Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

# NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

## 1 NAME

HISTORIC
W. & L. E. Gurley Building

AND/OR COMMON
W. & L. E. Gurley Building

## 2 LOCATION

STREET & NUMBER
Fulton Street bet. Fifth & Union — NOT FOR PUBLICATION 29

CITY, TOWN
Troy — VICINITY OF — CONGRESSIONAL DISTRICT

| STATE | CODE | COUNTY | CODE |
|---|---|---|---|
| New York | 36 | Rensselaer | 083 |

## 3 CLASSIFICATION

| CATEGORY | OWNERSHIP | STATUS | PRESENT USE | |
|---|---|---|---|---|
| __DISTRICT | __PUBLIC | X OCCUPIED | __AGRICULTURE | __MUSEUM |
| X BUILDING(S) | X PRIVATE | __UNOCCUPIED | __COMMERCIAL | __PARK |
| __STRUCTURE | __BOTH | __WORK IN PROGRESS | __EDUCATIONAL | __PRIVATE RESIDENCE |
| __SITE | **PUBLIC ACQUISITION** | **ACCESSIBLE** | __ENTERTAINMENT | __RELIGIOUS |
| __OBJECT | __IN PROCESS | X YES: RESTRICTED | __GOVERNMENT | __SCIENTIFIC |
| | __BEING CONSIDERED | __YES: UNRESTRICTED | X INDUSTRIAL | __TRANSPORTATION |
| | | __NO | __MILITARY | __OTHER: |

## 4 OWNER OF PROPERTY (Write: Henry E. Singleton, Chairman, Teledyne Kenneth T. Lally, Pres., Teledyne Gurley 514 Fulton St. Troy, N.Y. 12181

NAME
Teledyne, Inc.

STREET & NUMBER
1001 Avenue of the Stars

CITY, TOWN — VICINITY OF — STATE
Los Angeles — California

## 5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Office of the County Clerk

STREET & NUMBER
Reusselaer County Court House/2d at Congress

CITY, TOWN — STATE
Troy — New York

## 6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic American Engineering Record; National Register

DATE — X FEDERAL X STATE __COUNTY __LOCAL
1969;1970

DEPOSITORY FOR SURVEY RECORDS
Library of Congress; National Register (243)

CITY, TOWN — STATE
Washington, D.C.

## 7 DESCRIPTION

| CONDITION | | CHECK ONE | CHECK ONE |
|---|---|---|---|
| __EXCELLENT | __DETERIORATED | __UNALTERED | X ORIGINAL SITE |
| X GOOD | __RUINS | X ALTERED | __MOVED DATE_____ |
| __FAIR | __UNEXPOSED | | |

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Erected in 1862, the W. & L. E. Gurley Building stands on the site of the firm's second factory, the Julius Hanks foundry which the Gurley brothers acquired in 1852 and which was destroyed in the great Troy fire of 1862. In an amazing feat of construction, workman put up the present building in less than 8 months, and it has served for more than 115 years as the company's office and chief manufacturing facility. A four-story, irregular U-shaped, red brick edifice built around a small open courtyard, it extends approximately 130 feet along the north side of Fulton Street between Fifth Avenue and Union Street. The structure's Fifth Avenue facade measures about 90 feet in length and its Union Street facade about 140 feet. Adjacent to the north side of the building and fronting along Fifth Avenue is the Parker House, a three-bay-wide, three-story, red brick rowhouse which was once occupied by members of the Gurley family and which now houses stored company records. The Parker House is one of a series of such residences that extend north to the next block. Across Union Street to the east is the somewhat newer East Building, a four-story, red brick factory that resembles the Gurley Building and contains additional Gurley operations. Across Fulton, to the south, and extending along the west side of Union is the Johnson Building, a similar factory adquired by Gurley early in this century.

The Gurley Building rests on a stone foundation and has brick bearing walls with interior cast-iron columns approximately 8 inches in diameter. Its roof is slightly pitched and covered with sheet metal, possibly tin plate. The predominant features of the building's classical revival exterior design are archaded doors and windows that extend along each level of the structure's three exposed sides. Semicircular brick arches with brick hoodmoulds mark each bay on the first three stories, while segmental brick arches without hoodmoulds prevail on the fourth story.

Entrances are arranged asymmetrically. The chief one is at the eastern end of the Fulton Street facade, where it occupies three bays. The center bay has a double wood-and-glass door set under a glass fanlight, while the two flanking bays have large plate-glass windows with similar fanlights. The arches of these three bays are painted black and bear in gold letters the words "Engineers & Surveyors Instruments." Above is a three-bay-long black and gold sign bearing the company name "W. & L. E. Gurley." Two smaller double doors and one single door also provide access from Fulton, and at the corner of Fulton and Union a second major entrance is created by two

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## 8 SIGNIFICANCE

| PERIOD | AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW | | | | |
|---|---|---|---|---|---|
| __PREHISTORIC | __ARCHEOLOGY-PREHISTORIC | __COMMUNITY PLANNING | __LANDSCAPE ARCHITECTURE | __RELIGION |
| __1400-1499 | __ARCHEOLOGY-HISTORIC | __CONSERVATION | __LAW | __SCIENCE |
| __1500-1599 | __AGRICULTURE | __ECONOMICS | __LITERATURE | __SCULPTURE |
| __1600-1699 | __ARCHITECTURE | __EDUCATION | __MILITARY | __SOCIAL/HUMANITARIAN |
| __1700-1799 | __ART | __ENGINEERING | __MUSIC | __THEATER |
| X 1800-1899 | __COMMERCE | __EXPLORATION/SETTLEMENT | __PHILOSOPHY | __TRANSPORTATION |
| X 1900- | __COMMUNICATIONS | X INDUSTRY | __POLITICS/GOVERNMENT | __OTHER (SPECIFY) |
| | | __INVENTION | | |

SPECIFIC DATES Site: 1852-present
Bldg: 1862-present

BUILDER/ARCHITECT W. & L. E. Gurley

STATEMENT OF SIGNIFICANCE

Since the late 1800's the name W. & L. E. Gurley has been synonymous worldwide with the design and manufacture of precision mathematical and engineering instruments. Known today as Teledyne Gurley, the firm traces its history to 1845 when William Gurley and Jonas Phelps teamed to make surveying equipment. Their company became W. & L. E. Gurley in 1852, and according to Rensselaer Polytechnic Institute historian Samuel Rezneck, by 1900 it was "the largest manufacturer of surveying instruments in the country."[1]

During this period of rapid growth the company achieved many firsts. For example, in 1855 it published the Nation's first illustrated instructional manual of surveying equipment, thereby launching a long series of widely used professional guides; in 1876 it constructed the world's first light-weight (aluminum) transit; and in the 1880's its chief engineer, Edward Arms, developed a method of drawing platinum wire to the extremely fine diameter required for transit telescopes. Also in these years, says Rezneck, Gurley instruments "went with the engineers of both North and South America . . . to survey the wild western lands and lay out the railroads." In fact, he notes, Gurley products "were . . . used all over the world."[2]

After 1900 Gurley extended its leadership into new areas. In 1904 it manufactured weights and measures for the National Bureau of Standards, and in the late teens and early twenties

(continued)

[1]Samuel Rezneck, "Gurley Building 1862: W. & L. E. Gurley, Troy," in Robert M. Vogel (ed.), A Report of the Mohawk-Hudson Area Survey. Smithsonian Studies in History and Technology, No. 26 (Washington, 1973), 129.

[2]Ibid., 130.

## 9 MAJOR BIBLIOGRAPHICAL REFERENCES

(See continuation sheet.)

## 10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY less than 1 acre

UTM REFERENCES

| | ZONE | EASTING | NORTHING |
|---|---|---|---|
| A | 1,8 | 6,0,7,3,8,0 | 4,7,3,1,7,1,5 |
| B | | | |
| C | | | |
| D | | | |

VERBAL BOUNDARY DESCRIPTION

The boundary of the inventoried property coincides with the legal lot that is known popularly as 514 Fulton Street and which extends from Untion Street (where it has a frontage of about 140 feet) along Fulton to Fifth Avenue (where it has a frontage of about 90 feet).

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

| STATE | CODE | COUNTY | CODE |
|---|---|---|---|
| | | | |
| STATE | CODE | COUNTY | CODE |
| | | | |

## 11 FORM PREPARED BY

NAME / TITLE

George R. Adams, Director, Historic Landmarks Project

ORGANIZATION — DATE

American Association for State and Local History — November 1977

STREET & NUMBER — TELEPHONE

1400 Eighth Avenue South — 615/242-5583

CITY OR TOWN — STATE

Nashville, — Tennessee 37203

## 12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE ___ LOCAL ___

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

TITLE — DATE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

GPO 892-453

UNITED STATES DEPARTMENT OF THE INTERIOR
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perpendicular open arches separated by a heavy brick corner pier. Here graceful wrought-iron scrollwork fills open fanlights, and simple wooden doors fill a pair of matching recessed entryways. Two bays north on Fifth is another single doorway, and near the end the north end of the Fifth Street facade there is a large semi-elliptical archway which admits vehicular traffic to the courtyard. The Gurleys installed these numerous entrances so they could rent much of the ground floor to various retailers.

Above the first story, windows are wood framed and double hung with 12-over-12 and 9-over-9 sashes. Each floor is separated from the next by a brick-and-stone beltcourse, the lowest of which is denticulated. Two cantilevered cast-iron balconies--one three-bays-wide and one two-bays-wide--decorate portions of the Fulton Street facade near Union, and a corbeled and heavily bracketed sheet metal cornice ornaments the Fulton Street and Fifth Avenue facades. Above this on Fifth, additional decoration is provided by a four-bay-wide partial parapet bearing the company name and the date of the building.

Originally, in addition to leasing first-floor space to retailers, the Gurleys rented both the third and fourth floors to other manufacturers. As the company grew, however, it expanded gradually into the entire building. The initial Gurley offices, situated in the east end along Fulton, retain part of their original pressed metal ceilings and some of the original cherry woodwork and now serve as reception and clerical areas. Recently the company renovated the west end of the first floor along Fulton, and now this area houses the principal administrative offices. A Gurley museum is situated in a conference room facing Fulton near the center of the building. Here is housed perhaps the best collection of historic American surveying instruments in the world. The display is open to the public by appointment.

Elsewhere in the building large open spaces with exposed cast-iron columns dominate. Generally walls are plastered and painted light green. The flooring is wood. Each floor exhibits some temporary partitioning, but overall the company has made few alterations. Currently the building is heated with a low-pressure steam system utilizing an oil-burning furnace converted from coal in 1948. An especially interesting interior

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feature is the Gurley foundry, situated at ground level north of the courtyard. Although since 1948 the company has used the foundry only to cast lead weights for underwater current meters, it remains in fair condition.

On the upper floors, along with ultra-modern technical instruments, the firm continues to manufacture about 500 standard transits each year, and its craftsmen continue to make, by hand, fine wooden storage and carrying cases for them. Still in use are several circular dividing engines and other machines designed and built by Edward Arms. According to Teledyne's 1976 first quarter report, the building contains "what is believed to be the largest collection of mechanical dividing engines in the United States. These range from machines that were built by Gurley engineers themselves in the 1800's, to the most modern available Swiss engines capable of angular accuracy to one arc second, and linear ruling accuracy to 1 micron or about 40 millionths of an inch."[13]

When HAER studied the Gurley Building in 1969, the company was considering abandoning the structure for some undetermined location on the outskirts of town. Since then the firm has expended a considerable sum to develop renovation plans for the present complex. These call for the installation of all heavy equipment on the first floor and the removal of all offices to the adjacent Parker House but apparently for only slight exterior alterations. According to company officials, however, cost factors have prevented the firm from making definite plans to effect these proposed changes.

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[13] Teledyne Report, 3.

it began making hydraulic and meteorological instruments. Later the firm "was the first," according to the New York State Industrial Bulletin, "to produce a high resolution binary code disc, and among the first to make photoelectric encoders."[3] Teledyne Gurley encoders formed part of the Panoramic Mapping Camera used by the Apollo program to record the topographical features of the moon, and in 1972 they became part of a new off-the-shelf electronic digital readout system for machine tools.

Equally as remarkable as the accomplishments of the 132-year-old firm is its 115-year-old factory. A U-shaped, four-story, red brick structure it was erected in 1862 on the site of the previous Gurley factory, which had burned. Over the years the replacement building has undergone little significant exterior alteration. It houses an extraordinary collection of historic surveying instruments and what is probably the country's largest working collection of circular dividing engines, several of which were made by Arms. Here, along with its space-age products, the company continues to make its familiar transits and handcrafted wooden cases.

## History

In the Smithsonian Institution's report on HAER's Mohawk-Hudson area survey, Rezneck calls the W. & L. E. Gurley company an "unusual industrial concern" whose remarkable history embodies " an ambivalent, almost contradictory character."[4] The company office and factory has been situated on the same downtown Troy location since its founding in 1845 and in the same building since 1862. Day-to-day operations remain suggestive, as Rezneck notes, of a small-scale, individualized, family enterprise. A great variety of goods are turned out in relatively limited number, and there is little automation. Skilled workers using precision tools continue necessarily to determine quality of product. Yet over the years the company

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[3]"The Moon Is Next: Troy Firm Is Noted for Precision Instruments," New York State Department of Labor Industrial Bulletin (August, 1965), 3.

[4]Rezneck, "Gurley Building," 127.

has continually broadened its product line from surveying instruments to weights and measures to hydraulic and meteorological instruments to space-age electronics and has achieved a position of leadership in each area. Moreover, having finally been forced, like many other small enterprises, to merge with a larger firm, Gurley is now a subsidiary of Teledyne, Inc., an important and dynamic technological conglomerate.

Recorders of the Gurley company's history have made much of the Gurleys' origins in Connecticut, the State that produced Eli Whitney, Eli Terry, Samuel Colt, and numerous other industrial geniuses. Ephraim Gurley, father of William and Lewis E., moved from Mansfield, Conn., to Gibbonsville (now Watervliet), N.Y., in 1813, and 5 years later he joined Alpheus and Truman Hanks in establishing Hanks, Gurley, & Co., which operated the first iron foundry in Troy. Coincidentally, the Hanks brothers and their father, Benjamin, had also come from Mansfield, where the Hanks family enjoyed a reputation as pioneers in the manufacture of bells. Ephraim Gurley's partnership with the Hanks brothers lasted only until 1821, when he joined Charles and Nathaniel Starbuck in one of Troy's earliest stove casting enterprises.

A few years before his death in 1829, Ephraim purchased a house on Fifth Avenue, near the present Gurley factory, and here his widow reared their two sons. After attending several private schools the older boy, William, entered Rensselaer Polytechnic Institute and graduated in 1839 highly recommended for his competance in engineering and surveying. Following a brief stint as a surveyor, William went to Michigan in a fruitless search for an engineering job. Disappointed at the lack of positions, he soon returned to Troy and took an apprenticeship in a foundry run by Julius Hanks, another of Benjamin's sons. Within a few years Gurley became shop foreman, and in this position he mastered new skills and demonstrated ingenuity that eventually served him well in his own business. Meanwhile, in 1844 his brother, Lewis E. Gurley, became an apprentice to Jonas E. Phelps, a former Hanks employee who now owned a small firm for manufacturing mathematical and scientific instruments. Within a year mutual interests prompted William and Lewis's boss to establish Phelps & Gurley, a partnership that marked the beginning of the now-famous W. & L. E. Gurley company.

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Lewis left the business in 1847 and entered Union College, but upon graduating in 1851 he rejoined the firm as a full partner. The following year, 1852, he and William bought out Phelps' interest in the company and gave it the name--W. & L. E. Gurley--that it bore until 1967.

That same year, 1852, the Gurleys bought the Julius Hanks foundry, which by this time was run by Julius's son Oscar. It stood at the northeast corner of Fulton Street and Fifth Avenue, site of the present Gurley factory. Here the brothers manufactured compasses and an array of surveying instruments and related equipment which soon became known all over the country. One of the Gurleys' customers was reformer John Brown, who ordered several items by mail in 1855 and visited the factory personally in 1859 to purchase an illuminated compass. To advertise Gurley products William attended State fairs in Indianapolis and St. Louis in 1856 and traveled afterward to Minneapolis and St. Paul to meet business leaders. Additionally, about this same time (1855) W. & L. E. Gurley published A Manual of the Principal Instruments Used in American Engineering and Surveying. It was "the first of its kind in America," says Rezneck, and provided "an illustrated, instructional account of the instruments and their uses, without any reference to prices. This manual was reissued and sold at a nominal figure year after year," reaching its 52d edition as recently as 1951.[5] During the Civil War the firm gained further national exposure by manufacturing a number of military products, including brass fuse-plugs for naval projectiles and an improved type of brass trimming for saddle trees.

In May 1862 fire destroyed both the Gurleys' factory and their mother's home, which stood nearby. The property loss totaled more than $2 1/2 million, but by December workmen had cleared away the charred factory ruins and erected a new facility on the same site, and the Gurleys had begun pushing forward with additional Government contracts. In this new building W. & L. E. Gurley returned after the war to the manufacture and improvement of surveying instruments and in 1876 completed, according to surveying instrument collector-historian and former Gurley Chairman, Charles E. Smart, the "first ever" light-weight

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[5] Ibid., 130.

engineer's transit.[6] It was made of aluminum and was proudly displayed at the Centennial Exposition in Philadelphia. Especially important to the Gurleys' success in these years was Edward Arms, whom they hired in 1862 at age 17 and who served the company effectively for 72 years, until 1934. In the 1870's Arms, a mechanical genius, completed an unfinished circular dividing engine purchased from the Phelps estate in 1865, and in 1883 he designed a new one which worked three times faster. For some jobs the company still uses it and similar machines that he built in 1907 and 1908. Arms also devised a method of drawing platinum wire to the extremely fine diameter required for transit telescopes, thus eliminating the necessity of using spider webs in these instruments. In his 1886 history of Troy, Arthur J. Weise reported that Gurley manufactured wire no more than 1/12,000 of an inch thick and that "a thread of the wire sufficient to encircle the earth can be coiled inside a thimble."[7]

These developments and a growing product line made Gurley famous internationally. Gurley instruments, says Rezneck, "went with the engineers of both North and South America . . . to survey the wild western lands and lay out the railroads . . . and were, indeed, used all over the world."[8] Weise supports this conclusion. He lists theodolites, solar telescopes, compasses, transits, plane tables, Y levels, miners' compasses, chains, rods, and drawing instruments as Gurley products and states that "the enterprising firm makes annually more engineering and surveying instruments than any other three mathematical and philosophical instrument manufacturers in the United States, and widely distributes them in all parts of the world," including Japan, China, India, Syria, Arabia, Egypt, South and Central America, the Caribbean, Mexico, and Canada.[9] Coinciding with these activities, in 1881 W. & L. E. Gurley published an engineers' ephemeris that, according to Rezneck, "is still

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[6]Charles E. Smart, The Makers of Surveying Instruments in America Since 1700 (Troy, N.Y., 1962), 61.

[7]Arthur James Weise, The City of Troy and Its Vicinity (Troy, 1886), 105.

[8]Rezneck, "Gurley Building," 130.

[9]Weise, The City of Troy, 103.

issued in an annual edition, as an Abridgement of the Nautical Almanac.[10]

William Gurley died in 1887, and Lewis succumbed in 1897. Two years later the W. & L. E. Gurley company was incorporated, but it remained a family business and a leader in the manufacture of scientific instruments. In 1904, for example, the National Bureau of Standards chose Gurley to make its weights and measures. A few years later, during World War I the company turned its chief energy once again to the manufacture of such military goods as gun sights and artillery target scales and produced military applications of transits, alidades, and range finders.

After the war the direct line of family management ceased, but over the next several decades the firm enjoyed the effective successive leadership of Charles I. Day, Charles E. Smart, and Lester C. Higbee, graduates respectively of Columbia, M.I.T., and Rensselaer Polytechnic Institute. Without abandoning earlier product lines, these men led Gurley into the manufacture of hydraulic and meteorological instruments. When World War II began, Gurley launched full force into the production of illuminated transits, night compasses, azimuth instruments, bore inspection telescopes, and precision components for military machines. As in two previous wars, the company made an important contribution to national defense.

In the postwar years Gurley's products kept pace with rapidly changing technology, but the company itself got caught in the national trend toward industrial consolidation and was acquired in 1967 by Teledyne, Inc., of California. Although known now as Teledyne Gurley, the former W. & L. E. Gurley company remains at the top in its industrial field. According to the New York State Industrial Bulletin, it "was the first to produce a high resolution binary code disc, and among the first to make photoelectric encoders" which "are the heart and soul of automated machinery, electronic computers, missle guidance systems and the guidance systems in America's space capsules."[11] Teledyne Gurley encoders formed part of the Panoramic Mapping Camera used by the Apollo program to record the topographical features of the moon, and in 1972 they became

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[10]Rezneck, "Gurley Building," 130.

[11]"The Moon Is Next," 3.

part of a new off-the-shelf electronic digital readout system for machine tools. More recently, according to Teledyne's first quarter report for 1976, the company "developed an electronic digital sextant for the National Oceanic and Atmospheric Administration that uses a segment of an optical encoding disc to provice angular data, in electronic form, directly to shipboard computing equipment. The sextant supplies data on the position of an oceanographic vessel during hydrographic surveying."[12] Significantly, along with this kind of surveying equipment Teledyne Gurley continues to produce the familiar Gurley transits and beautiful handcrafted cases in which to transport and store them.

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[12] Teledyne Report: First Quarter 1976 (Los Angeles, 1976), 7.

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