened over their service life. An engineer at General Electric, Irving Langmuir, initiated a study of this problem in 1909.[152] He examined the gases remaining in incandescent lamps after production. After thousands of experiments, a lamp employing a ductile tungsten filament, but filled with a mixture of argon and nitrogen gas, was produced about 1913.[153] The presence of the gas reduced blackening. Under the pressure of gas, filaments resisted vaporization. The gas used in the first gas-filled lamps conducted heat away from the filament and thus lowered the lamps efficiency by reducing the brilliancy of the filament or by requiring more current to maintain the required luminescence. By 1921, when the Chicago Theatre was under construction, smaller lamps were the vacuum types, and high-wattage lamps were gas-filled. In 1920, approximately

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147 Lewis, *The Incandescent Lamp*, 94.

148 Bernhard, *EMF Electrical Year Book*, 413.

149 Lewis, *The Incandescent Lamp*, 98.

150 Bright, *The Electric Lamp Industry*, 490, originally cited by the Bureau of the Census, U.S. Department of Commerce, *Census of Manufacturers,* 1921-1929, Washington, D.C.

151 Lewis, The Incandescent Lamp, 96.

152 Ibid., 103.

153 Bernhard, *EMF Electrical Yearbook*, 413.

180,000,000 incandescent lamps with a total wattage of over nine billion watts were sold in the United States. About half of this wattage was in gas-filled tungsten lamps.[154]

Other improvements between 1882 and 1921 included replacement of expensive platinum lead wires with cheaper composites of nickel and copper. Molded glass bulbs without tips were also developed. Attempts were made at frosting the inside or outside of glass bulbs to reduce the glare from lamps. Incandescent lamps were not generally frosted on the inside until 1925.[155]

Incandescent lamp production improved as demand increased. In the 1890s, machines were introduced to seal the lamp by evacuating the glass bulb and setting the platinum lead wires. Up to that decade, lamps were hand-blown into molds by Corning Glass Works. The Libbey Glass Company developed a paste-mold glass bulb-blowing machine in 1894. A semi-automatic lamp-producing machine was introduced in 1895.[156] Developments after the turn of the century included the stem-making machine (which assembled the glass stem, lead-in wires, and filament supports) and the tubulating machine (which exhausted the air from a small hole in the round end of the lamp).[157] Various automatic lamp-producing machines were in use by the 1920s.[158]

Mechanization led to cheaper lamps, and increased production and growth in the lamp industry. By 1904, General Electric alone employed 3,800 workers in its lamp manufacturing plants.[159] The *EMF Electrical Yearbook* of 1921 describes the manufacture of incandescent lamps:

> To produce lamps at a reasonable cost it is essential that the processes be largely automatic and that the operators need not be technically skilled. As a consequence, incandescent lamps are made to a large extent by machinery, which is more or less automatic, the machines being for the most part operated by girls. Many of the operations involve the heating and shaping of glass parts. This is usually done by gas jets, which are arranged to strike the glass tubular stem, rod or bulb at the proper point. Other machines form the filament supports and base, draw the filament material, coil it (for gas-filled tungsten lamps), pump the air from the bulb, seal it, etc. There are about forty materials that are used to make up the average incandescent lamp. Their manufacture into the various lamp parts requires a large number of separate processes and many more operations, followed by the assembling of the parts into the completed lamp. Many machines are used for these various operations, aside from those mentioned. Practically all the machines are motor-driven.[160]

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154 Ibid., 414.

155 Lewis, *The Incandescent Light*, 105.

156 Bright, *The Electric-Lamp Industry*, 133.

157 Ibid., 205.

158 Bright, The Electric-Lamp Industry, 498.

159 Ibid., 205.

160 Bernhard, *EMF Electrical Yearbook*, 414.

5. History of Neon Illumination

At the time of documentation, a limited amount of abandoned neon lighting components of the Chicago Theatre vertical sign were present in the top panel of the sign (see description below). Only the ballasts for the neon fixtures and some glass tubing remained. Red neon had been used to spell out the name ABC-GREAT STATES when the theatre was operated by them.

Just as the evolution of the incandescent lamp followed a long period of development, neon illumination followed a parallel path. In 1683, Otto von Guericke observed light from the discharge of static electricity. Francis Hawksbee in his *Physico-Mechanical Experiments* of 1709 described how he had produced light by shaking up a vacuum tube filled with mercury. Johann Heinrich Winkler of Leipzig performed a similar experiment to Harksbee's in 1744. Winkler also formed a glass tube into a name by heat-bending it. In 1856, Heinrich Geissler experimented with a sealed low-pressure tube in which he produced light using a high-voltage alternating current. These experiments led to others by Geissler, as well as by Michael Faraday and William Crookes of England during the same period, which showed that gases are capable of carrying current in a closed environment, and sometimes produce luminescence.[161]

A secondary result of the research of Nikola Tesla into alternating current produced phosphor-coated tubes within which alternating current was passed through various gases. However, Tesla's tubes from 1892 were not long lasting due to chemical reaction between the electrodes and enclosed gases. By 1904, D. McFarland Moore had extended Tesla's concepts by producing tubes into which the gases (in this case nitrogen and carbon dioxide) could be replaced, allowing recharging of the unit. In 1904, Moore produced an illuminated sign for a Newark, New Jersey hardware store.[162]

Neon is one of the rare gases, so termed because of the very small amounts present in normal air. Rare gases are inert and will not combine with other gases, which makes them useful in tubes for passing an electrical charge. The use of neon gas dates to 1897, when two English scientists, Sir William Ransay and William Travers successfully isolated it. They displayed Geissler tubes containing neon as well as argon, krypton, and xenon gas at the 1897 Queen Victoria Diamond Jubilee exhibition. Ten years later, the French scientist George Claude developed a method for liquefying gases, allowing for the distillation of argon and neon gases in usable amounts.[163] Claude also found that neon was extremely sensitive to electrical discharges that produced a red glow in the gas. The addition of a drop of mercury to the gas produced a brilliant blue light. Claude patented the system in 1910.[164]

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161 Stern, *Let There Be Neon*, 16.

162 Ibid., 19.

163 Ibid., 19.

164 Forest C. Carter, Harvey L. Vrendenburg and C. Robert Patty, *A Historical Economic and Statistical Study of the Electric Sign Industry* (Fort Collins, Colorado: College of Business, Colorado State University, n.d.), 5.

Jacques Fonseque, who saw the potential for neon tubes to be bent into lettering for advertising, had been an assistant to Claude. In 1912, Fonseque sold the first neon sign to a Parisian barbershop, the Palais Coiffeur. The following year, one meter high letters spelling "CINZANO" caused a sensation in Paris.[165] The first appearance of neon signage in the United States was in 1923 at a Packard Motor Car Company dealership in Los Angeles.[166] This sign had been sold to the dealer by Fonseque. Claude subsequently sold licenses outside France, with several franchises developed in the United States. Thus the era of the neon sign began. The proliferation of neon continued through the end of Work War II,[167] with displays at the 1933-34 Chicago Century of Progress, the 1937 Paris World Exhibition, and the 1939 New York Worlds Fair. Following World War II, the development of the florescent lamp, as well as changes in signage design, led to a decline in the use of neon until its resurgence in the 1980s.

6. History of Illuminated Signs

Background

Signage, whether for identification or advertisement, dates back to ancient civilizations. Archaeologists have uncovered Egyptian artifacts with emblems of workmen's trades. In ancient Greece, the playwright Aristophanes and philosopher Aristotle referred to signage in their recorded works. The remains of painted signs were also found in the Roman ruins of Pompeii and Herculaneum.[168]

In the Middle Ages, when illiteracy was common, signage consisted of coats of arms to identify the property of houses of nobility, and symbolic figures such as a red lion or a green dragon. In 1393, innkeepers in England were required by law to have signs, and a similar regulation was put in effect in 1567 in France. Signboards in 1761 in France were required to be attached to the building, as opposed to separate signposts. After the introduction of oil lamps, signs could be illuminated from a window lamp shining from below the sign.[169]

Illuminated Signs

Gas lighting was used to illuminate signs as early as 1840, with a sign advertising P.T. Barnum's Museum. The first electrical sign, built in 1881, consisted of the name "EDISON" spelled out in incandescent bulbs. It was exhibited during the International Electrical Exposition in January 1882, at the Crystal Palace in London, England. The novelty of the electric lamp led to what was known as "electrical spectaculars," such as the

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165 Stern, *Let There Be Neon*, 23.

166 Ibid., 24.

167 Ibid., 28.

168 Jacob Larwood and John Camden Hotten, *History of Sign Boards from the Earliest Times to the Present Day, 8th ed.* (London: Chattus and Windus Picadilly, 1875), 1-3.

169 Ibid., 4-16.

first in New York City in 1891.[170] These inspired the use of electric lamps in signage across the country. The *Signs of the Times* magazine reported that by 1906 there were 75,000 electric signs in the United States. Electric signs were mass produced for the first time in 1909 by the P. Pause Company of Chicago.[171]

These early illuminated signs were developed with new innovations to adapt previous signage methods to the unique qualities of the electric lamp. These included channel letters with bulbs within the frame of the letter (as on the Chicago Theatre vertical sign), signs with slots cut unto the metal faces to form the shapes of letters, and lamps mounted inside the sign allowing the lights to shine through the letters. The image of channel letters with incandescent lamps was so novel that Kliegl Brothers, a manufacturer and supplier of theater equipment, used it in the design of their trademark.[172] Flashers were also used for certain effects, such as a Roman chariot race at Herald Square in New York, which displayed 2,500 flashes per minute.[173] By 1931, neon was available for general commercial use.[174]

Around the turn of the century, nickelodeon operators developed their own advertising signs, usually hand painted posters, to promote their current features. Film companies began to provide lithographs with their film around 1910, consisting of the title with various scenes describing the story line.[175] With the increase in capacity of theaters, owners needed to attract larger and larger crowds, leading to the necessity for larger signage informing patrons of the current attraction.[176] A publication by Commonwealth Edison Company on electric signs discusses the appeal of electric advertising for theaters:

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170 Carter, *A Historical Economic and Statistical Study of the Electric Sign Industry*, 4. As early as 1910 some spectaculars used up to 20,000 electric light bulbs, were several stories high, and one to two hundred feet long.

171 Ibid., 5.

172 Kliegl Brothers Universal Electric Stage Lighting Company, *Sweets Architectural Catalogue* (New York: Sweets Catalogue Service, Inc., 1925/1926), 2468.

173 Carter, *A Historical Economic and Statistical Study of the Electric Sign Industry*, 4-5.

174 Flexlume Corporation, *Sweets Architectural Catalogues* (New York: Sweets Catalogue Service, Division of D. W. Dodge Corporation, 1931). As quoted in their advertising, "neon was the newest and latest in colorful electric display with strong day and night attractiveness....red, blue, green, white, gold and purple."

175 Erwin Wagner, "History of Signs," *A Pictorial Survey of Marquees* (Notre Dame, Indiana: Theatre Historical Society, 1980), 2.

176 The alterations enlarging the marquee on the Chicago Theatre are an example of the competition between theaters. The Loop during 1920s and 1930s contained the Oriental Theatre, Schubert Theater, and now demolished McVickers Theater. Some other Chicago theaters included the Avalon (1927), Belmont (1926), Diversity (1925), Congress (1926), Music Box (1929), Palace (1926), Riviera (1919), Apollo (1921 and 1927), Uptown (1925), and Tivoli (1928).

> The moving picture house of today considers practically every passerby a possible patron. In order that there may be no possibility of the theatre not reaching the attention of everyone, moving picture theaters are using very elaborate electrical display fronts. Intricate designs and flashing boarders worked out in many-colored lights have demonstrated that this form of electrical advertising brings big returns.[177]

A contemporary of White Way Sign Company, manufacturer of the Chicago Theatre vertical sign, was Lu-Mi-Nus Signs, Inc., of Chicago, Illinois, which manufactured illuminated signs for theaters.[178] Lu-Mi-Nus manufactured the marquee and two vertical channel letter signs for the Roosevelt Theater in Chicago, which was featured in its advertising to architects and builders. The National Theatre Supply Company of Chicago offered designers the following services. (Note that the description discusses the use of renderings in the design process.)

> **Marquises** - Produced for us by a leading manufacturer and designer of extraordinarily attractive theatre marquises and canopies. They are built to order in any special design or decorative treatment desired.
>
> **Electric Signs** - Through our connections with the sign manufacturing industry, we are able to render a most reliable sign service, and are in a position to supply the theatre with most attractive theatre name flasher signs and changeable program boards of every description. Sketches rendered gratis.[179]

By the mid-1920s, theaters were the fifth largest building classification to have electric signs, with a total of 13,700 theaters having electric signs.[180] Due to space limitations in the public right of way, vertical signage was one solution for communicating the advertising message. Several of these vertical signs were unique in their design.

> ...similar vertical signs in Chicago c.1920 included The Savings Bank - a design very suggestive of saving with coins dropping from an extended hand into the bank below where 3% interest is paid on savings. The flasher gives the effect of a steady flow of coins into the bank and then the 3% flashes out...[181]

At the time of the erection of the vertical sign, the Commissioner of Gas and Electricity was responsible for the inspection of electrical wiring for buildings, including signage that extends onto the public right of way. The Electrical Inspection Bureau under the direction

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177 Commonwealth Edison Company, *Electric Signs* (Commonwealth Edison Company, 1920), 12.

178 Lu-Mi-Nus Signs, Inc. *Sweets Architectural Catalogue*. 17th ed. (New York: Sweets Catalogue Service, Inc., 1922), 1888.

179 National Theatre Supply Company, *Sweets Architectural Catalogue* (New York: Sweets Catalogue Service, Division of F. W. Dodge Corporation, 1927), C3217.

180 C.A. Atherton, *Electrical Advertising* (Cincinnati: The Sign of the Times Publishing Company, 1925), 175.

181 Commonwealth Edison Company, *Electric Signs*, 34.

of the Chief Electrical Inspector conducted inspections. The Bureau was divided into different areas of concentration: inspection and reinspection of interior work, inspection and reinspection of exterior work, theatre inspections, sign inspection, and laboratory inspections. In addition to these duties, the Bureau also supervised the examination and licensing of moving picture operators. Electric signs were to be reinspected annually, especially the structure of suspended signs over the public right of way. A license for a new sign cost $25, while renewal cost $10.[182] In 1921, 2,672 permits were issued for new signs and 10,156 signs were reinspected. Of the signs in use 31 December 1921, 10,252 projected over the walk; 1,761 hung parallel with the building; 182 were roof signs; and 281 were bulletin boards, making a total of 12,476 electric signs in the city of Chicago.[183]

7. Design Standards for Illuminated Signs (circa 1921)

Around the time of the fabrication of the vertical sign on the Chicago Theatre, standards existed for the architectural, structural, and electrical design of illuminated signs. The following outlines these standards. These standards are contained in the texts *Electrical Blue Book: The Buyers Encyclopedia of Electrical Material* of 1918;[184] *EMF Electrical Year Book* of 1921;[185] and *Electrical Advertising* of 1925.[186]

a. Architectural Design Standards

It was recognized that signs needed to fit into their architectural context:

> The display should be so designed as to enhance the architectural beauty of the building on which it is mounted, or to improve the appearance of the objects or space, which it conceals. It should be so complete and so in harmony with the ornamentation of the building architecture that to remove it would be to destroy or hurt the unity of the structure...Its framework and mechanical construction, its angle iron braces and guy wires should either be as completely hidden as are the angle iron girders of the building, or should be of such an ornamental nature as to be part of the display.[187]

However, the concept of bigger is better was also encouraged:

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182 Department of Gas and Electricity, City of Chicago, *Twenty-Fifth Annual Report, 1921* (Chicago: City of Chicago, 1921), 50-51.

183 Ibid., 55.

184 *Electrical Blue Book: The Buyers Encyclopedia of Electrical Material* (Chicago: International Trade Press, Inc., 1918).

185 Frank H. Bernhard, ed. , *EMF Electrical Year Book* (Chicago: Electrical Trade Publishing Company, 1921).

186 Atherton, *Electrical Advertising*, 20-46.

187 Ibid., 20-21.

> ...One of the most obvious and most effective means of obtaining attracting and selling power is by increasing the size of the display....In electrical advertising there are no limits to the size, which a display may attain. Letters forty feet in height and displays using twenty thousand lamps are past records. Also, the area over which a sign is legible (other things being equal) is proportional to the square of its linear dimensions.[188]

The types of illuminated signs commonly in use were covered:

> Metal letters either blocked out and mounted on frames or mounted on box signs are generally used on the large electric signs used on roofs. The metal letters have the sockets mounted in the letters, so as to outline the skeleton letter, being mounted flush with the surface or recessed in a trough. The letters are commonly painted with a light-colored reflective paint to render the sign more easily readable. They serve as non-electric signs by day and electric signs by night.[189]

> Signs in which the pattern of lettering is outlined in spots of light from the visible lamp bulbs are called exposed lamp signs....The pattern is painted or enameled on the box or container and the sockets are inserted and made flush with the surface at intervals along the strokes of the pattern. This construction is used largely for the less expensive and standardized signs, which are made in large quantities. It is the least expensive exposed lamp sign construction. The lamps are placed along certain lines, which are to be emphasized, and particularly along the strokes of the letters....trough pattern. The pattern is outlined with thin walls of sheet metal. The pattern itself may be flush and merely painted on a containing box, or the box may be omitted....It has three major advantages over the other types of exposed lamp construction, as follows: 1. It increases the brightness contrast between the pattern and the background by shielding the light from the background; 2. It makes reading at wide angles easier by preventing the filaments appearing displaced from the position in which they are designed to be; 3. It improves the daytime appearance by giving depth to the sign. To obtain these desirable features the trough or channel must be at least deep enough to cut off all direct light at angles greater than 90 degrees from the vertical axis of the lamp.[190]

Lamp spacing was discussed:

> If in the line of light which obviously is made up of a series of spots, the centers of the lamps (to which the spots, of course, correspond) are spaced one spot diameter apart, the appearance will be a continuous series of spots, as shown in Condition No. 2. If they are

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188 Ibid., 26-27.

189 Bernhard, *EMF Electrical Year Book*, 431.

190 Atherton, *Electrical Advertising*, 37-40.

> spaced at half this distance, the line will appear solid and continuous as in Condition No. 1. If they are spaced at distances greater than one diameter - for example, at three diameters, as in Condition No. 3, or father apart, as in Condition 4 - the line will appear as a series of separate sports, or there will be no distinct line at all.[191]
>
> In this connection it should be observed that if the vertical stroke of any letter is so short that it may be covered by less than four spots of light, the letter is really too short for the exposed lamp construction. No exposed lamp sign should ever be built with less than four lamps in vertical stroke.[192]

The motion of incandescent lighting was a prime factor in the design of illuminated signage:

> The effect of motion, obtained by flashing or dimming an electrical display is one of the most powerful means of obtaining attracting power. Under certain conditions motion may increase legibility as well, and it is always a factor in obtaining selling power.[193]
>
> In comparatively few electrical displays do the lamps or the illuminated parts actually move. The effect of motion is obtained by flashing one lamp after another, so that it is the spot of light that actually moves.[194]

Design details such as the border of the sign were discussed:

> In electrical advertising, perhaps more than in any other form, the value of a border, the shape of which is characteristic to the particular type of article advertised or to the publicity program, is extremely valuable. Its function is three-fold. It increases the size of the sign by surrounding the more intricate picture or lettering with a mass of light, it makes these details more legible and it gives the sign more overall characteristic shape.[195]
>
> The most common convention motions are running or changing borders. They are used as frames...to outline signs and displays of all kinds. For theater front attraction boards, marquee facings, bulletin boards and particularly in commanding places and building outlines, running and changing borders are very effective. The two essentials of a good border are: 1. That it shall be pleasing in pattern; 2. That is shall be distinctly different from its nearby competitors....There are an

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191 Ibid., 45.

192 Ibid., 46.

193 Ibid., 31.

194 Ibid., 135.

195 Ibid., 29.

almost infinite number of patterns which may be used to obtain this variety of motion for running borders.[196]

b. Architectural Material Standards

The types of materials for constructing signs are covered in two separate standards:

a. Material

Must be constructed entirely of metal or other approved non-combustible material, except that wood may be used on the outside for decoration if kept at least 2 inches from nearest lamp receptacle.

Sheet metal must be not less that No. 28 U.S. metal gage.

All metal must be galvanized, enameled or treated with at least 3 coats anti-corrosive paint, or otherwise protected in an approved manner against corrosion.

b. Construction

Must be so constructed as to secure ample strength and rigidity.

Must be so constructed as to be practically weatherproof and so as to enclose all terminals and wiring other than the supply leads, except that open work will be permitted for signs on roofs or open ground where not subject to mechanical injury...

Transformers, unless of the weatherproof type, cutouts, flashers, and other similar devices, if on or within the body of structure of the sign, must be a separate, completely enclosed, accessible weatherproof box or cabinet of metal of thickness not less than that of the metal of the sign itself.

The above devices, if otherwise located, must be enclosed in approved cutout boxes or cabinets.

Each compartment must have suitable provision for drainage through one of more holes each not less than 1/4 inch in diameter.[197]

The durability of signs was an important issue. The 1920s introduction of porcelain enamel-coated sheet metal was reflected in the standards:

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196 Ibid., 138.

197 *Electrical Blue Book*, 244.

> A few signs are made with baked enamel sheet steel, others with statuary bronze-finish copper, and others with natural weathered copper sheet and castings. On nearly all of the others the finish is paint. Under the very best outdoor conditions painted surfaces fade, become discolored, and in general require repainting once a year....Well organized and successful outdoor advertising companies include in their contracts repainting three times each year. In those cases where all the lamps are renewed after a predetermined burning period, repainting should be done at the same time that the lamps are renewed, and one, twice or three times between.[198]

c. Structural Standards

Lateral loads from wind pressures were to be considered in the design of signage:

> For strength to withstand sleet and wind pressures the frames must be securely riveted or bolted together and braced or guyed from the back, on the sides or top, depending on whether the sign is mounted on a roof, in front or along the face of a building or rests on the ground. The framing for box or plate signs almost invariably forms an integral part of the sign and the whole complete outfit is furnished by the sign manufacturer.[199]

d. Electrical Standards

Because the electrical system of a sign was one of the primary elements, the standards covering this were fairly extensive. Lamp size and spacing was discussed:

> For the majority of electric signs no special type of incandescent lamp is now required, standard medium-based lamps being the most generally used. At the present time [1921] the 15-watt tungsten lamp is the most popular for sign use. Before the drawn-wire tungsten lamps were developed it was impossible to make small tungsten lamps of standard voltage. Therefore it was quite common to use special low voltage sign lamps with a special sign lighting transformer; these are now seldom required, although still used to a limited extent. Special sign lamps are used in miniature letter signs in which they are shaped to form the various letters.[200]
>
> The effectiveness of an exposed lamp sign depends very largely upon the choice of lamps. Correct lamps make it very successful, while incorrect ones may either make it fail entirely or so reduce the advertising value of the sign as to make it a financial loss. The proper lamp depends upon four factors, as follows: 1. The shortest distance

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198 Atherton, *Electrical Advertising*, 170.

199 Bernhard, *EMF Electrical Year Book*, 296.

200 Ibid., 421.

> from the sign to the people to whom it is to make an appeal; 2. The circulation, or number of people who pass through the sphere of influence of the sign; 3. The most important of all, upon the surroundings and competing illumination. Brightly lighted district, of course, require brighter signs; 4. The distance to which the sign must carry.[201]
>
> In all forms of exposed lamp signs and displays it is very essential to good appearance that the lamp spacing be made right. Upon the correct spacing of the lamps depends the smoothness and finish, the completeness, and oftentimes the ease of legibility of the sign. Although one lamp might illuminate the painted pattern of the inside of the trough of a letter so that the letter could be recognized and read, the sign would not in that case be what is defined as an exposed lamp pattern display....For displays of different classes, various degrees of continuity in the lines are desirable....
>
> Condition No. 1: a solid continuous line of light. This condition is best for picture signs to show great detail or in signs in which the appearance must be the very best.
>
> Condition No. 2: A continuous series of spots of light. This condition is satisfactory for good appearance in ordinary sign construction.
>
> Condition No. 3: A series of separated spots of light. This condition is suitable for building displays, carnival lighting, etc.
>
> Condition No. 4: Separate spots of light not defining a line at all. This condition is satisfactory for marquees and is used not so much to define a line in light as to illuminate a general area.[202]

One of the factors to be considered in the design of signage was the relative brightness of the surrounding district. Note that State Street in Chicago was considered to be in the second brightest category of location at the time:

> In order to establish a convenient measure of completing brightness, it is assumed that all localities may be classified into districts according to their general brightness and the factor (1) is assigned to the brightest and (10) to the darkest as is indicated in table No. 2 [given below].[203]

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201 Atherton, *Electrical Advertising*, 42.

202 Ibid., 44.

203 Ibid., 42.

Table No. 2

District Brightness Factors	
Factors	Description of District
1	Extremely bright squares, such as Time Square, New York.
2	Very bright centers, such as State Street, Chicago.
3	Bright squares in large cities: Cadillac Square, Detroit; Playhouse Square, Cleveland.
4	White Ways in large cities; public square in smaller cities.
5	Business Districts (not White Way) in large cities; White Ways in smaller cities.
6	Business district in smaller cities; outlying districts in large cities.
7	Outlying districts in smaller cities; centers in small towns.
8	Darker outlying districts with an occasional store, etc.
9	Lighted highway, but no stores.
10	A small isolated display - no street lights or store windows.

Flashers were components that provided motion of the incandescent lamps:

> These flashers consist of motor-drive drums bearing a number of parallel contact arcs of various lengths on which contact fingers bear so as to make or break corresponding lamp circuits as the contact arc passes under the fingers. One side of the circuit is connected to the contact arcs, the other to one side of the lamps on the sign...the lamp groups to be controlled as units [are] connected to the respective contact fingers, one to each group of lamps. By adjusting the lengths of the arcs and their relative angular position it is possible to secure a great variety of flashing effects. For a large sign having an intricate flashing cycle the flasher is seemingly complex, but consists of elements such as described. The contact drum is driven usually at low speed through belt, chain or gear drive by a small motor. If the flasher is mounted on or near an outside sign it is enclosed in a weatherproof metal housing or cabinet.[204]
>
> Flasher Inspection and General Repairs - The entire motion of the display and its correctness depend upon the successful operation of the flasher contact mechanism or controller. A very little wear on the brushes, a slipping belt, a shaft which needs oiling or a loose connection may require only a moment for adjustment, and may make all the difference between a display which is perfect and one which is entirely unintelligible.[205]

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204 Bernhard, *EMF Electrical Year Book*, 291.

205 Atherton, *Electrical Advertising*, 170.

Standards for wiring of illuminated signs is given below:

> Must be approved rubber-covered, not less than No. 14 B & S gage.
>
> Must be neatly run, and so disposed and fastened as to be mechanically secure.
>
> Must be soldered to terminals, and exposed parts of wires and terminals must be treated to prevent corrosion.
>
> Must, where they pass through walls or partitions of the sign, be protected by approved bushings.
>
> On the outside, sign structure, except where open work is permitted, must be approved metal conduit or in approved lead-sheathed armored cable.
>
> For open work, wire must be rigidly supported on noncombustible, non-absorptive insulators, which separate the wires at least 1 inch from the surface wired over. Rigid supporting requires, under ordinary conditions where wiring over flat surfaces, supports at least every 4 1/2 feet. If the wires are liable to be disturbed, the distances between supports should be shortened.
>
> For open work in those parts of circuits where wires are connected to approved receptacles which hold them at least 1 inch from the surface wired over, and which are placed not over 1 foot apart, such receptacles will be considered to afford the necessary support and spacing of the wires. Between receptacles more than 1 foot, but less than 2 feet apart, an additional non-combustible, non-absorptive insulator maintaining a separation and spacing equivalent to the receptacles must be used. Except as above specified, wires must be kept apart at least 2 1/2 inches from voltage up to 300, and 4 inches for higher voltage.
>
> ...Leads from sign must pass through the walls of sign, either through approved metal conduit or armored cable, or must be neatly cabled and pass through one or more approved non-combustible non-absorptive bushings.[206]

8. History of Construction Materials for the Vertical Sign

a. Structural Steel

The steel industry was a development of the iron industry. Before 1860 in the United States, furnaces producing iron were typically located near sources of fuel. When the entire fuel supply was exhausted, the furnace usually was abandoned. As blast furnaces became more sophisticated, it became economical to ship raw materials to the furnace rather than reconstruct new furnaces near the fuel supply.

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206 *Electrical Blue Book*, 244.

The fuel for early blast furnaces was charcoal made by burning wood in an oxygen-starved atmosphere. Anthracite coal was also used as a fuel in the United States. The use of coke as a fuel for furnaces developed in England, where limited forests were available for charcoal production. Abraham Darby developed coke production in the early 1700s, whereby an almost pure carbon product was made by heating coal in a manner similar to charcoal production.[207] Coke was first used in the United States about 125 years later, since the extensive forests here provided less incentive to switch from charcoal fuel.[208] However, as forests near the iron and steel works were depleted, and as imported English iron produced with coke became cheaper than domestic iron, American manufacturers began to switch to coke fuel.

By smelting the raw ore, charcoal or coke, and limestone in a blast furnace without allowing gas to escape, pig iron was produced. This metallic product was a high carbon alloy of iron. Depending on its handling after leaving the blast furnace, iron was used in one of two forms: cast or wrought iron. Cast iron has good compressive strength, but poor tensile strength. Lowering the carbon content in cast iron produces wrought iron. Cast iron contains between 3 and 4.5 percent carbon, while wrought iron contains between 0.02 to 0.08 percent carbon. Wrought iron has three times the tensile strength of cast iron, and was produced by hammering, or later by churning the molten metal in a tank continuously exposed to heat. The wrought iron could be rolled into plates for framing elements or rods. Cast iron, due to its good compressive strength, came to be used for columns, while wrought iron was used for beams and other structural framing elements. Early ironworks typically were small and consisted of a blast furnace where pig iron was made, and a forge where the solidified iron was reheated and hammered down into bars.

Steel had been known for centuries and was both strong and durable. However, it could only be produced in small quantities. The principal uses of steel produced in the early years of the industry in this country were for cutlery, axes, edge tools, and artisan's tools. Steel is formed from an alloy of iron and carbon, and prior to the development of the Bessemer process was produced by adding carbon to wrought iron for a carbon content less than 1.7 percent. This was expensive because of the amount of fuel required. Early types of steel manufacture included blister steel, which was produced by a process of packing wrought iron bars together and heating them in the presence of charcoal for several days, during which the iron gradually absorbed carbon and became steel. William and John Garrard in Cincinnati made successful experiments with the crucible steel process in 1832.[209] Crucible steel was made by cutting the blister steel into short lengths and melting it in an airtight crucible. This improved the quality of the steel by equalizing its carbon content. Crucible steel was popular for the manufacture of cutlery; however, it was not possible to produce large quantities rapidly. The process was

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207 Douglas Alan Fisher, *The Epic of Steel* (New York: Harper & Row, 1963), 46.

208 Ibid., 108.

209 Ibid., 112.

also expensive, and difficulties were encountered in finding clay for crucibles that could withstand the heat of molten steel.

The steel industry was revolutionized by the invention of the Bessemer process, introduced in England in the 1860s.[210] The invention of this process resulted from the efforts of three men: an American, William Kelly, and two Englishmen, Henry Bessemer and Robert Mushet. The Bessemer process involved forcing air through molten pig iron so that the oxygen in the air combined with the carbon in the pig iron, generating sufficient heat to burn out the impurities in the iron. The older processes required oxygen carried in ore, mill scale, or slag to eliminate impurities in the pig iron. Bessemer realized that oxygen for refining could be taken directly from the air if it was blown on or through pig iron. Not only did the added air purify the iron, but it also made the furnace hotter. The process required only a few minutes, and an ingot of mild steel for forging or rolling could be cast rapidly.

The molten iron was placed in a ladle and poured into a cart, which was pushed to the converter house. The contents were run into the hot converter, the blast turned on, the converter tilted up to a vertical position, and the process known as the blow was begun. The converter was a cylindrical steel container lined with refractory bricks. The bricks at the base of the container were perforated with small openings through which air was sprayed into the metal at high pressure.

Patents for the manufacture of steel by the pneumatic process were granted to Kelly and Bessemer as early as 1856 and 1857, and the first such plant in the United States constructed in Wyandotte, Michigan, began operation in 1864.[211] The number of Bessemer steel works constructed in the next decade suggests the success of the process; by 1876, 13 Bessemer steel works had been constructed.

While the iron industry operated at small scale in many small plants, the Bessemer process (also known as the basic oxygen furnace) created both possibilities of manufacturing large quantities of steel at one time and the need for larger plants for its manufacture. A small Bessemer plant could not be operated at a profit since large production was necessary to absorb the higher costs of production and reduce overhead per ton of product. The development of the Bessemer system was the beginning of a shift from numerous small manufacturers of iron to a smaller number of larger manufacturers of steel.

Besides the Bessemer or basic oxygen process for producing steel, two other systems developed in the last half of the 1800s. The open-hearth furnace operates by converting iron into steel in an open hearth. This process was invented by two pairs on brothers working on opposite sides of the English Channel. Dr. Charles William Siemens and his brother Frederick were born in Germany and became naturalized British citizens. Dr. Siemens developed a regenerative gas furnace in 1856, where the heat from burnt gases was transferred to chambers called regenerators. Air that passes through them was directed to the burning gases, causing them to burn hotter. Dr. Siemens first creation was not successful. At the

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210 Ibid., 119.

211 Cecil D. Elliot, *Technics and Architecture* (Cambridge, Massachusetts: The MIT Press, 1992), 95.

same time in France, Emile and Pierre Martin were attempting to develop an open-hearth furnace, without much success. When Dr. Siemens visited the Martin brothers in 1864 he added his regenerative process to their furnace. The new furnace was a success. A furnace of this type was first installed in the United States in 1868. By 1900, production of steel using the open-hearth process (also called the Siemens-Martin process) had reached about 50 percent of the production level of the Bessemer process.[212]

The electric arc furnace for steel production followed in the 1890s. Several processes had been attempted prior to this to utilize electricity to produce steel. Electric furnaces had been in development by T.L. Willson in the early 1890s for the production of carbides (by combining carbon and metal). When carbide was overproduced, furnace owners looked for other uses for their equipment. Experiments made in France around the year 1900 for the production of metal alloys led to steel production. Modifications made in the United States, France, and Sweden eventually allowed the production of quality steel.[213]

During the last few years of the nineteenth century, more than half of the companies involved in the steel industry were consolidated into less than a dozen concerns under the direction of large corporations. Carnegie was not the only major producer to create a steel empire, and in 1901 the United States Steel Corporation was formed.[214] The new corporation eventually absorbed companies including Carnegie Steel, National Steel, and numerous others. United States Steel controlled hundreds of facilities including blast furnaces; open-hearth furnaces; Bessemer converters; blooming, slabbing, billet, and sheet bar mills; rod, wire, sheet and tube mills; and structural steel mills.

Standard Structural Sections

The development of rolled steel shapes, particularly the I-beam, dates to English textile mill construction of the late 1700s.[215] These mills were constructed with prefabricated cast iron shapes. The flax-spinning mill at Shrewsbury of 1796 included vertically-oriented plates with thickened bottoms for use as beams. This installation predates the understanding of flanges and webs typical in the I-beam. Thomas Tredgold, in his *Practical Essay on the Strength of Cast Iron* of 1824, discussed results of experiments where the most efficient shape for iron beams was a slender I-beam.[216] A contemporary of Tredgold's, the British mathematician Eaton Hodgkinson, studied beam action for cast iron members. Hodgkinson's findings included a beam with a thin vertical plate connecting a small upper bar and larger lower bar.

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212 Fisher, *The Epic of Steel*, 125-126.

213 Ibid., 291.

214 Thomas J. Misa, *A Nation of Steel: The Making of Modern America, 1865-1925.* (Baltimore: The John Hopkins University Press, 1995), 166.

215 Elliot, *Technics and Architecture*, 70.

216 Ibid., 71.

An early example of prefabrication of cast iron elements was found in the facades of that material manufactured by James Bogardus. His New York workshop, completed in 1851, featured a cast iron facade five stories in height.[217] Other cast iron facades followed in Chicago, St. Louis, and San Francisco. A building in Baltimore had a structural framing composed of inverted T beams of rolled wrought iron spaced three feet on center. The flanges of the beam supported the shallow brick arch floor system.

For the production of thin, flat sections of metal, casting was a poor method because cooling could cause warping. Henry Cort used rollers in 1783 to produce wrought iron faster than hammering.[218] With the growth of the railroads in the 1800s, production of rolled sections for rails developed rapidly.

Railroads required long, regular sections of iron. The well known I shape for rails developed in United States and Britain in the 1820s and 30s, although these by necessity had shallow depth.[219] In the late 1840s, Ferdinand Zores of Paris rolled the first I-beam deep enough for building construction. The first mill to roll I-beams was the Trenton Iron Works in New Jersey, operated by Peter Cooper, in 1854. These first beams were quite small.

The process for forming structural angles, channels, and I-beams involved first shaping bars of steel on rolling mills with two grooved rollers, one above the other (known as a two-high mill). A series of grooves in the rollers refined the shape of the section from rough outline to finished form. This process had flaws, especially with small sections, which cooled more rapidly than larger ones. The three-high mill followed, which prevented shapes from cooling rapidly. The middle roller could move the shape back and forth between the rollers. This eliminated the need to lift the shape by hand to pass it through the rollers again. Mechanization of the rolling process of Bessemer-produced steel developed with the introduction of electric motors and other devices. John and George Fritz are credited with developing many of these mechanical improvements towards the end of the nineteenth century.

Structural design of iron members developed after the 1840s.[220] Prior to that, empirical design based on load testing was used to select member sizes. German manufacturers introduced standardization of steel sections with publication of the Normal Profile Book in the 1880s. This publication contained standard dimensions for steel shapes. This allowed engineers and architects to perform structural design with shapes with known section criteria. Carnegie Steel in the 1880s discouraged special orders for structural shapes by making them much more expensive than the standard shapes in their catalogs. Other U.S. manufacturers followed, and in 1895,

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217 Ibid., 75.

218 Ibid., 96.

219 Ibid., 97.

220 Ibid., 100.

the Association of American Iron and Steel Manufacturers developed standard sections.[221]

Assembly of structural frames paralleled the development of steel production and structural design. Hot riveting of framing members was first developed in the ship building industry. Their use was introduced in the building industry in the late 1840s. Arc welding (developed from the electric arc lamp) followed in the mid-1880s, first with carbon rods and later with specially alloyed metal rods. Arc welding in construction did not come into common practice until around 1940. Acetylene torch welding was used for structural connections at the end of the nineteenth century.[222]

A description of the structural steel shapes used on the vertical sign is given below.

b. Galvanized Sheet Metal

Much of the cladding of the vertical sign is constructed of galvanized sheet metal.

The origin of the galvanizing process dates back to the experiments of Luigi Galvani, an Italian physiologist born in 1737. During his experiments in 1786 in which he ran current through the muscles of frogs, Galvani discovered metallic arcs.[223] When the frog's muscle tissue was suspended with copper hooks on an iron frame, the two dissimilar metals caused an electric arc to travel across the muscle. The reaction between the dissimilar metals was eventually termed a galvanic reaction. Galvanizing is the combination of dissimilar metals: the coating of an iron or steel base metal with another metal, usually zinc. The electropositive metal, zinc, corrodes while protecting the electronegative metal, either iron or steel. The amount of corrosion product (zinc carbonate) from zinc is less than the corrosion product for iron or steel, and the zinc corrodes less deeply over time. As long as the zinc coating is intact, the base metal receives protection.

A French chemist, Malouin, introduced a method for galvanizing steel in 1742.[224] I.M Sorel in France and H.W. Crawford in England both patented processes for hot-dip galvanizing in 1837. Galvanized sheet roofing was in use in the United States by 1839, with sheets 24 inches by 72 inches available by the 1850s.[225] Until the 1870s, sheet metal was made from iron.[226] The Bessemer steel process allowed

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221 Ibid., 99.

222 Ibid., 103-104.

223 William H. Spoers, *Hot-Dip Galvanizing Practice,* 2d ed. (Cleveland: The Penton Publishing Company, 1947), 1.

224 William L. Zahner, *Architectural Metals: A Guide to Selection, Specification and Performance* (New York: John Wiley & Sons, Inc., 1995), 320.

225 Margot Gayle and David W. Look, "Part I. A Historical Survey of Metals," *Metals in America's Historic Buildings* (Washington D.C.: U.S. Department of Interiors, National Park Service, Preservation Assistance Division, 1992), 15.

226 Fisher, *The Epic of Steel,* 142.

the production of steel inexpensive enough to be fabricated into sheet metal. Mechanized processes (as opposed to hand rolling) for sheet metal rolling developed as early as the 1760s, but were not successful until the latter 1800s.[227] Many of the early uses for galvanized sheet metal were for roofing, waterproofing, and exterior cladding.

Hot-dip galvanizing was the main method for galvanizing at the time of the fabrication of the Chicago Theatre sign. Hot-dip galvanizing involves first cleaning of the base metal in dilute sulfuric acid to remove dirt, rust, or oxide components. After rinsing, the base metal is dipped in fluxing acid, then in the galvanizing solution of molten zinc. During the dip process, the steel reacts with the molten zinc, forming a series of zinc-iron alloy layers topped with a coating of zinc at the outermost surface. The zinc coating develops a metallurgical bond to uncorroded steel. Galvanized steel coatings have a characteristic spangled surface appearance, although the size of the spangles can vary. The corrosion resistance of the coatings is related to its thickness, which typically ranges between 2 and 4 mils. The use of electrodeposition galvanizing followed the period of the fabrication of the Chicago Theatre's vertical sign.

A description of detailing of the galvanized sheet metal panels on the vertical sign is given below.

c. Zinc Ornament

The ornament at the top of the Chicago Theatre sign is fabricated of cast zinc. The ornament is soldered to the galvanized sheet metal panels.

The Romans used a by-product of copper production that was a compound of zinc to produce the first brass; however, the first use of pure zinc dates from 1738, by William Champion in England. Although early production of zinc developed in England, it was in Liege, Belgium, that zinc works founded by Abbé Daniel Dony produced zinc and zinc sheets in large quantities. Like galvanized sheet metal, zinc sheet and stamped zinc shingles were used for roofing. Uses were found for cast zinc for sculpture and ornament as early as 1832 in Germany, with production of architectural elements in the United States by the late 1800s.[228]

A description of the cast zinc ornament on the sign is given below.

d. Porcelain Enamel

The letters spelling out CHICAGO on the vertical sign are porcelain enamel-coated sheet metal. The original letters on the vertical sign were replaced prior to 1937 with these porcelain enamel letters.[229]

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227 Ibid., 143.

228 Gayle, *Metals in Americas Historic Buildings*, 15.

229 Examination of historic photographs IL-1195-15 through IL-1195-20 reveals subtle differences in the shapes of the original letters and those present in photographs dated circa 1937 and after. The letters visible in the circa 1937 photographs are similar to those present on the sign at the time of the documentation.

Porcelain enamel is a thin coating of glass fused to metal at temperatures above 800 degrees Fahrenheit. Porcelain enamel is made by fusing a glassy composition to a metal substrate, often cast iron or steel. The enamel material is made from components including silica, feldspar, quartz, borax, soda ash, and iron oxides. For the sheet metal elements such as the letters, a wet application method was likely used to apply the enamel to the base metal. Following dipping or spraying of the enamel elements, the coated metal was dried and fired at high temperatures of 1,400 to 1,600 degrees Fahrenheit. Following cooling, the finish was polished.

Porcelain craftsmen in Limoges, France, discovered in the fifteenth century that enamel would bond to metal when the two materials were fired. Cast iron cooking utensils were coated with porcelain enamel for improved performance. The rough surface of iron and steel in the nineteenth century however, prevented enameling from being effective. With the development of improved sheet metal goods, the use of porcelain enameling grew after World War I.[230]

Although porcelain enamel had been in use in jewelry and the decorative arts for many centuries, the use of the coating system in the construction industry was first examined around 1890 by Theodor Bergmann of Germany. After development in the early part of the twentieth century, porcelain enamel was in use for kitchen and bathroom fixtures during the 1920s.[231] Porcelain enamel was introduced for commercial production for the building trades in the mid-1920s.

Glossy finishes were typical in the 1920s. Early manufacturers of porcelain enamel building products were centered in the Midwest, with two in Chicago, one in Terre Haute, Indiana, and another in Detroit, Michigan.[232] Components produced at that time included roofing shingles and exterior wall cladding.

The use of letters similar to those on the Chicago Theatre vertical sign was common. One reference for the design of electric signs describes this type:

> Metal letters either blocked out and mounted on frames or mounted on box signs are generally used on the large electric signs used on roofs. The metal letters have the sockets mounted in the letters, so as to outline the skeleton letter, being mounted flush with the surface or recessed in a trough. The letters are commonly painted with a light-colored reflective paint to render the sign more easily readable. [233]

A description of the letters on the Chicago Theatre vertical sign is given below.

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230 Fisher, *The Epic of Steel*, 247.

231 Thomas C. Jester, "Porcelain Enamel," *Twentieth-Century Building Materials: History and Conservation* (New York: The McGraw Hill Companies, 1995), 255.

232 Ibid., 256-257.

233 Bernhard, *EMF Electrical Year Book*, 431.

PART II: ARCHITECTURAL INFORMATION

A. General Statement

1. Architectural Character

The Chicago Theater building was built in 1921 as an ornate picture palace. The floor plan is L-shaped, wrapping around the Page Brothers Building on the southeast corner of State and Lake Streets. The building is of a concrete-encased steel frame construction resting on caissons, clad in brick and terra cotta. The exterior exhibits Beaux Arts form and ornament based upon the Arc de Triomphe in Paris, as evident on the State Street elevation. The triumphal arch that frames the theatre entrance measures thirty feet wide at the base and rises six stories. It is topped by an ornate cornice, a recessed seventh story faced with terra cotta, and a recessed brick two-story penthouse. The north and south elevations have a terra cotta base and cornice with brick walls and infill panels.

2. Condition of Fabric

Based on limited examination of the exterior envelope of the Chicago Theatre, the south and west elevations were in fair to good condition.

Limited examination of the vertical sign prior to its removal revealed that significant corrosion had occurred on the structural steel framing. Corrosion had also occurred in isolated locations of the sheet metal facing panels as well as on isolated portions of the porcelain enamel channel letters spelling "CHICAGO." Additional discussion of the condition of the structure is provided below.

B. Description of Exterior

1. Site

The Chicago Theater site is bounded by State Street on the west, Lake Street on the north, Wabash Street on the east and Benton Court on the south. It occupies two parcels, the south 60 feet of lots 1, 2, 3 and all of lots 4-10 inclusive of block 9 of the Fort Dearborn addition to Chicago, the whole southwest fractional 1/4 of section 10-39-14, east of the Third Principal Meridian. Parcel 2 includes lots 2 and 3 of Block 9 in the Fort Dearborn addition to Chicago (except the south 60 feet of each said lot) in section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County Illinois. The building wraps around the Page Brothers Building at the southeast corner of State and Lake Street. The address of the Chicago Theatre is 175 North State Street.

2. Overall Dimensions

The Chicago Theater is composed of two parts: a main section which houses the auditorium, stage, dressing rooms, inner foyer, the promenade levels behind the auditorium, lounges and bathrooms, and the grand staircase leading to the upper and lower level; and the west wing which fronts sixty feet on State Street and houses the main entrance, ticket lobby, grand lobby, and two floors of offices. The footprint of the building is L-shaped. The overall dimensions of the building measure 170 feet (52 meters) from north to south along the east elevation, 296 feet (90 meters) from east to west along the Benton Court (south) elevation, 60 feet (18 meters) from north to south along the State Street (west) elevation

with 110 feet (33 meters) running from north to south behind the Page building, 68 feet (20 meters) from east to west along the north side behind the Page Building, and 228 feet (69 meters) running from east to west along the Lake Street elevation (north).

3. Foundation

The foundations are not covered in this documentation.

4. Walls

a. West Elevation

The seven-story State Street elevation is symmetrical with projecting bays on the south and north corners. The design is based upon the Arc de Triomphe in Paris. This motif is particularly apparent at night when hundreds of light bulbs, embedded in bands of terra cotta rosettes, trace the Second Empire corners and ornamental features. The elevation is clad with a smooth, glazed, off-white terra cotta with a three-foot base of smooth gray terra cotta units, laid in Flemish bond coursing. The set-back seventh story is a brick two story penthouse housing the Little Chicago, Balaban & Katz's small preview theater. The Beaux Arts style ornament used to embellish this elevation is of molded terra cotta and includes the masks of comedy and tragedy, floral garlands, bands of rosettes, foliate cartouches, inset panel of high relief, horn-playing cherubim, singing heads, acanthus leaves, harps, egg and dart molding, and ornamented broken pediments. The tradition of this Beaux Arts decorative style is historically defined by a disciplined vocabulary of elaborate forms and grand proportions.

The ground floor on this elevation originally featured a decorative brass box office, flanked on each side by two pairs of gilt French doors and the pier of the triumphal arch. A six course rusticated terra cotta base defined the lowest section of the triumphal piers at the north and south corners of this elevation. Each pier, defined by a rusticated coursing of stone at the base contained: one set of gilt doors set at an archway and two brass and terra cotta poster cases. Modernized by Rapp & Rapp Architects in 1953, this area now contains new brass and plate glass doors, poster cases, a modern box office, and a base of polished granite instead of the rusticated stone. All of the decorative terra cotta above the doors, the transoms, and four large bronze lanterns which hung over the poster cases were removed and covered by an extension that forms the present marquee.

The theatre marquee has been changed three times.[234] The original was a simple canopy with two lines of attraction spaces on each of three sides. Archival photographs reveal that the second marquee, built between 1922 and 1923, was larger and more ornate. In 1937, the marquee was slightly altered with larger display areas on the sideboard panels. This consisted of panels for more text display but was not integrated into the overall design of the marquee. The marquee was changed again circa 1948, at which time the pediment on the west elevation was replaced, featuring larger channel letters with the name "CHICAGO" and a new "Y" logo. The new pediment design had streamlined swirl patterns and the

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234 Additional description of the marquee is provided in the chronology of the vertical sign and marquee.

sideboard panels were once again enlarged, reaching their greatest size. Photographs from 1948 show the sideboard and west elevation panels to have individual letters that possibly were illuminated, but by 1963 these were replaced with letters mounted to luminous panels lit with fluorescent lamps.

Above the marquee rise the piers of the great arch. Each pier is embellished with a broken pedimented niche crowned with a head garland, bands of terra cotta rosettes, and a foliated cartouche. A large circular window is set within the arch itself. The window, constructed of panes of glass, ornate steel mullions and muntins, features an eleven foot diameter stained glass medallion containing the Balaban & Katz coat of arms. Above the great arch is an entablature of garlands and rosettes with the masks of comedy and tragedy placed on center.

The sixth floor frames the top of the arch and is composed of five double-hung windows set apart by eight inset panels of high relief. The heavy cornice work that crowns this floor is a combination of acanthus leaves, singing heads, six-petaled rosette bands, modillions, dentils, and egg and dart molding.

The seventh floor sets back from the main cornice and crowns the elevation. It is articulated by five double-hung windows, each crowned with embellished broken pediments. Eight inset panels of high relief separate the window as well as ornament the piers. A simpler cornice of dentils and rosette banding ornaments this floor, which is then crowned by a simple terra cotta parapet.

To the north of the great arch is the six-story tall vertical sign, which is the focus of this documentation.

b. East Elevation

The east elevation is not covered in this documentation. The east elevation of the main portion of the building forming the stage tower abuts an adjacent building.

c. South Elevation

The south wall of the theater borders an alley known as Benton Court. This wall is finished more simply than the State Street elevation. The wall is clad in terra cotta and buff colored brick (both in Flemish bond coursing) with ornamental terra cotta embellishments. The decorative terra cotta of the sixth and seventh floors extends 93 feet around the south face from the State Street elevation. The motif of the right pier of the triumphal arch also continues around the corner and onto the south elevation (ending 17 feet from the west corner) and is faced in smooth terra cotta and embellished with an ornate broken pedimented niche, bands of rosettes, and a foliated cartouche. The next 76 feet, extending eastward from the east corner of the pier is trimmed in terra cotta and faced with art brick. Three large French windows trimmed in terra cotta surrounds articulate a 35 feet 6 inch span extending eastward from the pier and define the second floor of this elevation. Art brick laid in a Flemish bond coursing is set directly above these windows and is stepped out several inches, creating a low relief ornamental rectilinear arch design and ornament from the third through fifth floors of this elevation. A simplified pier design of brick with terra cotta trim follows above between the sixth floor windows. Three small windows articulate the third floor below the fire escape. The

entrance, with four double doors, is embellished with a terra cotta shouldered architrave surround and protected by a decorative cast metal canopy that is similar to the theater's first State Street marquee. The rest of this wall, extending east 93 feet from the State Street corner, is utilitarian. It is clad with brick without embellishments and contains fire exit doors, a fire escape, the stage door, and dressing room doors. Portions of this brick elevation have been painted in the past with signage that has now worn away.

d. North Elevation

The north elevation is not covered in this documentation. The overall character of this elevation is similar to the western portions of the south elevation but without window openings.

e. Structural system, framing

The building is of concrete-encased steel frame construction resting on caissons.

5. Openings

a. Doorways and doors

(1) West Elevation

The entrance floor of the State Street elevation is symmetrical in design. There are four principal patron entrances facing the street, two each flanking a glass, steel and terra cotta ticket booth. Adjacent on either side of this booth is a recessed entrance opening containing two bronze and glass double doors surmounted by a transom. Terra cotta and granite clad piers separate these two openings from the next recessed entrance with double doors and transom. There is a six foot wide terra cotta pier to both the north and the south of the central entrance openings. Two additional recessed openings, each with a single set of double glass and steel doors lies to the outside of each pier. A roof top door opens to the fire escape from the elevator shaft.

(2) East Elevation

The east elevation is not covered in this documentation.

(3) South Elevation

There are eleven personnel entrances on the ground floor of the Benton Court elevation. These serve as side door entrances to the lobby and emergency exits from the theater. Two openings on the west end of the elevation are ornamented with a terra cotta surround. The first is no longer used as a doorway and has an air conditioning unit set into the door panels with an iron cage over the opening. The second is steel with four inset panels on each side. The next opening towards the east in embellished with a terra cotta shouldered architrave surround and contains four double bronze and glass doors surmounted by a four-paneled transom. There are

twelve fire exit doors on the south elevation; some have glass insets and some are hollow metal.

(4) North Elevation

The north elevation is not covered in this documentation.

b. Windows

(1) West Elevation

The exterior wall of the State Street elevation contains twelve window openings. A thirty foot wide arch opening of glass and cast metal is centered from north to south on this wall. A stained glass medallion, measuring eleven feet in diameter, features the Balaban & Katz coat of arms in the center of this opening. The five openings on the sixth floor are enclosed with double hung window units in a one over one configuration. The seventh floor has five window openings each containing a single double hung window with a one over one configuration. The penthouse has one window opening containing a double hung window.

(2) East Elevation

The east elevation is not covered in this documentation.

(3) South Elevation

The exterior wall of the south elevation contains thirty-three window openings. The west end of the south elevation contains fifteen window openings. A single opening on the first floor, located to the west of the architraved door opening, contains a double hung unit with two panes, in a one over one configuration. Three round headed window openings surmount the terra cotta belt course and are centered on the west half of the wall, at the second story level. These openings are each filled with a rectilinear, fixed pane window unit divided into three sections by two mullions. The central section is glazed with eighteen panes in a three over six configuration and is flanked by two units, each with six panes in a one over six configuration. These rectilinear units are crowned by a fixed Palladian unit with fifteen panes. Three rectilinear window openings are extant at the east end of the west half of the south wall, on the second floor. These openings are filled with double casement units, each with six panes in a two over three configuration. The five openings on the sixth floor are enclosed with double hung window units with two lights, in a one over one configuration. The seventh floor has seven window openings, each containing a single double hung window with two lights in a one over one configuration. The east half of the south elevation was not covered in this documentation.

(4) North Elevation

The north elevation is not covered in this documentation.

6. Mechanical equipment

a. Vertical Sign Architectural Description

The Chicago Theatre vertical sign is a double faced sign on the north and south elevations, classified as an exposed lamp construction with lettering outlined in spots of light from exposed incandescent lamps with channel letters spelling out the name "CHICAGO." It is mounted to the north of the great arch on the face of building on the State Street elevation. The vertical sign measures seventy-five feet ten inches, approximately six stories, in height.

The profile of each lettered face centers around a rectilinear shaft that flares out at the base and is capped with a broad entablature of molding profiles at the top. The shaft section measures ten feet across in the middle and twelve feet at the widest point of the flared base. The base is curved with a concave curve joining two convex curves on either side.

The profile of the entablature starts five feet three inches up from the bottom of the letter H with a bracket each side with six convex curved profiles extending out from the shaft. Surmounting the architrave is a three foot five inch high frieze, which is capped with a cornice composed of a series of molding profiles. The frieze consists of a cyma recta molding at the base, a convex profile to which a molding was once attached, and a cyma recta molding. The cornice profile continues with an outer profile of three concave cavettoes, the first set at a descending 45 degree angle; the second running parallel with the vertical plane, and a third set at an ascending 45 degree angle. The profile continues upward with a series of five ovoloes and a concave arch. The cornice is crowned with a 3/4 round measuring three feet four inch in diameter, faced in painted sheet metal. The cornice wraps around the round headed vertical shaft with overall measurements of seventeen feet seven inches wide by twenty-one feet. Structural steel elements project through the top of the cornice. The ornamental elements are fabricated of cast zinc set on sheet metal cladding over a structural framework of steel angle sections.

Prior to the removal of the vertical sign from the theatre site, the narrow elevation of the east, west, top and bottom sides of the sign had painted sheet metal panels. When originally constructed, the sign was sheathed on only the north and south elevations. The panels that clad the framework of the sign, are galvanized sheet metal (1/16 inch thick) and are secured to the outer frame with randomly placed sheet metal screws. The panels vary in size and are seamed with butt joints across the flat lettered faces of the sign. Lapped joints were used at the three assembly points on each face of the sign. The edges of the sheet metal are folded under creating a 1/2 inch lip around the outside edges of the sign. Round headed sheet metal screws were used to attach the sheathing to the frame.

The east and west elevations, enclosed with panels of sheet metal, contain a series of steel rod ladder rungs (3/4 inch diameter) that are bolted to the principal steel

framework. There are 65 rungs on the east elevation and 55 on the west. This narrow elevation typically measures three feet three inches in width from edge to edge of the chaser troughs. There are four sheet metal access doors on the east elevation. These are located, in reference to the north and south elevations, between the letters "G" and "O," between the letters "C" and "A," adjacent to the letter "H," and adjacent to the letter "C" at the top of the sign. These openings range in size from 15 to 20 inches wide by 27 to 38 inches high. The west elevation does not have any access doors.

"CHICAGO" is vertically spelled out along the shaft of the sign with stacked channel letters. The round cornered, block letters are metal with incandescent lamp sockets mounted to form the outline of the strokes of each letter, recessed in an outline trough of thin sheet metal. The 4-1/4 inch sides of the troughs lap around the 16 inch base piece and finish with a 1/2 inch lip around all of the upper edges. White enamel paint has been applied over the original white porcelain enamel finish.

The letters vary in size. The letter "C" measures five foot five and half inches high; "H," five foot three inches high by five foot one and a half inches; "I," one foot six inches wide by six foot one and a half inches high; "A," six feet one inch high by six foot one inch wide; and "O," five foot nine and one half inches wide by five foot nine inches high.

Round headed sheet metal screws affix the letters to the metal sheathing and the girts of the structural framing. There are 38 lamp sockets in the letter "C;" 44 in the letter "H;" 18 in the letter "I;" 42 in the letter "A;" 45 in the letter "G;" and 46 in the letter "O." The extant lamps remaining in the letter sockets are 25 watt incandescent bulbs. At the time of documentation, most of the sockets contained lamps.

Four metal chaser troughs constructed of galvanized sheet metal, crimped, lapped, and painted, form a border around the round headed vertical shaft and flared base portions of the sign. These troughs are 3-1/2 inches deep with a 1/2 inch lip and are four inches wide across the bottom. Standard medium base incandescent lamp sockets (one inch) are mounted into the sheet metal with 210 extant in the outermost trough, 226 in the second, 224 in the third and 219 in the innermost trough. The sockets are mounted eight inches apart within each trough and positioned to line up on a 45 degree diagonal across the four tracks. A single trough of chaser lights extend along the perimeter of the cornice portion of the sign, which houses 56 chaser lamp sockets. A total of 1,870 chaser lamp sockets are mounted within the four chaser trough border on the south and north elevations. Many of the sockets are filled with corks to keep out water. Motor driven flashers, located on the roof of the marquee, controlled the chaser lamps creating the illusion of a running border.

Zinc coated relief ornamentation of molded sheet metal embellish the entablature portion of the double faced sign. The architrave features a large raised scroll of bent sheet metal suggesting a bracket element to visually support the freeze and cornice. Egg and dart molding, vertically mirrored floral bud forms and a fillet, all made of molded zinc, also ornament this section of the sign. The frieze features vertically mirrored foliated plants enclosed within a rectangle defined by twisted

rope. The cornice is embellished with symmetrically placed relief ornaments. A mirrored chain of floral elements surmounts the round headed top of the vertical shaft with five falling plant forms and one crocket flanking the sides. In the crowning section for the cornice is a pair of small floral chains, a pair of falling plant forms, a pair of curved fillets, and a pair of rosettes symmetrically set on either side of the 3/4 round. Two-dimensional ornamentation is found in the painted Chicago logo featuring the "Y" insignia from the City Coat of Arms (symbol of the three branches of the Chicago River) centered within the 3/4 round at the top of the vertical sign.

The painted color scheme that was extant on the sign upon its removal from the theatre site included yellow, orange, red, blue, and white. The flat sheathing on the north and south elevations was red. A border of orange was painted under and around each letter extending out four inches from the letter trough. The letter troughs were painted white enamel along with the raised foliated forms and crockets, the "C" in the "Y" logo and a line encircling the logo (similar to that found on the marquee). The border troughs, scrolls, twisted rope, egg and dart and rosettes were painted blue. A circle composed of three painted blue wedges forms the reverse outline of the Y branch in the logo at the top.

The measured drawing portion of this documentation includes an analysis of paint finishes on the vertical sign. The **Chronology of the Marquee and Vertical Sign** section above provides an outline of possible paint schemes.

b. Vertical Sign Structural System

The Chicago Theatre vertical sign is supported by a structural steel frame consisting of primary members that attach to the building and provide an armature for secondary members that support the exterior cladding. The main structural system transfers the gravity and wind loads acting on the sign to the structure of the building.

The sign is supported by four points of connection to the building on the east side of sign: at the top of the sign, between the letters "C" and "H," near the top of the letter "A," and at middle of the letter "O." At each location the support for the sign consists of a horizontal outrigger beam running east-west built-up from two 9 inch by 2-3/8 inch steel channels back-to-back and a third 10 inch by 2-5/8 inch top channel laid down legs down over the back-to-back channels. The web of the third channel is riveted to the flanges of the back-to-back channels. Each of the built-up horizontal beams is laterally braced by two steel angles running diagonally at approximately 45 degree angle from gusset plates attached to the top channel of the built-up beam to the building wall, where the angles pass through the terra cotta facade to the building structural system. The connections for the three lower steel members described above are concealed by the terra cotta cladding. The top support beam extends to a three-dimensional exposed steel truss on the roof of the theater.

The truss consists of a three-dimensional rectangular frame with three east-west planes of X-bracing as well as X-bracing in the north-south direction and in the top and bottom planes of the truss. The built-up outrigger beam, extending into the top of the sign, extends over the center bay of east and west X-bracing. The top chord

is flat and the bottom chord is sloped with the roof. The bottom chords of the truss, running east-west and consisting of built-up channel sections similar to the outriggers supporting the sign, are supported on curbs covered by the roofing membrane. The members of the truss are typically 3 inch by 5 inch by 1/4 inch angles. The X-bracing of the truss typically consists of 3 inch by 3 inch by 1/4 inch angles.

Additional bracing is provided along the height of the sign by 7/8 inch diameter steel tie rods. These tie rods extend down at approximately a 45 degree angle from the middle two built-up outrigger beams (where they intersect with the terra cotta facade) to the structural framing within the sign. The tie rods pass through the sheet metal cladding of the sign. These diagonal members help to support the free end of the horizontal beam below. The round steel pipe near the base of the sign is for running electrical wiring and does not provide structural support.

The support beams connect within the sign to vertically oriented built-up trusses that run the height of the sign. The trusses are placed at the outside edges of the sign and extend through the top of the sign approximately 3 feet 6 inches above the sheet metal cladding at the top. Each of the chords of the truss is an 3 inch by 3 inch by 1/4 inch angle with 2-1/2 inch by 1/4 inch steel bars forming the diagonals and placed at about 1 foot on center. The overall width of the truss is 16 inches. The steel bars and angles are connected with square-headed bolts. Spanning between the main trusses are bracing trusses similar in construction as the main trusses at approximately 6 feet 10 inches vertically on center. Steel 3/4 inch diameter X-bracing tie rods cross the bays formed by the main trusses and the bracing trusses. The rungs for the ladders on the east and west short face of the sign are bolted with clip angles to the main vertical trusses.

The primary structure of the sign supports secondary structural members for the cladding system. This framing consists of galvanized clip and framing angles, Z-channels, and light gauge channels. Typically the support framing for the sheet metal cladding consists of 2-1/2 inch by 2-1/2 inch by 1/4 inch galvanized angles running horizontally and bolted to the main vertical trusses. These are laid horizontally about 4 to 5 feet on center. Typically each section of sheet metal has three supports at the top, bottom, and middle. Attached to these horizontal channels with clip angles and bolts, are the galvanized support channels for the sheet metal cladding. These channels, about 5 inches deep with 2-1/2 inch flanges, run the perimeter of each panel of cladding. The channel webs have holes for running the chaser light wiring. Intermediate galvanized Z-channels support the cladding, with two to three channels per panel. The cladding at the top portion of the sign is framed differently due to its more complex shape. Round headed sheet metal screws were used to attach the letters to the cladding and framing.

The non-original sheet metal side panels are painted galvanized sheet metal. To install these panels, the ladder rungs would have been removed and reinstalled. The bottom panels of the sign were replaced with sheet metal in the recent past.

At the time of documentation, portions of the primary structure were extensively corroded. The built-up outrigger beam, as well as portions of the vertical trusses, had experienced the most severe corrosion. Other portions of the primary structural members that were exposed to moisture, or where moisture could collect such as at

horizontal surfaces of framing members, were corroded. Members near sheet metal panel joints also experienced a higher degree of corrosion. The secondary structural members were in better condition, with many framing members retaining their galvanized coating. Isolated portions of the galvanized sheet metal cladding and porcelain enamel letters had light to severe surface corrosion.

c. Vertical Sign Electrical System

The electrical system for the vertical sign at the time of documentation consisted of the following elements:

(1) Electric power supply enters the building below the sidewalk vaults from the State Street (west) side of the building through a duct trunk to the main building electrical panel housed in the northwest corner of the basement (beneath the entrance to the theater). The panel consists of an electric meter, 15 main switches, and 48 connectors that distribute power throughout the building. Four of the connectors service the vertical sign: one connector each for the lighting of the letters "CHICAGO" on the north and south faces of the sign, and one each for the lighting in the chaser troughs on the north and south faces of the sign. At the time of the sign's removal, only the two connectors for the letters were operational. Each connector consists of four contacts with three fuses with 70 amp, 230 volt, three-pole capacity.

(2) The feeder for the sign extends from behind the main panel in the basement up the northwest corner of the lobby portion of the building. From this feeder, the power supply runs to just above the second floor level onto the roof of the marquee, where the distribution panels and flashers are housed. There are two distribution panels, one for the lighting in the letters spelling out "CHICAGO" and one for the chaser lighting. The panels were manufactured by R.A. Erickson of Chicago and rated for 100 amp, 125-250 volt capacity. Power is routed through the two distribution panels. From the chaser distribution panel, power is directed through to the panel containing the flasher mechanisms for the vertical sign and marquee.

(3) Eight flasher mechanisms operate the chaser lighting on the vertical sign. These flashers were in place at the time of the documentation (although not functional) and consists of an electric motor which turned a drum or wheel, operating four contact switches arranged around the wheel. A manufacturer's name was not visible on the flasher mechanisms for the vertical sign. The wire operating the flasher motor was color-coded white and the four incoming and outgoing wires for the contact points were red. Given the components in place at the time of documentation, it is not known how or if the four chaser tracks could be synchronized. To synchronize the speed of the flashers, a governor motor or other components would be necessary. Power for the sign lighting then re-enters the building and runs up to a wiring distribution panel that is located near the base of the sign within the building. The wiring for the sign (switched to red, green, yellow, and blue color-coded wire as noted below) runs through a six inch steel pipe to the base of the sign.

(4) The wiring within the sign is divided into approximately 60 separate color-coded wires, with the wiring for the letters color-coded white and the wiring for the chasers color-coded red, green, blue, and yellow. The wiring for the incandescent lighting sockets for the letters was wired in series. The wiring for the incandescent lighting sockets for the four trough chasers were connected with one color of wire connected to every fourth socket within the chaser trough. The lamp sockets were wired in a spiral or split diagonal pattern. Without a governor motor, the lamps at the chaser troughs could not have been synchronized. A random pattern was likely, with the split diagonal being the basic form present at certain times. Movement of this sort is present in the circa 1930s film footage of the sign.[235]

(5) The single chaser trough at the top of the sign was wired with the same four color-coded wires. Every fourth incandescent socket was connected to a color-coded wire. Three lights in a row were illuminated at any given instant. At the time of the documentation, light bulbs were only in place in the letters "CHICAGO." These bulbs were typically 25 watt lamps. It is likely, given the wiring and potential electrical loads from the lamps, that the chaser lamps were of lower wattage.

(6) Within the top portion of the sign in the arched portion (behind the sheet metal cladding with the word "THE") are components of neon lighting that formed the name "PLITT" on the north and south faces of the sign. These elements consist of 15 transformers, glass tubing, and glass electrode-insulator receptacle housings, tube supports, and wiring. The transformers were manufactured by the Jefferson Electric Company of Bellwood, Illinois, and were 120 volt, 60 cycle primary and 12,000 volt, 30 MA secondary. Most of the wiring for these components is no longer in place and it is not known where or how this wiring tied into the wiring for the remainder of the sign.

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235 Remembering Chicago, documentary video (Chicago: Window to the World Communications, Inc., 1994).

PART III: SOURCES OF INFORMATION

A. Archival Drawings

Original Drawings

Capitol Theatre on State and Lake Streets, Chicago, for Balaban & Katz Corporation. C.W. & Geo. L. Rapp, architects, and Lieberman, Klein, and Heim, engineers, revised 21 January 1921.

Copies of the original drawings are in the collection of the Chicago Historical Society.

Renovation Drawings

Chicago Theater Complex. Daniel P. Coffey & Associates, Ltd., architects; Environmental Systems Design, Inc., electrical and mechanical engineers; and Don Belford & Associates, Inc., structural engineers, revised 8 May 1986.

Copies of the renovation drawings are kept at the Chicago Theatre.

B. Interviews

Interview with Bob Flannery, vice-president, The White Way Company, by Jeffrey Koerber, Wiss, Janney, Elstner Associates, Inc., 23 October 1996.

Interview with Jeff Hamand, Facilities Manager, The Chicago Theatre, by Jeffrey Koerber, Wiss, Janney, Elstner Associates, Inc., 3 September 1996.

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