

D.C. 9/30/86

United States Department of the Interior
National Park Service

For NPS use only

National Register of Historic Places
Inventory—Nomination Form

received

date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic UNIVERSITY OF ILLINOIS ASTRONOMICAL OBSERVATORY

and or common N/A

2. Location

street & number 901 SOUTH MATHEWS AVENUE not for publication

city, town URBANA vicinity of

state ILLINOIS code 012 county Champaign code 019

3. Classification

Category	Ownership	Status	Present Use
<input type="checkbox"/> district	<input checked="" type="checkbox"/> public	<input checked="" type="checkbox"/> occupied	<input type="checkbox"/> agriculture
<input checked="" type="checkbox"/> building(s)	<input type="checkbox"/> private	<input type="checkbox"/> unoccupied	<input type="checkbox"/> commercial
<input type="checkbox"/> structure	<input type="checkbox"/> both	<input type="checkbox"/> work in progress	<input checked="" type="checkbox"/> educational
<input type="checkbox"/> site	Public Acquisition	Accessible	<input type="checkbox"/> entertainment
<input type="checkbox"/> object	<input type="checkbox"/> in process	<input type="checkbox"/> yes: restricted	<input type="checkbox"/> government
	<input checked="" type="checkbox"/> being considered	<input checked="" type="checkbox"/> yes: unrestricted	<input type="checkbox"/> industrial
		<input type="checkbox"/> no	<input type="checkbox"/> military
			<input type="checkbox"/> museum
			<input type="checkbox"/> park
			<input type="checkbox"/> private residence
			<input type="checkbox"/> religious
			<input checked="" type="checkbox"/> scientific
			<input type="checkbox"/> transportation
			<input type="checkbox"/> other:

4. Owner of Property

name BOARD OF TRUSTEES—UNIVERSITY OF ILLINOIS

street & number 354 ADMINISTRATION BUILDING, 506 SOUTH WRIGHT STREET

city, town URBANA vicinity of state ILLINOIS

5. Location of Legal Description

courthouse, registry of deeds, etc. OFFICE OF UNIVERSITY COUNSEL

street & number 266 ADMINISTRATION BUILDING, 506 SOUTH WRIGHT STREET

city, town URBANA state ILLINOIS

6. Representation in Existing Surveys

title Historic Resources of the University has this property been determined eligible? yes no

of Illinois at Urbana-Champaign
date Summer 1986 federal state county local

depository for survey records Illinois Historic Preservation Agency

city, town Springfield state Illinois

7. Description

Condition		Check one	Check one
<input type="checkbox"/> excellent	<input type="checkbox"/> deteriorated	<input type="checkbox"/> unaltered	<input checked="" type="checkbox"/> original site
<input type="checkbox"/> good	<input type="checkbox"/> ruins	<input checked="" type="checkbox"/> altered	<input type="checkbox"/> moved date _____
<input checked="" type="checkbox"/> fair	<input type="checkbox"/> unexposed		

Describe the present and original (if known) physical appearance

SUMMARY

The University of Illinois Astronomical Observatory is significant as the location of the development of the selenium cell and the photo-electric cell which revolutionized the science of astronomical photo-electric photometry—the measurement of celestial magnitudes. The research was conducted on the twelve-inch Warner and Swasey refractor telescope located in the second story equatorial room of the 1896 brick observatory. The period of significance is 1906 to 1922. The building retains integrity of location, setting, materials, workmanship, feeling and association. Although the original form of the building was enlarged by additional classroom wings in the 1950's and 1960's, the original design as expressed by the plan, space, structure, and style is clearly evident and recognizable apart from the later wings.

ORIGINAL AND PRESENT APPEARANCE

During the state legislative session of 1895, a sum of fifteen thousand dollars was appropriated for a new astronomical observatory at the University of Illinois. The location was to be on the grassy knoll between Mathews Avenue and Burrill Avenue. The vacated Burrill Avenue is now the location of the sidewalk along the eastern side of the University Quadrangle. The site is just north of the 1876 Morrow Plots, the nation's oldest experimental field, now a National Historic Landmark. The structure was built to replace a smaller observatory located further north and west, closer to the heart of campus.

Contracts were let in the early spring of 1896, and ground was broken in April of that year. The architect was Charles A. Gunn; Bevis and Company of Urbana were the general contractors. Ira Baker, a professor of Civil Engineering, served as the supervisor of construction while George Meyers, first director of the observatory, was in Europe.

The building was constructed on a one-story T plan, facing north. It is of buff-colored Roman brick (manufactured in Indiana), with limestone lintels and sills. The bar of the T is seventy-five feet long east to west and twenty-five feet deep. The stem of the T is located to the south, centered along the east-west axis and is twenty-six feet deep by twenty-five feet wide. The octagonal observation tower rises to a height of twenty-five feet at the intersection of the T and then becomes round, continuing to a total height of 35 feet. At the floor level of the second story equatorial room, a balustrade circles around the exterior of the tower on the north, east and west.

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Inventory—Nomination Form**



Continuation sheet Description

Item number 7

Page 1

The tower is capped by a great hand-tooled, circular, limestone plate which carries the dome track. The internal diameter of the dome is twenty-four-and-one-half feet and at its apex, is twenty-four feet above the equatorial room floor. The operable slit has a clear opening of forty-four inches and is opened and closed by hand in a matter of seconds. The dome tower and equatorial room are completely original with the exception of a motor drive which replaced the rope and sheave method of rotating the dome on its metal track.

At the center of the equatorial room is located the 1896 twelve-inch refractor telescope. The telescope was made by the highly respected firm of Warner and Swasey of Cleveland, Ohio. For maximum stability, it is mounted on a brick pier which extends down the bedrock and is not attached to the building in any way. The telescope was obtained at a cost of four thousand five hundred dollars. Also original is the observer's chair; it was included in the original contract for the building and equipment and was built by Bevis and Company at a cost of twenty five dollars.

The octagonal entrance hall below the equatorial room is centered around the massive brick pier. The interiors of the loadbearing brick walls are painted white. Other non-bearing walls are of four-inch tongue and groove bead board. This room was originally and continues to be used for storage of portable equipment, books, etc. The original stairs, newel posts, balustrades and wood floors are extant.

Originally, there were two transit rooms in each of the east-west wings. Each room had a permanently mounted transit telescope on a brick pier. Transit telescopes are useful for accurate measurement of stellar positions. The windows drop into pockets in the basement wall to allow for unobstructed observing from these locations. Corresponding slits in the ceiling opened to complete clear meridian and zenith. The transit rooms have since been converted to office space, as has the southern classroom wing. The brick piers are still visible in the basement beneath the transit rooms.

The exterior is subtly ornamented by a brick cornice, stone sills and lintels, stone water course, ornamental gutters and original copper downspouts. Most windows are original wood double hung. The central front entrance door with transom and concrete stoop is original. While the original front balustrade has been replaced, the western stoop and ornamental iron balustrade is intact.

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form



Continuation sheet Description Item number 7 Page 2

ADDITIONS AND ALTERATIONS

Although the transit rooms are no longer used for their original purpose, the primary alteration to the building has been the two single story additions, one located in the southwest corner and the other being the large wing on the east.

The first addition was of light cream-colored brick and was nestled into the southwest corner of the building to provide additional classroom and office space in 1956. The addition replicates the original structure in scale, rhythm and detail, and materials in essentially every way except color. Care was taken to match the cornice lines, gutters, stone lintels, sills and watercourse. The brick is of the same size, and its configuration attempts to match the narrow mortar joints of the earlier building.

Likewise, the large east wing, constructed in 1966, is of the same light cream-colored brick and also replicates the aforementioned detail. The scale of this later addition is much larger than either of the two previous components. This building provided more office space, a new dark room and a radio telescope lab. Both additions were designed by architect P. Dixon.

IMPACT ON HISTORIC INTEGRITY

In order to assess the implications of additions and alterations for purposes of determining historic integrity relative to a property's historic significance, it is necessary to examine the seven ways that integrity applies to historic resources: location, design, setting, materials, workmanship, feeling and association.

- 1) Location: Because the observatory remains on its original site, and because the property is significant for its association to pioneer photometric research undertaken there, the building retains integrity of location.
- 2) Setting: While location identifies the particular place of an event, setting defines the character of that place. The observatory is no longer on the outskirts of campus, but it is effectively buffered by open space on three sides. To the south are the National Historic Landmark Morrow Plots. To the west is the grass plaza in front of the Undergraduate Library. On the east, originally a meadow, is a parking lot. Through the use of an electric switch located in the equatorial room, an observer is able to turn off the

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form



Continuation sheet Description Item number 7 Page 3

the lights in the parking lot to decrease glare and increase visibility. Smith Music Hall is located to the north of the building. The two are separated by a landscaped sidewalk and bicycle path.

- 3) Design: The design integrity of the building has been compromised to some degree by the additions, particularly that of the east wing which visually obscures all but the dome when viewed from the east. However, because of the location of the additions, only the original east wall and the two walls which formed the southwest corner of the original building are now incorporated as interior walls. The difference in color of the original building further enables it to identify itself. As design is defined by ornament, features such as the original deck with its turned spindles, the tin dentils under the dome track and the ornamental cornice and stonework help to identify the building as a turn of the century structure.

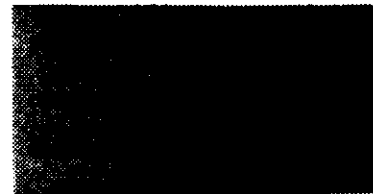
In its 1982 Draft "How to Apply the National Register Criteria for Evaluation," the National Park Service indicates on pages 40-42, "A property important for association with an event, historical pattern or person(s) ideally might retain some features pertaining to all seven...However, integrity of design and workmanship might not be as relevant to the significance."

The report goes on to indicate that if such a property retains the basic design elements relative to its type, it would be eligible for the National Register. The University of Illinois Observatory is a good illustration of such a case. Basic design features critical to the astronomical research include the observation tower, equatorial room, dome, pier and twelve-inch refractor telescope; all of which remain intact.

- 4) Materials: With very few exceptions, most historic materials remain intact. Two such exceptions are the replacement of ornamental hand railings at the north and south doors and the replacement of the east tower bay window with a handicap accessible door. Those historic materials that remain include the original brick, stone, flooring, wall treatment, railings, windows, hardware, gutters, downspouts, piers and astronomical equipment.
- 5) Workmanship: The craftsmanship of the masonry contractor J.B. Bennet is evident in the graceful curve of the observation tower walls, the smooth flush mortar joints, and the stationary

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form



Continuation sheet Description Item number Page

piers. Hand tooling marks are evident on the stone dome track plate.

6&7) Feeling and Association: The most subjective of the seven factors determining integrity, feeling and association are generally present if the property can, in fact, visually represent that it is a historic building and if it is actually the site of the significant event. For example, while the wooden ramp for the handicap accessibility is an unsightly feature on the north facade of the building, it does not obscure the fact that the observatory is an old building that has occupied its place on the South Quad for many years. To the University community and passers-by, the observatory conveys its sense of time and place through design, location, setting, and materials.

CONDITIONS AND THREATS TO THE PROPERTY

While basically in sound structural condition, the building has suffered from a lack of routine maintenance in recent years. Work is needed to fortify the observation deck, and the second story cornice and dome surface need to be repaired and repainted. The southeastern wall of the equatorial room is also showing evidence of water damage by the presence of efflorescence on the interior of the wall.

Because of its location and its continued use as a teaching observatory, the threat of demolition does not seem imminent. Loss of historic fabric due to inappropriate remodeling or repair would appear to be more likely at this time.

8. Significance

Period	Areas of Significance—Check and justify below				
<input type="checkbox"/> prehistoric	<input type="checkbox"/> archeology-prehistoric	<input type="checkbox"/> community planning	<input type="checkbox"/> landscape architecture	<input type="checkbox"/> religion	
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> archeology-historic	<input type="checkbox"/> conservation	<input type="checkbox"/> law	<input checked="" type="checkbox"/> science	
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> agriculture	<input type="checkbox"/> economics	<input type="checkbox"/> literature	<input type="checkbox"/> sculpture	
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> architecture	<input type="checkbox"/> education	<input type="checkbox"/> military	<input type="checkbox"/> social/	
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> art	<input type="checkbox"/> engineering	<input type="checkbox"/> music	<input type="checkbox"/> humanitarian	
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> commerce	<input type="checkbox"/> exploration/settlement	<input type="checkbox"/> philosophy	<input type="checkbox"/> theater	
<input checked="" type="checkbox"/> 1900-1922	<input type="checkbox"/> communications	<input type="checkbox"/> industry	<input type="checkbox"/> politics/government	<input type="checkbox"/> transportation	
		<input type="checkbox"/> invention		<input type="checkbox"/> other (specify)	

Specific dates 1907-1922

Builder/Architect C.A.GUNN, arch./BEVIS&CO., contrs.

SUMMARY
Statement of Significance (in one paragraph)

"As a result of Stebbins' work at Illinois with the photoelectric cell, photoelectric photometry is the standard technique in determining stellar magnitudes today," quoth George McVittie, fourth director of the University of Illinois Astronomical Observatory. Stellar magnitude is one of the most fundamental measurements in the field of astronomy. The University of Illinois Observatory is significant as the site of revolutionary research in the use of electronic techniques for the detection of astronomical radiation.

CONTEXT

Prior to 1907, nearly all measurement of the magnitude of stars had been obtained by visual or photographic means. The earliest method, visual comparison of relative brightness, has been likened to measuring the weights of rocks by holding them in your hands. Later, photographic methods used starlight to make a representation on a photographic plate. Neither method was adequate for quantitative measurements as they were not nearly accurate enough for anything but the most rudimentary comparisons. Because of these drawbacks, the use of electricity for empirically gathering astronomical data revolutionized the field of astronomy.

Two German scientists had experimented briefly with the use of an electric cell to measure starlight in 1895. Due to the minimal success of the experimentation, it was not pursued and photography continued to be the accepted means for measuring starlight. The credit for the science of modern photoelectric astronomical photometry is given to Joel Stebbins (1878-1966). Stebbins did his pioneering research in the field during the period from 1907 to 1922 while he was director at the Illinois Observatory. As history of science scholars have noted, "the history of photoelectric photometry, the breakthrough in astronomical photometry that began around 1910, is for the most part the 'story' of J. Stebbins, director of the University of Illinois Observatory from 1903-1922, and the Wasburn Observatory of the University of Wisconsin from 1922 until his retirement in 1948."(1)

Stebbins arrived as director of the Observatory after completing his PhD at the University of California, Berkeley in 1903. For the next few years he conducted research into the relative brightness of binary stars using visual and photographic techniques. Stebbins was assisted in his efforts by his wife, May, who frequently acted as recorder. In a speech before the American Astrological Society in 1957, Stebbins

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Inventory—Nomination Form

Continuation sheet Significance

Item number 8

Page 1

recalled the events which led up to the use of the electric cells. "She (May Stebbins) wrote down the numbers as the observer called them, but after some nights of recording a hundred readings just to get one magnitude, she said it was pretty slow business. I responded that someday we would do all this by electricity. That was a fatal remark. Thereafter she would often prod me with the question, 'When are you going to change to electricity?' It happened that within two or three months, the Department of Physics gave an open house, and one of the exhibits was in charge of a young instructor, F.C. Brown. He showed how when he turned on a lamp to illuminate a selenium cell, a bell would ring, when the lamp was off, the bell would stop. Here was the idea: Why not turn on a star to a cell on a telescope and measure a current?" (2). Stebbins soon made friends with Brown and in due time they had a selenium cell positioned on the twelve inch refractory telescope. In the fall of 1907, after some trial and error, the two achieved the first light curve for the moon since 1860.

This successful use of photoelectric technology was a quantum leap in the field of astronomy. Stebbins later discovered that cooling the cell to zero degrees Fahrenheit doubled the sensitivity and diminished the irregularities in the circuit tenfold. Likewise, by reducing the size of the cell, irregularities were again reduced. Brown and Stebbins went on to detect stellar intensity and activity that were previously unrecorded. In the process, their work superceded and scrapped four doctoral theses.

Stebbins continued to do pioneering work with the selenium cell until 1913, when he became associated with Jacob Kunz. Kunz was a University of Illinois physics professor who had been doing experimentation on an improved photoelectric cell which was based on the alkalia metals. This cell was the predecessor of the modern day "electric eye." Its applications in science and industry have been widespread, including early uses in talking motion pictures, television and aviation.

The improved technology of the photoelectric cells over the selenium type had the advantage of greater sensitivity and faster operation. Stebbins explained it in this way, "Only recently we managed to produce a cell which is twice as sensitive as anything we had before, and this amounts to the same thing as though some good fairy had suddenly doubled the light gathering power of our telescope." (3). The results were precise light curves of eclipsing double stars, which permitted the determination of the diameters and masses of stars with a higher accuracy than any previously attained, and the discovery of previously undetected eclipses in several stars such as Beta Aurigae and Delta Orionis." (4).

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Inventory—Nomination Form**

Continuation sheet Significance

Item number 8

Page 2

Through his work with Stebbins, Kunz continued to refine his cells. This owed largely to the fact that starlight is one of the faintest of all light sources. Kunz's cells were the most sought after in the country, being more than a million times more sensitive than cells commercially available. (5) This dedication earned him the recognition as the "father of the photoelectric cell." (6) Because of his close collaboration with Kunz, Stebbins usually got the best cells for himself, leaving those of second best quality to other observatories.

Apparently disgruntled at the Administration at the University, Stebbins left in 1922 to take over the directorship of the Washburn Observatory at the University of Wisconsin. Stebbins replaced his mentor, George C. Comstock, whom he had studied with as a graduate student some twenty five years before. Stebbins went on to apply the techniques he developed while at Illinois. Continual experimentation led to continuously improved technology for the study of astronomy.

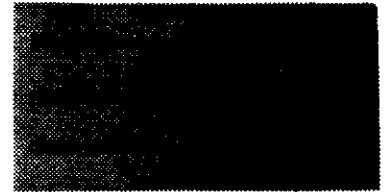
The early research done at the University of Illinois Astronomical Observatory was vitally important in the field of astronomy. It transformed the measurement of astronomical radiation from imprecise visual and photographic methods, to a linear, quantifiable science.

Without its basis, modern photoelectric astronomy would not have been possible. The continued evolution of the technology over the decades has made photoelectrical photometry the standard tool for astronomical measurement. All major astronomical observatories in the world have cells for locating distant stars not visible to the eye. Except in a few rare instances, photography as a tool for such work is now all but obsolete.

The University of Illinois Observatory is the structure most closely associated with this significant research. It retains the basic design features most closely linked to its historical significance: the original twelve inch telescope, observation tower and equatorial room, pier and dome. As such, it provides an accurate and vivid sense of the birthplace of modern astronomy.

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form



Continuation sheet

Significance

Item number 8

Page 3

FOOTNOTES

- 1
O. Struve and V. Zebergs, ASTRONOMY OF THE TWENTIETH CENTURY, MacMillian, New York, 1962, p. 80.
- 2
Joel Stebbins, "Early Photometry at Illinois", PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF THE PACIFIC, Vol. 69, No. 441, December, 1957, p. 506.
- 3
Joel Stebbins, "The Electrical Photometry of Stars", SCIENCE, Vol. 61, No. 1066, June 14, 1915, p. 811.
- 4
A.E. Whitford, "American Pioneer in Photoelectric Astronomy", SKY AND TELESCOPE, May, 1966, p. 266.
- 5
Joel Stebbins, "Jakob Kunz 1874-1938", POPULAR ASTRONOMY, Vol. 67, No. 3, March 1939, p. 15.
- 6
"Jakob Kunz, on U.of I. Faculty 29 Years, Dies", THE EVENING COURIER, Urbana, IL., July 19, 1938, n.p.
- 7
Ibid., Whitford, p. 266.

9. Major Bibliographical References

SEE CONTINUATION SHEET

10. Geographical Data

Acres of nominated property .92

Quadrangle name URBANA, IL

Quadrangle scale 7.5"

UTM References

A

1	6	3	9	5	4	9	1	0	4	4	3	9	9	2	1	0
Zone			Easting				Northing									

B

Zone			Easting				Northing									

C

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

D

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

E

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

F

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

G

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

H

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Verbal boundary description and justification Beginning at a point 625' E. of the NW corner of the SE1/4, of Sec. 18, T19N, R9E, proceed due south 200' then east 200', then north 200', then west 200' to point of beginning.

List all states and counties for properties overlapping state or county boundaries

state N/A code county code

state code county code

11. Form Prepared By

name/title SHAUNA J. FRANCISSEN / MIKE SVEC-research

organization PRESERVATION AND CONSERVATION ASSOCIATION

date JULY 8, 1986

street & number P.O. BOX 2555, STATION A

telephone (217) 359-0114

city or town CHAMPAIGN

state ILLINOIS, 61820

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 Director

date 9-22-86

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

date

Attest:

Chief of Registration

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Inventory—Nomination Form**



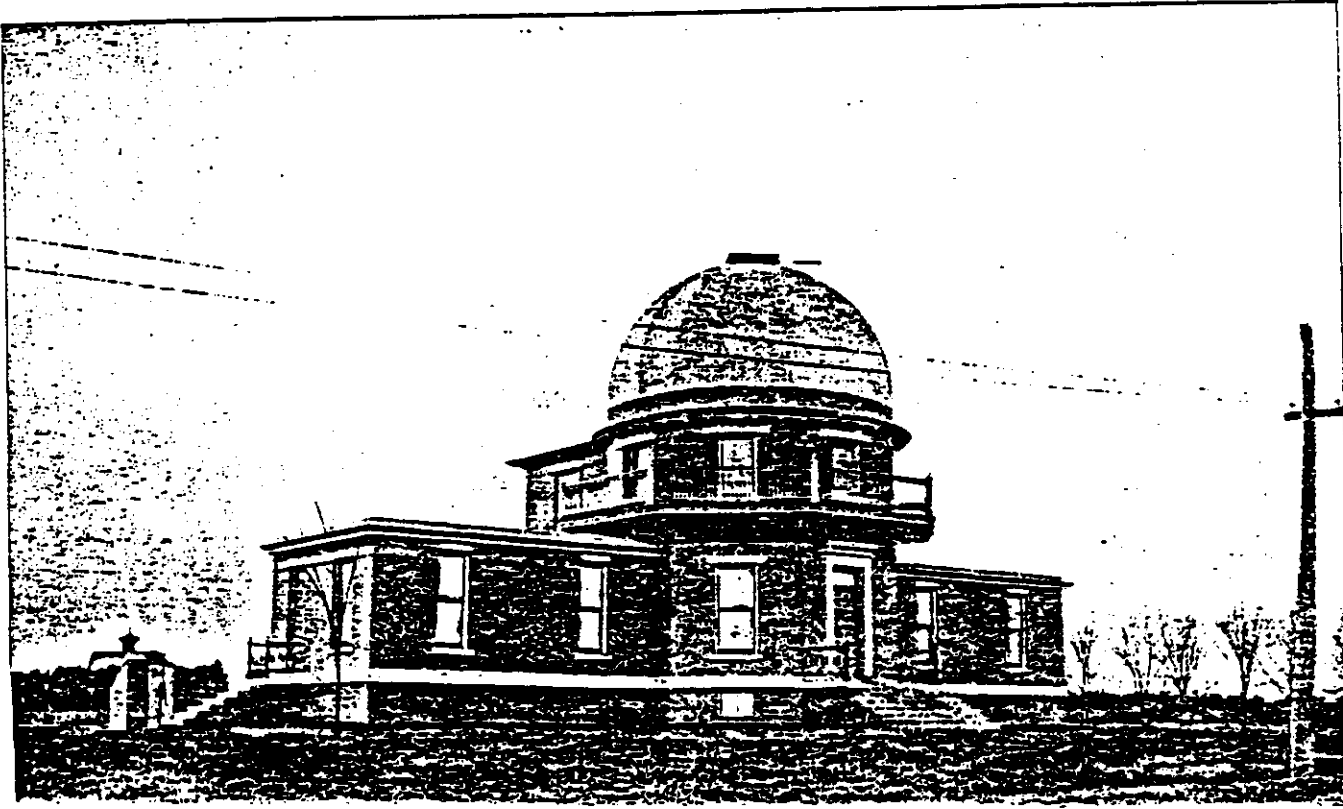
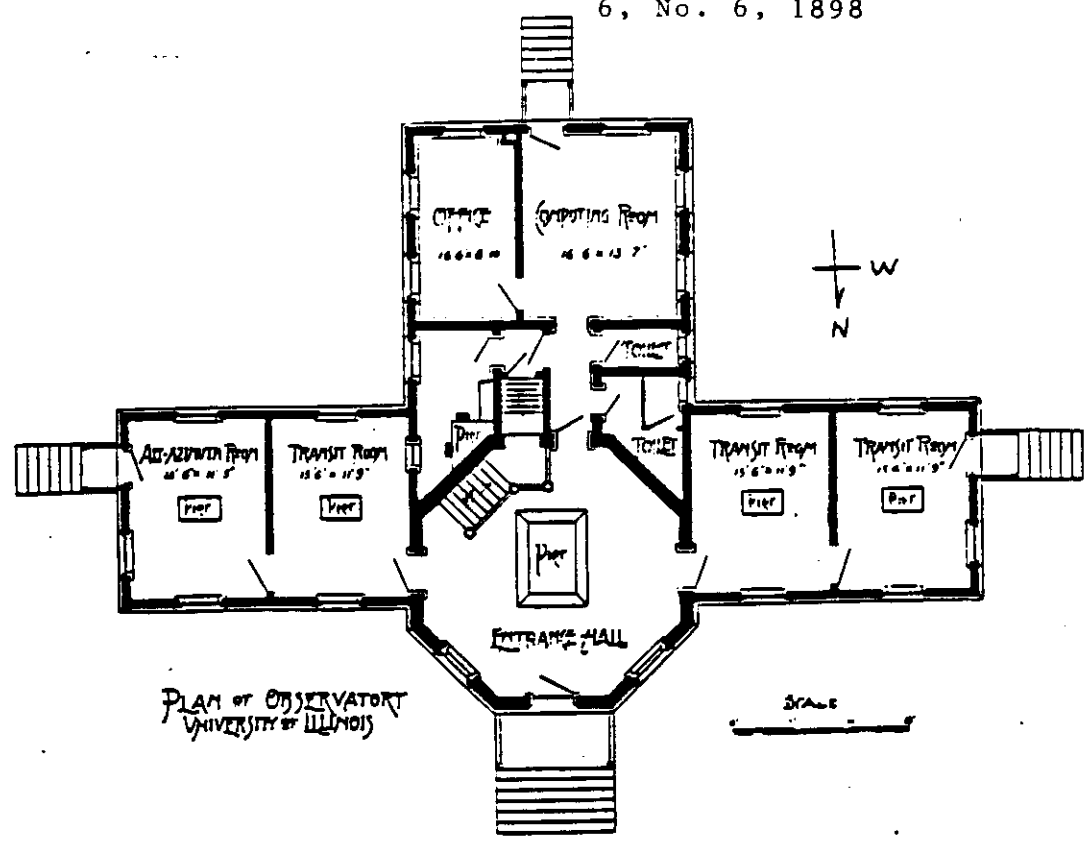
Continuation sheet Bibliography

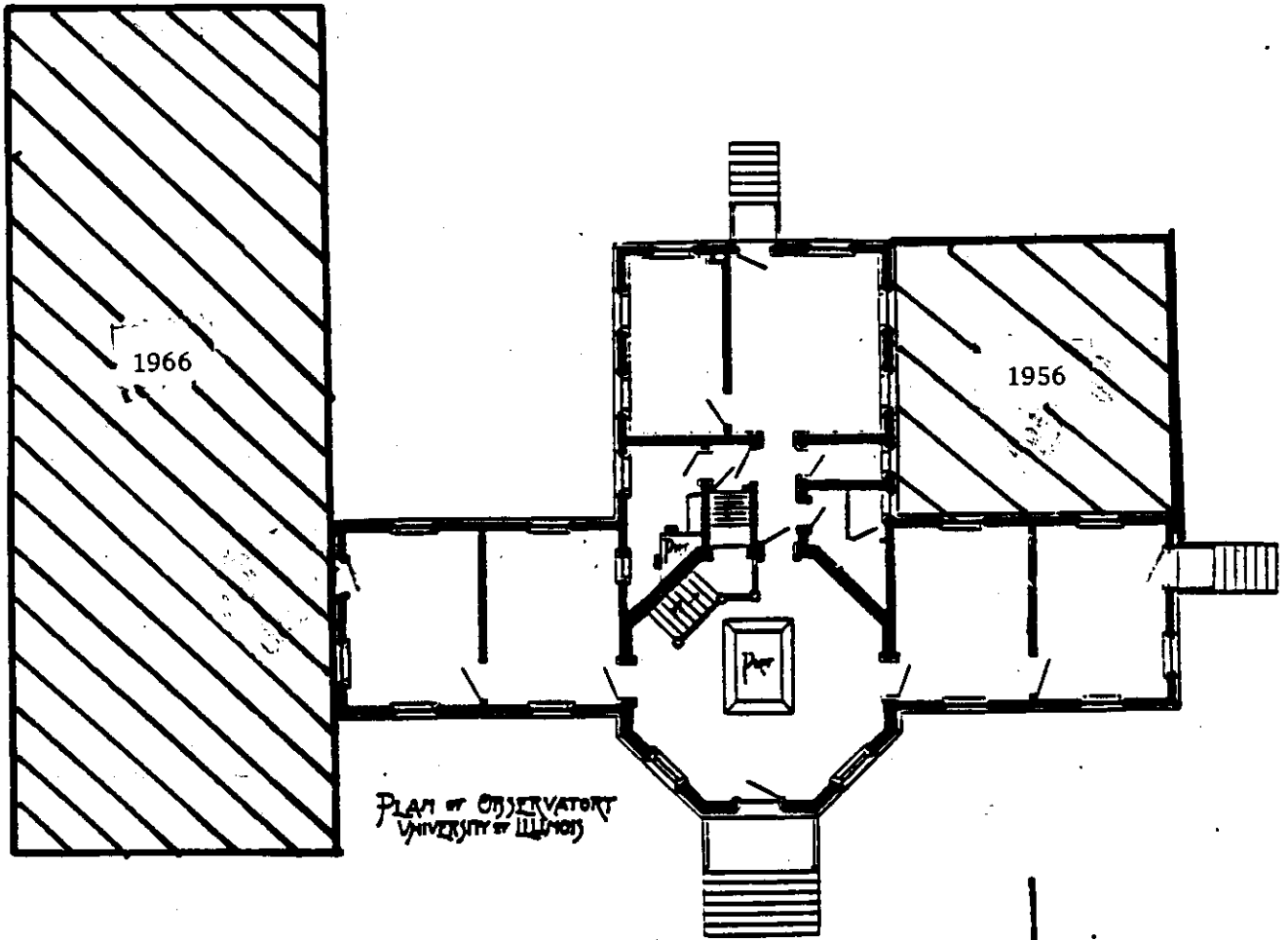
Item number 9

Page 1

BIBLIOGRAPHY

- Myers, G.W., "The Astronomical Observatory at the University of Illinois", POPULAR ASTRONOMY, Vol. 6, No. 6, 1898.
- National Park Service, "How To Apply the National Register Criteria for Evaluation", Draft, Department of the Interior, Washington, D.C., June 1, 1982.
- Stebbins, Joel, and F.C. Brown, "Determination of the Moon's Light with a Selenium Photometer", ASTRONOMICAL JOURNAL, Vol. 26, December, 1907.
- Stebbins, Joel, "Early Photometry at Illinois", PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF THE PACIFIC, Vol. 69, No. 411, December, 1957.
- Stebbins, Joel, "Jacob Kunz 1874-1938", POPULAR ASTRONOMY, Vol. 67, No. 3, March, 1939.
- Stebbins, Joel, "The Brightness of Halley's Comet as Measured With a Selenium Photometer", ASTROPHYSICAL JOURNAL, Vol. 32, July, 1910.
- Stebbins, Joel, "The Electrical Photometry Of Stars", SCIENCE, Vol. 61, NO. 1066, June 14, 1915.
- Struve, O., and Velta Zeberg, ASTRONOMY OF THE TWENTIETH CENTURY, MacMillian, New York, 1962.
- Warner and Swasey, A FEW ASTRONOMICAL INSTRUMENTS, Cleveland, 1900.
- Whitford, A.E., "American Pioneer in Photoelectric Photometry", SKY AND TELESCOPE, May, 1966.
- University of Illinois Archives, Observatory file, Urbana, IL.
- Telephone interview with Professor James Kaler, Department of Astronomy, University of Illinois, Urbana, IL., July, 1986.



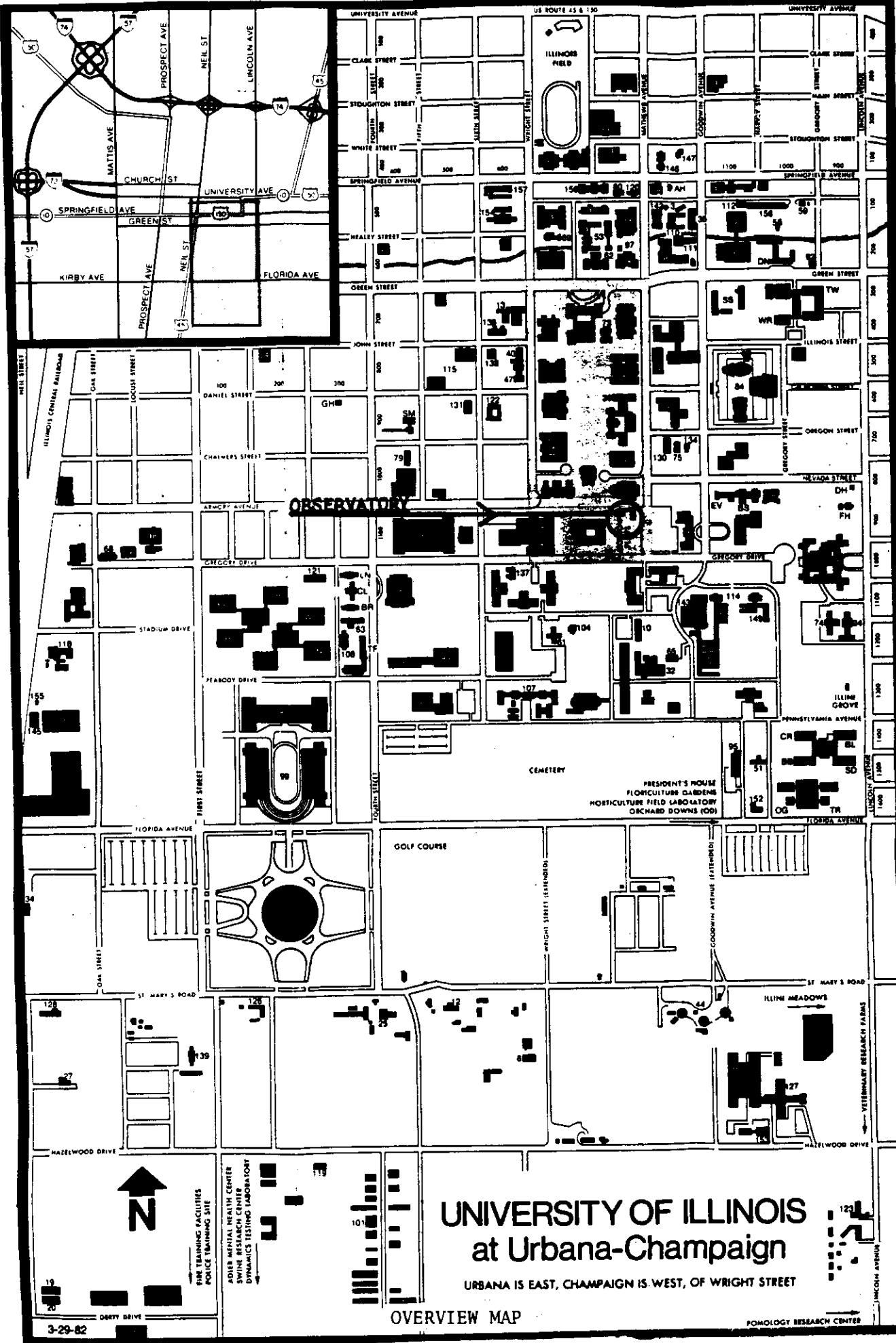


PLAN OF OBSERVATORY
UNIVERSITY OF ILLINOIS



SCALE: approx. 1/16

ILLUSTRATION OF BUILDING ADDITIONS



OBSERVATORY

CEMETERY

GOLF COURSE

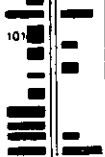
ILLINI MEADOWS

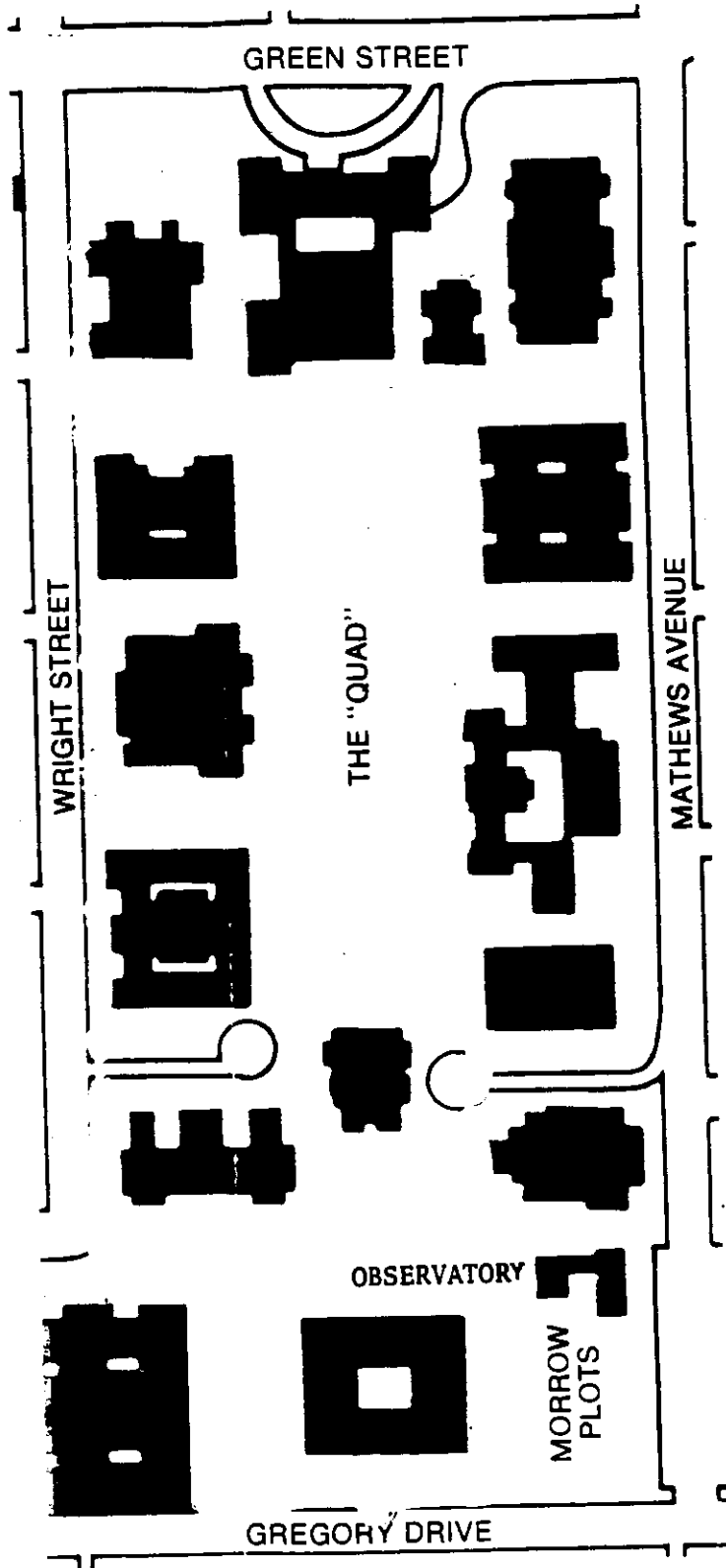
VETERINARY RESEARCH FARMS

PRESIDENT'S HOUSE
FLORICULTURE GARDENS
HORTICULTURE FIELD LABORATORY
ORCHARD DOWNS (OD)

ADVISORY HEALTH CENTER
RESEARCH CENTER
DYNAMICS TESTING LABORATORY

FIRE TRAINING FACILITIES
POLICE TRAINING SITE





PROPERTY IN RELATIONSHIP
TO THE UNIVERSITY QUADRANGLE

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 18). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name University of Illinois Observatory
other names/site number _____

2. Location

street & number 901 South Mathews Avenue not for publication
city, town Urbana vicinity
state Illinois code IL county Champaign code 019 zip code 61801

3. Classification

Ownership of Property <input type="checkbox"/> private <input type="checkbox"/> public-local <input checked="" type="checkbox"/> public-State <input type="checkbox"/> public-Federal	Category of Property <input checked="" type="checkbox"/> building(s) <input type="checkbox"/> district <input type="checkbox"/> site <input type="checkbox"/> structure <input type="checkbox"/> object	Number of Resources within Property	
		Contributing	Noncontributing
		_____	_____ buildings
		_____	_____ sites
		_____	_____ structures
		_____ objects	_____ Total
		<u>1</u>	

Name of related multiple property listing: _____
Number of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of certifying official _____ Date _____
State or Federal agency and bureau _____

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.
Signature of commenting or other official _____ Date _____
State or Federal agency and bureau _____

5. National Park Service Certification

I, hereby, certify that this property is:

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

Signature of the Keeper _____

Date of Action _____

6. Function or Use

Historic Functions (enter categories from instructions)

Education
Research Facility

Current Functions (enter categories from instructions)

Education
Research Facility

7. Description

Architectural Classification
(enter categories from instructions)

No style

Materials (enter categories from instructions)

foundation concrete
walls brick
roof copper
other

Describe present and historic physical appearance.

The history of the University of Illinois Observatory dates to 1895 when the Illinois state legislature voted the sum of fifteen thousand dollars for the construction of a new observatory on the grassy knoll between Matthews Avenue and Burrill Avenue in Urbana, Illinois. The site is just north of the 1876 Morrow Plots, the nation's oldest experimental field, and a National Historic Landmark. The structure was built to replace a smaller observatory located farther north and west, closer to the heart of campus.¹

Contracts were let in the early spring of 1896 and ground was broken in April of that year. The architect was Charles A. Gunn; Bevis and Company of Urbana was the general contractor. Ira Baker, a professor of civil engineering, served as the supervisor of construction while George Meyers, first director of the observatory, was in Europe.

The building was constructed on a one-story T plan, facing north. It is of buff-colored Roman brick (manufactured in Indiana), with limestone lintels and sills. The bar of the T is 75 feet long east to west and 25 feet deep. The stem of the T is located to the south, centered along the east-west axis and is 26 feet deep by 25 feet wide. The octagonal observation tower rises to a height of 25 feet at the intersection of the T and then becomes round, continuing to a total height of 35 feet. At the floor level of the second equatorial room, a balustrade circles around the exterior of the tower on the north, east, and west.

The tower is capped by a great hand-tooled, circular, limestone plate which carries the dome track. The internal diameter of the dome is 24.5 feet and its apex is 24 feet above the equatorial room floor. The operable slit has a clear opening of 44 inches and is opened and closed by hand in a matter of seconds. The dome tower and equatorial room are original with the exception of a motor drive which replaced the rope and sheave method of rotating the dome on its metal track.

See continuation sheet

National Register of Historic Places Continuation Sheet

Section number 7 Page 2

At the center of the equatorial room is located the 1896, 12-inch refractor telescope. The telescope was made by the firm of Warner and Swasey of Cleveland, Ohio. For maximum stability it is mounted on a brick pier which extends down to bedrock and is not attached to the building in any way. The telescope was obtained at a cost of \$4,500. Also original is the observer's chair; it was included in the original contract for the building and equipment and was built by Bevis and Company at a cost of \$25.

The octagonal entrance hall below the equatorial room is centered around the massive brick pier. The interiors of the load-bearing brick walls are painted white. Other non-bearing walls are of four-inch tongue and groove bead board. This room continues to be used for its original purpose--storage of portable equipment, books, etc. The original stairs, newel posts, balustrades and wood floors are extant.

Originally, there were two transit rooms in each of the east and west wings. Each room had a permanently mounted transit telescope on a brick pier. The windows drop into pockets in the basement wall to allow for unobstructed observing from these locations. The transit rooms have since been converted to office space, as has the southern classroom wing. The brick piers are still visible in the basement beneath the transit rooms.

The exterior is ornamented by a brick cornice, stone sills and lintels, stone water course, ornamental gutters, and original copper downspouts. Most windows are original wood, double hung. The central front entrance door with transom and concrete stoop is original. While the original front balustrade has been replaced, the western stoop and ornamental iron balustrade is intact.

Although the transit rooms are no longer used for their original purpose, the primary alteration to the building has been two single story additions, one located in the southwest corner and the other being the large wing on the east.

The first addition was of light cream-colored brick and was nestled into the southwest corner of the building to provide additional classroom and office space in 1956. The addition replicates the original structure in scale, rhythm, detail, and materials in essentially every way except color. Care was taken to match the cornice lines, gutters, stone lintels, sills, and watercourse. The brick is of the same size, and its configuration attempts to match the narrow mortar joints of the earlier building. Likewise, the large east wing, constructed in 1966, is of the same light cream-colored brick and replicates the aforementioned detail. The scale of this later addition is much larger than either of the two previous components. This addition provided more office space, a new dark room and a radio telescope laboratory.

National Register of Historic Places Continuation Sheet

Section number 7 Page 3

The basement of the observatory and the dome housing the 12-inch refractor are still used by the astronomy department of the University of Illinois. The remaining rooms are now used to house various administrative offices of the University.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D NHL Criteria 1

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

National Register
Education, Engineering, Science

National Historic Landmark:
Science, Subtheme: Physical Science,
Facet: Astronomy

Period of Significance

1907-1922

Significant Dates

Cultural Affiliation

Significant Person

Joel Stebbins

Architect/Builder

Charles Gunn

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

Summary

The University of Illinois Observatory is significant because of its association with the development of the selenium photoelectric cell which revolutionized the science of astronomical photoelectric photometry--the measurement of celestial magnitudes. The research was conducted on the 12-inch Warner and Swasey refractor telescope located in the second story equatorial room of the 1896 brick observatory. The development of the selenium cell was done by Joel Stebbins (1878-1966), in the years from 1907 to 1922, while he was the director of the University of Illinois Observatory. As a result of Stebbins' work at Illinois with the photoelectric cell, photoelectric photometry became the standard technique in determining stellar magnitudes. The determination of stellar magnitudes is one of the most fundamental measurements in the field of astronomy.

History

Prior to 1907 all measurements of the magnitude of stars were obtained by visual comparison of relative brightness--a slow, cumbersome and inexact process at best. Later, photographic methods used starlight to make a representation on a photographic plate. Neither method was adequate for quantitative measurements, as they provided only the most rudimentary comparisons. Because of these drawbacks, the use of electricity for empirically gathering astronomical data revolutionized the field of astronomy. The man responsible for this development is Joel Stebbins who did his pioneering research in the field of astronomical photometry during the period from 1907 to 1922 while he was director at the Illinois Observatory.²

Stebbins arrived as director of the observatory after completing his Ph.D. at the University of California, Berkeley, in 1903. For the next few years he conducted research into the relative brightness of binary stars, using visual and photographic techniques. Stebbins was assisted in his efforts by his wife, May, who frequently acted as recorder. In a speech

See continuation sheet

National Register of Historic Places Continuation Sheet

Section number 8 Page 2

before the American Astronomical Society in 1957 Stebbins recalled the events which led up to the electric cells:

She (May Stebbins) wrote down the numbers as the observer called them, but after some nights of recording a hundred readings just to get one magnitude, she said it was pretty slow business. I responded that someday we would do all this by electricity. That was a fatal remark. Thereafter she would often prod me with the question, "When are you going to change to electricity?" It happened that within two or three months, the Department of Physics gave an open house, and one of the exhibits was in charge of a young instructor, F.C. Brown. He showed how, when he turned on a lamp to illuminate a selenium cell, a bell would ring, when the lamp was off, the bell would stop. Here was the idea: Why not turn on a star to a cell on a telescope and measure a current?³

Stebbins soon made friends with Brown and in due time they had a selenium cell positioned on the 12-inch refractor telescope. In the fall of 1907 after some trial and error, the two achieved a light curve for the moon.

This successful use of photoelectric technology was a quantum leap in the field of astronomy. Stebbins later discovered that cooling the cell to zero degrees Fahrenheit doubled the sensitivity and diminished the irregularities in the circuit tenfold. Likewise, by reducing the size of the cell, irregularities were again reduced. Brown and Stebbins went on to detect stellar intensity and activity that were previously unrecorded.

Stebbins continued to do pioneering work with the selenium cell until 1913 when he became associated with Jacob Kunz. Kunz was a University of Illinois physics professor who had been doing experimentation on an improved photoelectric cell which was based on the alkali metals. This cell was the predecessor of the modern-day "electric eye." Its applications in science and industry have been widespread, including early uses in talking motion pictures, television, and aviation. The improved technology of the photoelectric cells over the selenium type had the advantage of greater sensitivity and faster operation. Stebbins explained it in this way:

Only recently we managed to produce a cell which is twice as sensitive as anything we had before, and this amounts to the same thing as though some good fairy had suddenly doubled the light gathering power of our telescope.⁴

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 3

The results were precise light curves of eclipsing double stars, which permitted the determination of the diameters and masses of stars with a higher accuracy than previously attained, and the discovery of previously undetected eclipses in several stars such as Beta Aurigae and Delta Orionis.⁵

Through his work with Stebbins, Kunz continued to refine his cells. This owed largely to the fact that starlight is one of the faintest of all light sources. Kunz's cells were the most sought after in the country, being more than a million times more sensitive than cells commercially available.⁶ This dedication earned him recognition as the "father of the photoelectric cell."⁷ Because of his close collaboration with Kunz, Stebbins usually got the best cells for himself, leaving those of second best quality to other observatories.

Stebbins left the University of Illinois in 1922 to take over the directorship of the Washburn Observatory at the University of Wisconsin. Stebbins replaced his mentor, George C. Comstock, with whom he had studied as a graduate student some 25 years before. Stebbins went on to apply the techniques he had developed while at Illinois. Constant experimentation led to consistently improved technology for the study of astronomy.

The early research done at the University of Illinois Astronomical Observatory was vitally important in the field of astronomy. It transformed the measurement of astronomical radiation from imprecise visual and photographic methods, to a linear quantifiable science. Without this research, modern photoelectric astronomy would not have been possible.

National Register of Historic Places Continuation Sheet

Section number 8 Page 4

Footnotes

1. Most of the material in this form was adapted from the following source:
Shauna J. Francissen, "National Register of Historic Places Inventory-Nomination Form-University of Illinois Astronomical Observatory" (Urbana, Illinois: Preservation and Conservation Association, 1986).
2. Otto Struve and Velta Zebergs, Astronomy of the Twentieth Century (New York: Macmillan, 1962), p. 80.
3. Joel Stebbins, "Early Photometry at Illinois," Publications of the Astronomical Society of the Pacific, December 1957, p. 506.
4. Joel Stebbins, "The Electrical Photometry of Stars," Science June 14, 1915, p. 811.
5. A.E. Whitford, "American Pioneer in Photoelectric Astronomy," Sky and Telescope May 1966, p. 266.
6. Joel Stebbins, "Jacob Kunz, 1874-1938," Popular Astronomy March 1939, p. 15.
7. "Jacob Kunz, on U. of I. Faculty 29 Years, Dies," The Evening Courier (Urbana, IL.), July 19, 1938, n.p.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 9 Page 2

Bibliography

Francissen, Shauna J. "National Register of Historic Places Inventory-Nomination Form-University of Illinois Astronomical Observatory." Urbana, Illinois: Preservation and Conservation Association, 1986.

Myers, G.W. "The Astronomical Observatory at the University of Illinois." Popular Astronomy, 6 (1898).

Stebbins, Joel, and F.C. Brown. "Determination of the Moon's Light with a Selenium Photometer," Astronomical Journal December 1907.

Stebbins, Joel. "Early Photometry at Illinois" Publications of the Astronomical Society of the Pacific, December 1957.

_____. "Jacob Kunz, 1874-1938," Popular Astronomy, March 1939.

_____. "The Brightness of Halley's Comet as Measured With a Selenium Photometer," Astrophysical Journal, July 1910.

_____. "The Electrical Photometry of Stars," Science, June 14, 1915.

Struve, Otto, and Velta Zebergs. Astronomy of the Twentieth Century. New York: Macmillan, 1962.

Svec, Michael T. The University of Illinois Astronomical Observatory. Urbana, Illinois: 1988.

University of Illinois Archives, Observatory file, Urbana, Illinois.

Warner and Swasey. A Few Astronomical Instruments. Cleveland, 1900.

Whitford, A.E. "American Pioneer in Photoelectric Photometry," Sky and Telescope, May 1966.

See Continuation Sheet

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # _____

See continuation sheet

Primary location of additional data:

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

Specify repository: _____

10. Geographical Data

Acres of property .92

UTM References

A

1	6	3	9	5	4	9	0
---	---	---	---	---	---	---	---

4	4	3	9	9	2	0
---	---	---	---	---	---	---

Zone Easting Northing

B

--	--	--	--	--	--	--

--	--	--	--	--	--	--

--	--	--	--	--	--	--

Zone Easting Northing

C

--	--	--	--	--	--	--

--	--	--	--	--	--	--

--	--	--	--	--	--	--

D

--	--	--	--	--	--	--

--	--	--	--	--	--	--

--	--	--	--	--	--	--

See continuation sheet

Verbal Boundary Description

The boundary follows the outside perimeter of the observatory building.

See continuation sheet

Boundary Justification

The boundary includes only the observatory building since it alone encompasses the site and facilities contributing to the national significance of the resource.

See continuation sheet

11. Form Prepared By

name/title Harry Butowsky

organization National Park Service date May 1, 1989

street & number 1100 L Street, NW telephone (202) 343-8155

city or town Washington state DC zip code 20013

UNIVERSITY OF ILLINOIS OBSERVATORY

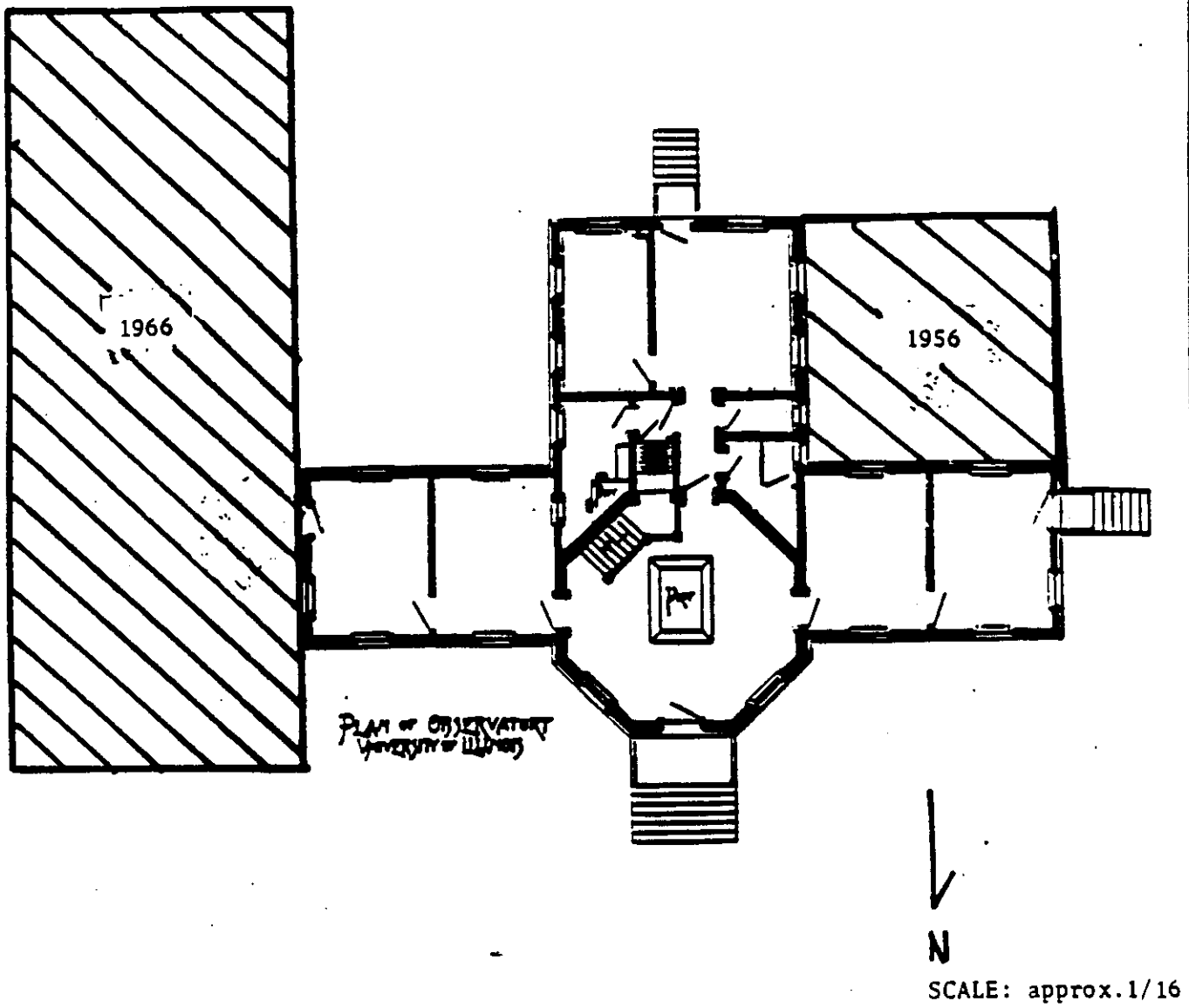
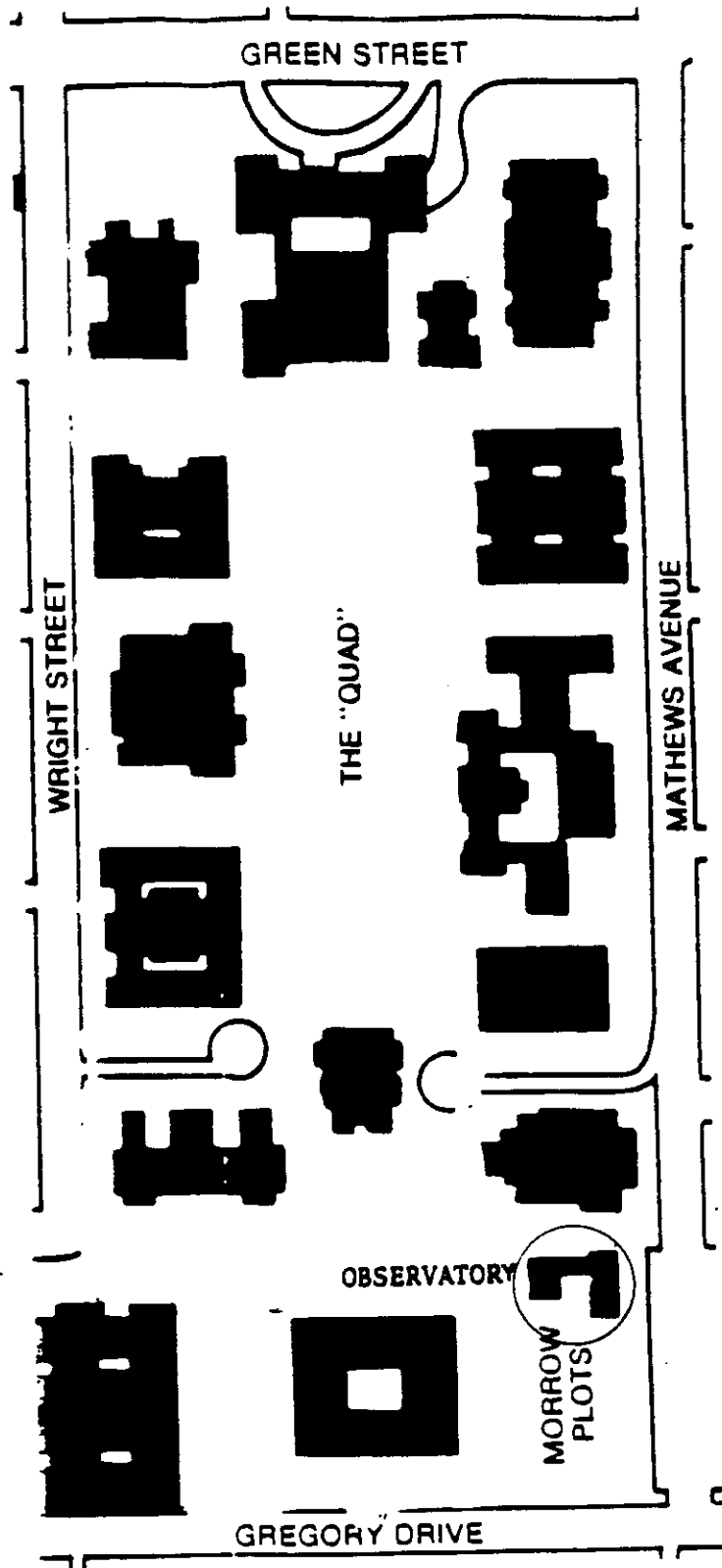


ILLUSTRATION OF BUILDING ADDITIONS



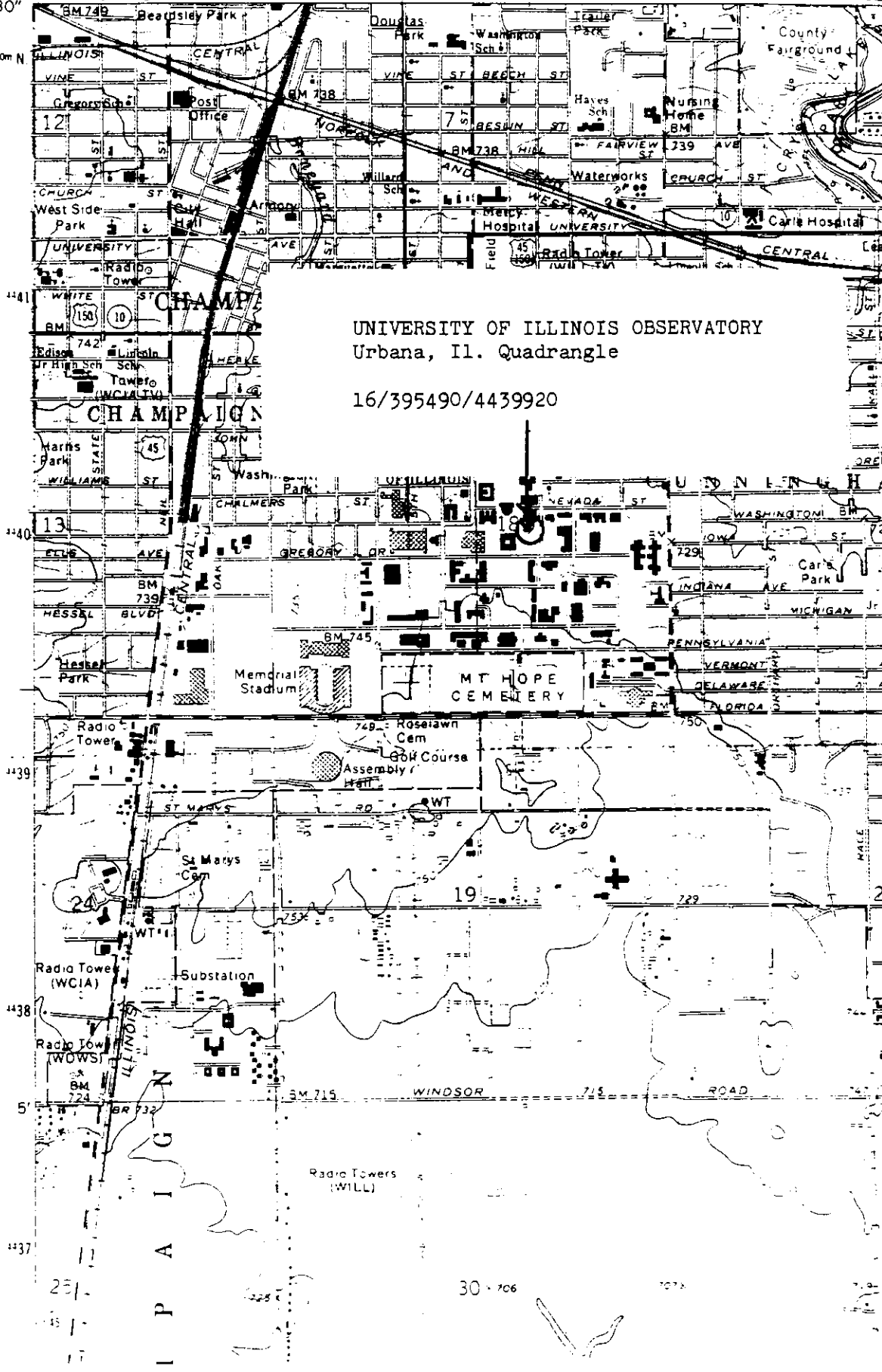
PROPERTY IN RELATIONSHIP
TO THE UNIVERSITY QUADRANGLE

3182 (LINE
RISING)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

88° 15' 394000m E R 8 E R 9 E 395 396 12

40° 07' 30" 142000m N



UNIVERSITY OF ILLINOIS OBSERVATORY
Urbana, Il. Quadrangle

16/395490/4439920

IP A I G N
WINDSOR ROAD
Radio Towers (WILL)
30 706

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

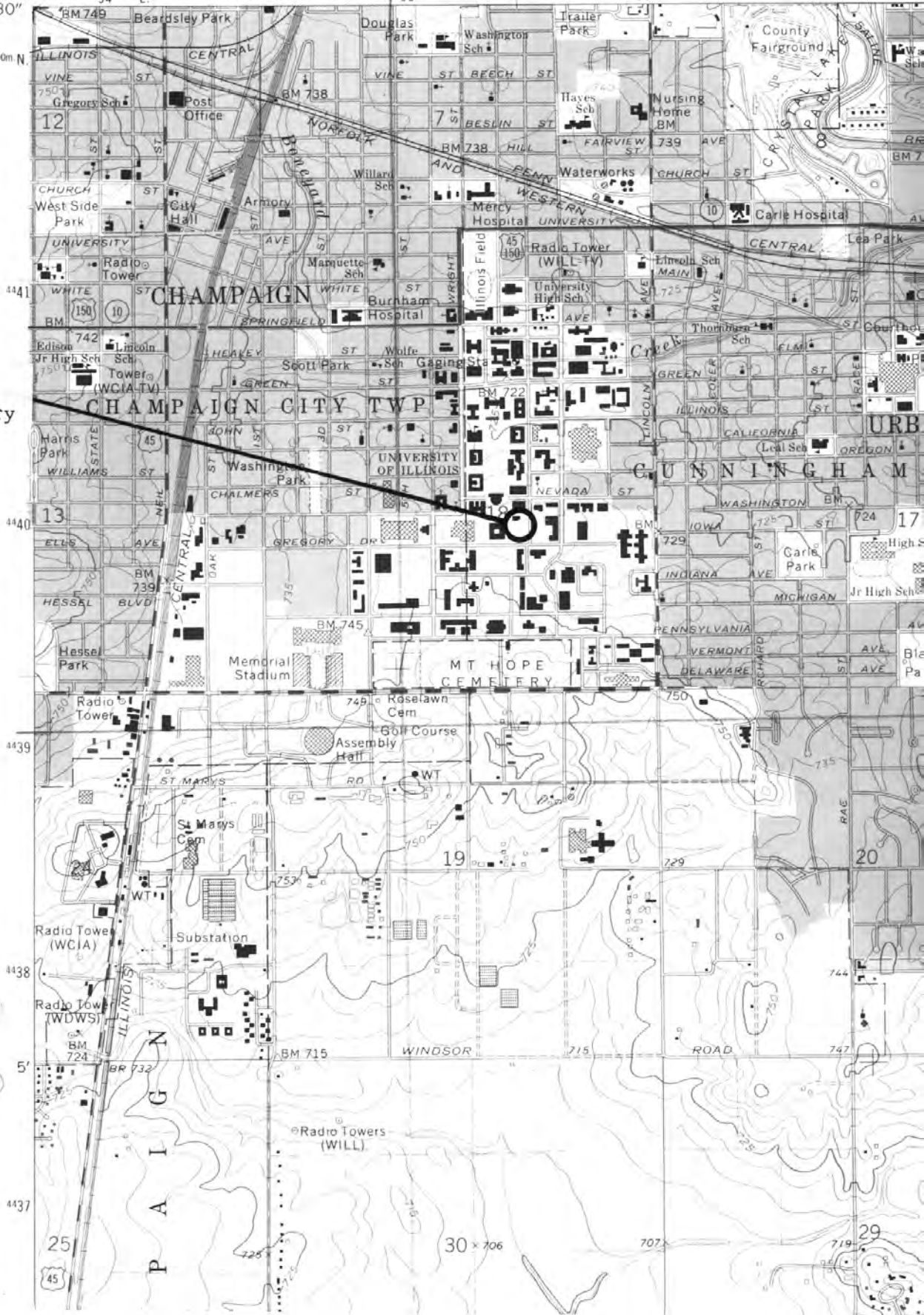
3364 III NE
(RISING)

88° 15' 394000m E. R. 8 E. R 9 E 395 396 12' 30"

40° 07' 30"

442000m N

University of Illinois
Astronomical Observatory



N 4454120
E 395490

4437

25

30 x 706

707

29



United States Department of the Interior

NATIONAL PARK SERVICE

P.O. BOX 37127

WASHINGTON, D.C. 20013-7127

IN REPLY REFER TO:

NOV 14 1986

The Director of the National Park Service is pleased to inform you that the following properties have been entered in the National Register of Historic Places beginning November 2, 1986 and ending November 8, 1986. For further information call (202) 343-9552.

STATE, County, Vicinity, Property, Address, (Date Listed)

ALABAMA, Butler County, Greenville, East Commerce Street Historic District (Greenville MRA), Roughly bounded by Cedar, Chesnut, Commerce, and Hickory Sts. (11/04/86)

ALABAMA, Butler County, Greenville, Greenville City Hall (Greenville MRA), E. Commerce St. (11/04/86)

ALABAMA, Butler County, Greenville, Little--Stabler House (Greenville MRA), 710 Fort Dale St. (11/04/86)

ALABAMA, Butler County, Greenville, Post Office Historic District (Greenville MRA), W. Commerce and Fort Dale Sts. (11/04/86)

ALABAMA, Butler County, Greenville, Ward Nicholson Corner Store (Greenville MRA), 219 W. Parmer (11/04/86)

ARKANSAS, Monroe County, Brinkley, Mount Zion Missionary Baptist Church, 409 S. Main St. (11/04/86)

DELAWARE, Kent County, Clayton, Clayton Railroad Station, Bassett St. (11/06/86)

DISTRICT OF COLUMBIA, Washington, Buildings at 1644--1666 Park Road NW, 1644--1666 Park Rd., NW (11/06/86)

DISTRICT OF COLUMBIA, Washington, Embassy Building No. 10, 3149 Sixteenth St., NW (11/06/86)

DISTRICT OF COLUMBIA, Washington, McLachlen Building, 1001 G St. NW (11/06/86)

DISTRICT OF COLUMBIA, Washington, Southern Aid Society--Dunbar Theater Building, 1901--1903 Seventh St., NW (11/06/86)

DISTRICT OF COLUMBIA, Washington, Walsh Stable, 1511 (rear) Twenty-second St., NW (11/06/86)

FLORIDA, Manatee County, Palmetto, Palmetto Historic District, Roughly Bounded by Twenty-first Ave., Seventh St., Fifth Ave., and the Manatee River (11/06/86)

ILLINOIS, Alexander County, Tamms, Chicago and Eastern Illinois Railroad Depot, Front St. (11/06/86)

* ILLINOIS, Champaign County, Urbana, University of Illinois Astronomical Observatory, 901 S. Mathews Ave. (11/06/86)

ILLINOIS, Cook County, Chicago, Legler, Henry E., Regional Branch of the Chicago Public Library, 115 S. Pulaski Rd. (11/06/86)

ILLINOIS, Cook County, Chicago, Uptown Broadway Building, 4703--4715 N. Broadway (11/06/86)

ILLINOIS, Montgomery County, Hillsboro, Blackman, George, H., 904 S. Main St. (11/06/86)

ILLINOIS, Williamson County, Marion, Goddard Chapel, Rose Hill Cemetery, Rt. 37 N. (11/06/86)

IOWA, Harrison County, Dunlap, Wheeler, John R., Jr., House, 407 S. Third St. (11/06/86)

IOWA, Ringold County, Maloy vicinity, Shay, Lee, Farmhouse, Off CR P-27 (11/06/86)

The following actions have been taken on the following properties but were excluded from a previous list:

KEY: Property Name, Multiple Name, Address/Boundary, City, Vicinity, Reference Number, NHL status, Requested Action, Decision Date

CALIFORNIA

Alameda County

Lightship WAL-605, RELIEF
Oakland Estuary in Brooklyn Basin
Oakland 89002462 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

Los Angeles County

Hale Solar Laboratory
740 Holladay Rd.
Pasadena 86000103 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

Marin County

Point Reyes Lifeboat Rescue Station, 1927
Drake's Bay, Point Reyes National Seashore
Inverness vicinity 85002756 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

ILLINOIS

Champaign County

University of Illinois Observatory
901 S. Mathews Ave.
Urbana 89002466 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

INDIANA

Parke County

J.H. Russell Bridge
Parke County Covered Bridges TR
N of Rockville
Rockville vicinity 78000396
RENOVAL 2/20/90

Jessup Bridge

Parke County Covered Bridges TR
E of Rockville
Rockville vicinity 78000395
RENOVAL 2/20/90

KENTUCKY

Fleming County

Sherburne Covered Suspension Bridge
KY 11 at Lickino River
Sherburne 76000682
RENOVAL 2/06/90

0089N

MAINE

Cumberland County

Lightship No. 112, WANTUCKET
Southern Maine Vocational Technical Institute Pier
South Portland 89002464 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

MASSACHUSETTS

Bristol County

Torpedo Boat PT-617
Battleship Cove
Falls River 89002465 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

Norfolk County

Great Blue Hill Weather Observatory
Blue Hills and Neponset River Reservations NRR
Milton
Milton 80000665 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

OREGON

Benton County

Kappa Alpha Theta Sorority House, Old
145 NW 21st St.
Corvallis 89000516
RENOVAL 2/06/90

Lincoln County

Lightship WAL-604, COLUMBIA
1792 Maritime Dr.
Clatsop 89002463 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

VERMONT

Windser County

StellaFane Observatory
S of North Springfield off Breezy Hill Rd.
North Springfield vicinity 77000107 NHL
NATIONAL HISTORIC LANDMARK 12/20/89

The following properties were also entered in the National Register but were excluded from a previous notice:

KEY: Property Name, Multiple Name, Address/Boundary, City, Vicinity, Reference Number, NHL status

FLORIDA

Nassau County

Original Town of Fernandina Historic Site
Roughly bounded by Towngate St., City Cemetery, Nassau, Marine, and Ladies Sts.
Fernandina Beach 1/28/90 86003685

NEW MEXICO

Lincoln County

Archeological Site LA 12155
Prehistoric and Historic Agricultural Sites in the Lower Rio Bonito Valley IR
Address Restricted
Lincoln vicinity 2/18/90 88001509

RHODE ISLAND

Providence County

Doyle Avenue Historic District
Doyle Ave. from N. Main St. to Hope St.
Providence 2/22/90 90000104

Washington County

Perry--Carpenter Grist Mill
364 Moonstone Beach Rd.
South Kingstown 2/22/90 90000106