CLOYNE COURT
2600 RIDGE ROAD
BERKELEY, CALIFORNIA

HISTORIC STRUCTURES REPORT

for the
University Students Cooperative Association
and the
University of California
at Berkeley

FINAL
JULY 27, 2007

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"Your attention is respectfully called to Cloyne Court, now building at Berkeley. It is a first class modern apartment house conveniently and beautifully situated, well constructed, and carefully planned for the comfort and privacy of its tenants. It will offer nearly all, if not all, of the advantages of housekeeping without its vexations, cares and heavy expense.”

(From a c1904 brochure “Cloyne Court: A High Class Modern Apartment House in Berkeley, California”)

Cloyne Court was built in 1904 as a residential hotel by a group referred to as the University Land Improvement Association - who apparently sponsored this project and no other - and who had direct ties to the emerging University of California at Berkeley. Investors in the company included Phoebe Apperson Hearst, Jane K. Sather, James K. Moffitt, John Galen Howard, and James M. Pierce, the latter of whom – with his wife Margaret – operated the hotel and, in 1914, also took possession thereof. Cloyne Court remained a residential hotel operated by the Pierce family for the next 32 years. In 1946 it was adapted for use as a housing cooperative for university students.

An on-line history of the Cloyne Court by the Berkeley Architectural Heritage Association (BAHA) provides the following summary:

“The hotel was named after the philosopher George Berkeley, Bishop of Cloyne, and was built at the substantial cost of $80,000.

In 1946, Cloyne Court was sold to the University Students Cooperative Association (USCA) for $125,000. By 1970 USCA was strapped for cash, having purchased several former sororities and built new co-ops. It sold Cloyne Court to the Regents of the University of California and has been leasing it back ever since. In the fall of 1972, the formerly [sic] all-male facility went co-ed with the arrival of 62 new female residents. Over the years, changes have been made to the room layout, the most significant occurring in 1976, when the suites were cut up and hallways added in the upper floors.” (from http://www.berkeleyheritage.com/berkeley_landmarks/cloyne_court.html)

Cloyne Court is a City of Berkeley landmark, and is also listed on the National Register of Historic Places (NRHP). According to the NRHP nomination record (the full NR registration form is appended to this HSR), “the building was designed to provide the tenants with the maximum of privacy, with each section having its own entrance and stairway from outside. Not more than two suites on each floor were to open on to the same vestibule.” The original advertising brochure cited above summed up Cloyne Court’s advantages: “The building is designed particularly for members of the faculty of the University and their families... who wish to
avoid the annoyance and cost of housekeeping...” Each
unit was self-contained in that it had its own living
room, bedrooms, and bathroom. On the ground floor
these walls and their steel doors are still extant, but the
walls have been opened on the upper stories to allow for
more hallways.

With respect to its setting, the NR record also states
that Cloyne Court was built “a block north of the
University campus,” and “at a time when the campus was
oriented to the south and west rather than to the north.
The only university buildings on the north side of cam-
pus were a small observatory and a glass conservatory
for the University Botanical Gardens. The residential
neighborhood which developed on the north side of the
campus was predominately of a rustic nature, featuring
unpainted wood siding and set in lush gardens.

Today the block where Cloyne Court stands is
owned by the University and contains the former Beta
Theta Pi House [now the Goldman School of Public
Policy], a parking lot where the 1908 Newman Hall once
stood, and a three story concrete parking garage where
a shingled dormitory once stood. The block to the east
and west are also owned by the University. The blocks
to the north have remained residential. Cloyne Court
and the former Beta Theta Pi House serve as transitional
structures between the large campus research and acade-
ic buildings, and the residential neighborhood.”
(NRHP, sec7, p2)

The overall neighborhood in which Cloyne Court
was built was then known as Daley’s Scenic Park, and is
today referred to as Northside. A summary about this
historical neighborhood is also provided in the attached
NRHP record (section 8, pages 7-11).

Cloyne Court is an inconspicuous place, setback
from the streets, amidst the trees, somber, quiet, gentle
- despite its imposing size.

From the original architectural drawings, which we
are fortunate to have access to (copies of which are
attached), one gets the sense that the project’s size was
new for the architects, who drew it up at the scale of
1/4” per foot - perhaps normal for their practice - but
which resulted in 6 foot by 3-1/2 foot drawing sheets.

Cloyne Court is of another, seemingly pre-techno-
logical time in North America and the SF Bay Area,
handed down to us. A surviving place from what is now
referred to as the Bay Area tradition, and sometimes fur-
ther distinguished by being called the First Bay Area tra-
dition, without that distinction intending to mean any-
thing pioneer, or particularly first, as that Bay Area tra-
dition was heavily indebted to the great, late-19th centu-
ry Shingle Style architecture that descended from the
East Coast and the late, great architectural firms of H.H. Richardson (HHR) and McKim, Mead and White (MM& W).

Even a cursory look at images of HHR’s and MM& W’s works confirm this direct connection. For example, HHR’s Channing House of 1882, or HHR’s Stoughton or Bryant houses, all of which look like they belong in the East Bay hills.

Though the Bay Tradition did transcend its Eastern precursor, it is highly indebted thereto.

What the Bay Tradition added to the Shingle-Style was environment, and in particular the generosity of and, therefore, connection to outdoor space, open and cheerful western skies, hills alternating gold and green, and sculptural woodlands. In fact, it is the connections between setting, landscape and architecture where early Bay Area buildings fully succeeded the Shingle-Style of their Eastern mentors.

Nor is the inheritance incidental. John Galen Howard, the architect of Cloyne Court and, as discussed herein, of other, nearby Shingle-Style buildings, worked with and gravitated from both HHR and MM& W, thereby establishing a direct line of inheritance from one Bay tradition - Massachusetts, to another - San Francisco. And it was the latter of these firms who advocated his travels to the prestigious Ecole de Beaux Arts. There can be no doubt that he was indebted to MM& W for such sponsorship, as well as for their architectural tutoring.

Each of these regional variations of the Shingle-Style were materially based on the bounty of North America’s coastal forests. The Shingle-Style is dependent on wood, not just in the form of shingles, but also in that of timbers, like those of the deep, dark eaves of Cloyne Court. Even its foundation substructure incorporated massive timbers, the likes of which are no longer available, and the presence of which distinguishes the structures of this period.

Purpose and Methodology

Although the building was converted to student housing in 1946, the overall character of Cloyne Court has largely survived the past century of use. The building stands proud, yet there can be no mistake but that it has been both overused and, from an historic architectural perspective, under cared for. To the extent that it is fair to say that its site is in ruin. The same is frankly true of its interior, which is worn beyond imagination, having been used as a canvas by decades of students, and as a home for wayward furniture.

This Historic Structure Report (HSR) is a preservation planning document intended to assist with the rehabilitation and adaptive reuse of Cloyne Court, by providing background historical and architectural information for the use of the owner and other interested parties.

This report primarily intends to address this place from the perspective of historical restoration and rehabilitation. The scale of the task is large, as there are so many potential restoration and rehabilitation priorities. Thus, the overall intent is to be as realistic as possible about what may be achieved. For example, the interior has a range of original spaces and features. But the interior is beyond simple repair, and to concentrate restoration and rehabilitation efforts there, when there are so
many higher priorities at the building exterior and site, would be wasteful. Interior recommendations are, therefore, limited to the proposed retention of remaining original spaces.

Additional and specific purposes of this HSR are to:

- Document Cloyne Court, including the evaluation and identification of characteristic forms, features and materials
- Identify the relative significance of the various parts of the historical resource
- Evaluate and present treatment recommendations specific to a proposed project and addressing historic materials and assemblies.

The identification of distinguishing characteristics is a central subject of this HSR, a primary intent being to establish what is significant about Cloyne Court, and thus what is essential to its perpetuation. This report also outlines actions towards that which is identified as significant, by providing general and material treatment recommendations. In turn, the findings of this HSR necessarily address what is not distinctive or significant about this place, in so doing recognizing that change is necessary in order to insure its perpetuation, and thus identifying where change is preferred. In short, this HSR provides findings about what to protect versus where to allow change, with the underlying understanding that comprehensive and overdue improvements will be made to this property in the coming years.

Towards those ends, this HSR otherwise compiles the historical record about Cloyne Court, by assembling available records in one place. In this sense, this HSR is intended as a reference manual, for the use of property owners and users in their efforts to repair, alter and upgrade their facility.

In this case, the historical record is quite generous, including as it does a written nomination to the NRHP that is highly competent and complete. Given the quality of the NRHP record, this HSR does not attempt to reinvent historical information. Rather, it incorporates portions of the existing record into this document, again for the purpose of compiling the information needed to understand this historical resource. However, while the existing historical records are effective in words, there were few images to support the words, and no original plans were previously identified.

This HSR will therefore supplement the historical record by providing graphic information, including a set of original drawings of the structure - courtesy of the UCB Environmental Design Archives’ John Galen Howard collection - a remarkable set of drawings for the fact that they even exist, as few architectural records from the pre-1906 Bay Area do.

Project Team

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The University of California at Berkeley (USB)
Project Sponsor:
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Fig.5: Cloyne Court Hotel
View of Cloyne Court (background left) from Hearst Avenue, w/ former Beta Theta Pi House in foreground (MH-2006)
“Cloyne Court will be owned and managed by a company formed for that purpose. Among those interested in the company are: Dr. Chas. M. Bakewell, Mr. C.H. Bentley, Mr. Anson S. Blake, Dr. Carlos Bransby, Mr. F.W. Dohrmann, Prof. John Fryer, Mrs. Phoebe A. Hearst, Mr. John Galen Howard, Mr. J.B. Landfield, Dr. Louis Lisser, Mr. J.K. Moffit, Mr. Warren Olney, Mr. Warren Olney Jr., Mr. Jas. M. Pierce, Dr. Casper Pischel, Mrs. Jane K. Sather, Mr. Louis Titus, Mr. Frank M. Wilson.

Mr. and Mrs. James M. Pierce will have the immediate charge of the building in all its departments.

Cloyne Court will open on October 15, next.”

(From a 1904 brochure “Cloyne Court: A High Class Modern Apartment House in Berkeley, California”)

The following summarizes specific events associated with Cloyne Court. This chronology is based on original drawings of 1904, Sanborn Fire Insurance Maps of 1911, 1928 and 1929 (SM), City of Berkeley (CB) building permit records of 1927 to the present, USCA (CC) records from 1994 to the present, and on previous reports, in particular the NRHP (NR) registration form. Where applicable, each of these sources is noted.

**DATE** | **SUBJECT**
---|---
Pre-1900 | Prior to its construction, the Cloyne Court property, located within the north side neighborhood of Daley’s Scenic Park - which was then developing into a prestigious residential enclave - was apparently open land. A 1893 illustration entitled BirdseyeView of Berkeley, by Chas. A. Bailey (located at the History Room of the Berkeley Public Library) shows the site as
open, with several small residential structures on surrounding parcels. Ridge Road was then identified as Daley Avenue, and Hearst Avenue was College Way.

1901 John Galen Howard appointed the Supervising Architect of the University of California at Berkeley, and a Professor in the School of Architecture.

1903 The UC Berkeley Department of Architecture established under the direction of John Galen Howard.

1904 Cloyne Court Hotel designed and constructed for the University Land and Improvement Association; James and Margaret Pierce, proprietors; John Galen Howard, Architect.

12/4/'04 The Cloyne Court Hotel, “a first class modern apartment house, conveniently and beautifully situated, well constructed, and carefully planned for the comfort and privacy of its tenants,” opens for occupancy.

1905 Susan B. Anthony (1820-1906), American Civil Rights Activist, and Dr. Ludwig Boltzman, Viennese Physicist, are guests of Cloyne Court (NR).

4/18/'06 The Great San Francisco Earthquake and Fire brought refugees to the East Bay, including 44 additional guests to Cloyne Court, which apparently suffered the earthquake otherwise intact.

1909 Lord James, British Ambassador to the U.S., and Lady Bryce are guests at Cloyne Court (NR).

1911 Cloyne Court property title transferred from ULIA to James and Margaret Pierce.

1914 Cloyne Court property title transferred from University Land and Improvement Association to James and Margaret Pierce.

1921 Margaret Pierce passes away in Berkeley.

9/17/'23 The 1923 Berkeley Fire swept through the north side neighborhood of Daley’s Scenic Park, destroying over 500 structures, yet sparing the very northern and eastern edges, including Cloyne Court and its immediate neighbors, as well as the University grounds and buildings. In the wake of the fire, Cloyne Court again takes in refugees.

1926 Two garages constructed on Le Roy. These garages appear in the 1928 Sanborn, along with a notation of a 1926 permit number and date, although no permit record exists for this construction.

1927 John Galen Howard resigns as supervising architect and chair of the UC Berkeley Department of Architecture.

1929 James Pierce passes away in Berkeley. The owner and proprietorship of Cloyne Court passes to his son, Elliott H. Pierce (NR). A c1929 brochure entitled “Cloyne Court Hotel” with “E. H. Pierce, Manager,” identifies the hotel as then having “thirty-two apartments of one, two, three, four and five room suites each with its private bath.”
Architect John Galen Howard (b. 1864) passes away in Berkeley.

1933
Founding of the University of California Student Cooperative Association (USCA)

1936
Elliott H. Pierce passes away, whereafter the Cloyne Court Hotel passes to his sister, Mary Pierce (NR).

1940
Sir Walter R. Heann, England's Consul General, and Henri Meroe, France's Consul General, are guests at Cloyne Court (NR).

1941
Wolfgang Pauli, Nobel Physicist, is a guest of Cloyne Court (NR).

1943
Count Carlo Sforza, Italian Minister of Foreign Affairs, is a guest of Cloyne Court (NR).

6/30/’46
Cloyne Court Hotel sold by the James M. Pierce Estate Co., Lucy Pierce, President and Mary Pierce, Secretary, to the University of California Students Cooperative Association.

1950
Gordon Moore, Intel co-founder, boards at Cloyne Court (CC).

1952
Leon F. Litwack, Pulitzer Prize winner, UC Berkeley History Professor, boards at Cloyne Court (CC).

1953–1955
Narsai David, food correspondent for San Francisco's KCBS AM radio, boards at Cloyne Court (CC).

1968(?)
USCA transfers property title to UCB, leasing it back therefrom

2/28/’28
Apts. rep., Lew Smith, contr. (CB)

7/3/’29
New shed, A.C. Kirby, contr. (CB). This is, perhaps, the utility shed at the west end of the front elevation.

12/3/’29
Fire escape, J.F. Kolberg, contr. (CB)

12/13/’38
Apt. [repair], Alpine Wd. & Sply, contr. (CB)

7/31/’43
Dwell. Alt., W.M. Pierson, contr. (CB)

6/28/’47
Fire escape, Neilson Ironworks, contr. (CB). A great deal of fire escape related work ensued once the property came to be owned and occupied by the student coop. However, fire escapes appear in the records, including the Sanborns, from early on.

2/24/’48
2 fire escape ladders, Imperial Engineering, contr. (CB)

10/14/’48
2 ladders w/goosenecks, 2 ladders plain, repair old fire escape, Imperial Engineering, contr. (CB)

7/16/’47
Rat proofing kitchen (CB)

7/24/’48
2 fire escape ladders, Imperial Engineering, contr. (CB)

10/14/’48
2 ladders w/goosenecks, 2 ladders plain, repair old fire escape, Imperial Engineering, contr. (CB)

2/24/’55
Provide hall and divide large room, 1’2” sheetrock and sheet metal to provide fire separation, Wm.D. Bohan, contr. (CB)

10/7/’57
A fire protection evaluation that identifies: roof composition approx. 2 years old; roof extending into the courtyard (NR). The 1911 Sanborn shows the building without, as of yet, the Music Room addition, although the exterior deck/balcony directly above is extant. The NR record indicates this room was added in 1911. By 1928, the music room and the two flanking deck/balconies are in place, but the deck/balcony at the east side of the building is not. That east deck/balcony first appears in the 1929 Sanborn.

6/30/’24
Unspecified alteration, J.W. Emery, contr. (CB)

3/28/’27
Unspecified alteration, Lew Smith, contr. (CB)

7/27/’27
Two new garages, L. Smith, contr. (CB).

8/5/’27
New garage, Lew Smith, contr. (CB)

The following summarizes recorded and identifiable alterations made to Cloyne, again chronologically, and based on Sanborn Fire Insurance Maps (SM), City of Berkeley (CB) building permit records, USCA (CC) records from 1944 to the present, and on the NRHP (NR) registration form. Where applicable, each of these sources is again noted.

**SUMMARY OF ALTERATIONS**

**Date**

**Subject**

**c1911**
Music Room added at the first floor, extending into the courtyard (NR). The 1911 Sanborn shows the building without, as of yet, the Music Room addition, although the exterior deck/balcony directly above is extant. The NR record indicates this room was added in 1911. By 1928, the music room and the two flanking deck/balconies are in place, but the deck/balcony at the east side of the building is not. That east deck/balcony first appears in the 1929 Sanborn.

6/30/’24
Unspecified alteration, J.W. Emery, contr. (CB)

3/28/’27
Unspecified alteration, Lew Smith, contr. (CB)

7/27/’27
Two new garages, L. Smith, contr. (CB).

8/5/’27
New garage, Lew Smith, contr. (CB)

These 3, 1927 garage structures were located along the driveway in the northeast and southeast corners of the site. Permitted in 1927, they are visible in the 1929 Sanborn Map – though not in the 1928 map – as well as the Daley’s Scenic Park map (figure 4 to the NR form). Per a 1965 permit application, these two garages were removed. Their foundation walls are still partially in place.

7/16/’47
Rat proofing kitchen (CB)

7/24/’48
2 fire escape ladders, Imperial Engineering, contr. (CB)

10/14/’48
2 ladders w/goosenecks, 2 ladders plain, repair old fire escape, Imperial Engineering, contr. (CB)

7/16/’47
Rat proofing kitchen (CB)

7/24/’48
2 fire escape ladders, Imperial Engineering, contr. (CB)

10/14/’48
2 ladders w/goosenecks, 2 ladders plain, repair old fire escape, Imperial Engineering, contr. (CB)

2/24/’55
Provide hall and divide large room, 1’2” sheetrock and sheet metal to provide fire separation, Wm.D. Bohan, contr. (CB)

10/7/’57
A fire protection evaluation that identifies: roof composition approx. 2 years old; roof
of composition shingle over original wood shingles (CB). This 1957 property evaluation by the City dates the composition shingle roof to c1955. The current roofing is dated, by permit, to 1987.

3/7/’58 Replacing plaster ceiling in Piano Room caused by bad roof which has been replaced; replacing wall in basement; fir and sheetrock ceiling for pool room; Cloyne Court, contr. (CB)

12/22/’58 Fireproof game room and install fire doors (CB)

5/13/’65 Tear down two garages located on the north east corner of the lot (CB)

3/21/’68 Installation of fire doors at bottom of 7 stairwells (CB)

2/5/’85 T/O [take off] 2 layers - install S/M [sheet metal], shingles, Star Roofing, contr. (CB)

6/3/’95 More tree removal (CC)

12/12/’95 Tree Removal (CC)

5/11/’96 New 400 amp service (CC)

1/9/’97 Replace boiler (CC)

5/26/’98 Replace kitchen roof (CC)

7/21/’98 Rebuild trellis and deck (CC)

5/24/’99 Skylight (CC)

1/25/’00 Remove fallen tree (CC)

2/28/’00 1st floor fire damage (CC)

4/3/’00 Window bar replace & repair, Reed Bros. Security, contr. (CB)

3/6/’02 Disable access (CC)

5/27/’02 New concrete driveway (CC)

10/24/’02 Fire damage (CC)

3/24/’03 New skylights west wing (CC)

5/11/’03 New garage doors, new windows in dungeon (CC)

3/8/’04 Repair gutters (CC)

5/11/’04 Tile dining room floor (CC)

6/8/’05 New deck over library (CC)

Fig. 9: Cloyne Court – Plan
Illustrating identifiable alterations (Adapted from 1929 Sanborn Map)
SUMMARY OF SIGNIFICANCE

The Cloyne Court Hotel was made a City of Berkeley Historical Landmark in 1982 (Landmark #65), and was included on the National Register of Historic Places (NRHP) in 1992 (1992-12-24), such listing consequently resulting in its inclusion on the California Register of Historical Resources.

Documents prepared for these nominations and designations identify Cloyne Court as significant as a work of architecture and as the work of a master architect. These same materials provide good coverage of the subjects of events and persons associated with the history of Cloyne Court, yet the designation is not founded on the basis of any such associations. While many important persons visited and stayed at Cloyne Court, the historical importance of such persons is coincidental to their association with Cloyne Court.

Nevertheless, one family cannot be overlooked when summarizing the history of Cloyne Court – the Pierces – members of whom operated the original Cloyne Court Hotel from its opening in 1904 until its transfer to the USCA in 1946. This dedicated family consisted of husband and wife James and Margaret Pierce, and their children, Eliot, Lucy and Mary Pierce.

Other persons of interest are identified in the historical chronology, above, and in the NRHP nomination. The following Statement of Significance is excerpted from the final NRHP Registration Form:

“Cloyne Court Hotel is significant under Criterion C in the area of architecture as an example of the work of John Galen Howard and as an example of the First Bay Tradition style. Howard, Supervising Architect for the University of California at Berkeley and Director of its School of Architecture, worked mainly in the Beaux-Arts idiom, but explored the woody, Bay Area tradition through some of his work. Cloyne Court Hotel was Howard’s first large scale shingled building and is highly reflective of a style that had a huge influence on design in the Bay Area.

Cloyne Court represents a pivotal role in the career of John Galen Howard (1864-1931), who served as Supervising Architect for the University of California Campus (1901-1924), designed the complex of buildings which comprise the core of the campus, and founded the first school of architecture west of the Rockies in 1903. Cloyne Court is the first large scaled shingled building by Howard in Berkeley and the only one not on the University Campus. It is an important building in Howard’s career because it assimilates his East Coast and Ecole des Beaux Arts architectural background with the design trends which prevailed in the San Francisco Bay...
Area at the turn of the century. In Cloyne Court, Howard has applied these concepts on a much larger scale than he had in his previous small scaled single family dwellings, and has achieved a design of inherent simplicity, in contrast to his classically decorated masonry buildings on the campus.

As a good representative example of the First San Francisco Bay Tradition, Cloyne Court is one of the few surviving large shingled residential buildings in the Bay Area, and is the largest in Berkeley.

The First San Francisco Bay Tradition was the architectural expression of the belief that buildings should complement and enhance their natural surroundings and, stylistically, was an assimilation and integration of the American Arts and Crafts Movement, the American shingle style, and the teachings of the Ecole des Beaux Arts in Paris. The Bay Tradition began in the late 1870's and became widely popular in the mid-1890's and remained popular until around 1915. The concept that buildings should complement and enhance their natural surroundings was primarily confined to Picturesque single family residences, making Cloyne Court among the rare examples of a large multi-residential building in this Tradition. Cloyne Court is also a unique and singular expression of the First Bay Tradition in the restrained classic symmetry of its exterior. In this neighborhood, Cloyne Court is one of only fifty buildings to have survived the 1923 Berkeley Fire, where 500 buildings were destroyed, and where the First Bay Tradition dominated the built environment before 1923.

Of the fifty surviving buildings, Cloyne Court, whose exterior is essentially intact, is one of seven important and distinguished structures, each one a unique and singular expression of the First Bay Tradition which are still standing within two blocks. Among these are Howard's North Gate Hall (1906) [fig.12] and Naval Architecture Building (1909) [fig.11], both listed on the National Register of Historic Places, which form a cluster with the residential buildings designed by Bernard Maybeck [Oscar Mauer Studio, 1906], Ernest Coxhead [Allenoke, 1904 and Beta Theta Pi, 1933], and A. C. Schweinfurth [Moody House, 1896]. It is one of Howard's most dignified and innovative designs in shingle. Cloyne Court is also historically associated with distinguished men and women with ties to the University and this association is testimony to the inter-relationship between the University and the neighborhood at the turn-of-the-century.

Cloyne Court not only provides a large and important contribution to the cultural heritage of the immediate neighborhood, and to Berkeley and the Bay Area, but more importantly, to that part of its architectural heritage that was so badly fragmented by the 1923 Berkeley fire, an architectural heritage, which had a pro-
found influence on Post World War II domestic architecture and continues to have an ongoing, though not consistent, significant influence on design theory and practice internationally."

The NR nomination records Cloyne Court as being eligible to the NRHP under Criterion C: Design/Construction. Properties eligible for the NR under Criterion C "embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values..." (from the U. S. Department of the Interior, National Park Service, National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation).

As summarized, Cloyne Court is primarily significant as it is the work of a master architect, John Galen Howard.

Architect John Galen Howard

In the world of California's historical architecture, John Galen Howard (1864-1931) is an architect of signal importance. Born and raised in and around Boston, Howard attended MIT for three years (1883-1885) prior to working in the Massachusetts office of architect H.H. Richardson (1885-1887). He first visited California in 1887, traveling to Los Angeles, where he stayed for two years to work with the firm of Caukin & Haas. Howard traveled abroad in 1889, prior to returning to the East Coast, where he took a position in the New York offices of McKim Mead & White, Architects (MM& W). At this juncture, although without a formal architectural degree, Howard had worked with two of the nation's most seminal architectural firms, Richardson and MM& W. While in the employment of the latter, Charles McKim encouraged Howard's attendance at the Ecole de Beaux Arts in Paris, to where Howard embarked in 1890, and from where he returned to New York in 1893.

At that time, Howard started a practice with the engineer Samuel M. Cauldwell. In 1898, Howard & Cauldwell submitted plans to the international competition for the University of California at Berkeley, and were selected as finalists. Thus, in 1899, Howard returned to California, and settled in Berkeley in 1901, where, despite being a semi-finalist, he served as the architect supervising the Hearst Architectural Plan for the University.
Howard would subsequently serve as the University's architect for more than two decades, until his retirement in 1924.

During his tenure as University Architect, Howard created many of the finest buildings of the Berkeley campus and of the Bay Area, including the Doe Library (1911-1917), California Hall (1905), the Sather Tower/ Campanile (1931), and the Hearst Memorial Mining Building (1902-1907-fig.16) – the latter of which was conceived and partially constructed during the same period as Cloyne Court Hotel. In fact, despite their extraordinarily different styles, the original designs for Cloyne Court included a range of details that were also employed at Hearst Mining, in particular the originally planned march of arched doors and windows at the Cloyne courtyard (although these were built in a simplified version), the robust timber details of the roof at Cloyne's main entry, and its clay tile roof (which was also not realized, but was built with wood shakes). Another campus building of this same moment in time is the rustic log structure known as Senior Hall, for which Howard prepared a design in late 1904, and which was completed in 1906. He subsequently designed several other Shingle-Style buildings, also very nearby: North Gate Hall (1908-1912), and the Naval Architecture Building (1913-1914); a third rustic, wood clad structure for the Department of Military Science (1920), now referred to as Dwinelle Annex (fig.15); and a final Shingle-Style building, the Women's Faculty Club (1923).

As noted in the NRHP record, Cloyne Court “is an important building in his career because it assimilates his East Cost and Ecole des Beaux Arts architectural background with the design trends which prevailed in the San Francisco Bay Area at the turn of the [20th] century.”
First San Francisco Bay Tradition

The NRHP nomination also recognizes Cloyne Court's architectural significance, as "an important example of the First San Francisco Bay Tradition, a building type which was the architectural expression of an attitude that buildings should complement and enhance their natural surroundings. The First San Francisco Bay Tradition assimilated and integrated a wide assortment of styles including the American Arts and Crafts Movement, the American Shingle Style, the teachings of the Ecole des Beaux Arts in Paris. Cloyne Court is one of the few surviving large shingled residential buildings in the Bay Area, and is the largest in Berkeley, and it is among the rare examples of a multi-residential building in the Shingle Style in the country." (from NR: s.8, p.8)

Architectural writer Vincent Scully, Jr., referred to the shingle style, in his book of that name, as the "gentlest forms… the most relaxed and spiritually open and… the most wholly wedded to the landscape… that the United States has produced… generous and gentle… whose purpose was humane." (from NR: s.8, p.9)

According to the late architectural historian David Gebhard, “the first Bay Tradition (1890-1915)” is represented by “the work of Ernest Coxhead, Willis Polk and the young Bernard Maybeck.” The character of the buildings of the Bay Traditions “has been established through a strong play of open contradictions - of vernacular builder's forms and details contrasted with highly sophisticated historic forms…”. (from “The Bay Region Styles: 1890-1930”; David Gebhard; the Foundation for San Francisco's Architectural Heritage, 1973)

Period Of Significance

The NR record identifies the property's period of significance as being 1904-1924. The earlier date corresponds to the design and construction of the original building, and the latter apparently to the year in which John Galen Howard retired from public architecture, thereby reinforcing that its significance is primarily based on its architect.

While the assigned period of significance concludes in 1924, as more than 15 years has passed since that nomination, there is ample reason to now extend Cloyne Court's period of significance to 1946, when the original hotel use ended.

As discussed below, there is no apparent basis for a finding of additional significance in relation to the building's subsequent ownership, occupancy or use.

University Student Cooperative Association (USCA)

“The USCA began in 1933, to meet the need for affordable student housing during the Great Depression. Berkeley YMCA director Harry Kingman inspired 14 students to start the first housing cooperative in Berkeley, doing workshifts in exchange for lower rent. In the fall of 1933 the students leased Barrington Hall which housed 48 students. Sherman Hall, Sheridan Hall, and Euclid Hall all opened during this era, as well as Stebbins Hall, the first women's co-op.

After World War II the USCA also purchased Ridge House and Cloyne Court Hotel to meet the demand from the increase in the student population caused by the GI Bill. In the 1960s the USCA opened one of the first co-ed student housing projects in the nation, Ridge Project, later renamed Casa Zimbabwe in the 1980s. The 1960s and 1970s saw a decline in the popularity of the Greek System in Berkeley, which allowed the USCA to purchase defunct sororities which became Davis House, Andres Castro Arms, and Wolf House.

The 1970s saw the opening of Lothlorien Hall, a vegetarian theme house, and Kingman Hall, both of which formerly belonged to cults (Lothlorien belonging to the One World Family and Kingman Hall to the Berkeley Living Love Center). This decade also saw the construction and opening of the Rochdale Village Apartments, one of the USCA's three apartment facilities. The others are Fenwick Weaver's Village and the Northside Apartments. The USCA also owns two graduate and re-
entry student houses, The Convent and Hillegass/ Parker House, formerly Le Chateau.

In 1990, the members of the USCA voted to close its largest co-op Barrington Hall, in reaction to complaints from neighbors and problems with the City. The decade also saw the opening of two new theme houses: the African American Theme House, opened in response to the University's closing of all of its theme houses; and, in 1999, Oscar Wilde House, the first LGBT co-op in the country. Oscar Wilde House is a former fraternity house, which the USCA was able to buy due to the continuing decline in the popularity of the Greek system in Berkeley.

The USCA currently owns and operates 20 houses and apartments, housing over 1300 students.

Famous Cloyne Court Alumni
• Narsai David (1953–1955, Cloyne Court), food correspondent for KCBS AM radio in San Francisco
• Gordon Moore (1950, Cloyne Court), Intel co-founder
• Leon F. Litwack (1957, boarder, Cloyne Court), Pulitzer Prize winner, UC Berkeley History Professor

(From: http://en.wikipedia.org/wiki/University_Students%27_Cooperative_Association)

As noted, the USCA have been the stewards of Cloyne Court since 1946. From 1946 to c.1968, the property was under their ownership, but has since been the property of the University of California, who lease the facility back to the USCA. Although there have been several important occupants of Cloyne Court, the importance of these individuals is coincidental to their association with Cloyne Court. Neither are there any USCA associated events with Cloyne Court that are identifiably important to our history. Indeed, the USCA has inhabited Cloyne Court, maintaining the property's historical significance. Yet, frankly, with little in the way of care for the resource as an historic property, though also with little alteration, and certainly no alteration that can be construed as historically significant in its own right.

Finally, the University of California has owned this property for some 40 years. During this period, they have not had any significant or even direct impact on this resource, since the USCA has been the property's managing tenant.

Fig. 16: Cloyne Court – 1911 Sanborn Map
North at top of map
SUMMARY OF SIGNIFICANCE
The following section presents an historic preservation planning analysis of Cloyne Court.

The use of historic preservation zoning (the terms zoning and zones are used as they effectively describe the process of delineating an historical resource into categories of significance) establishes a general framework for treatment of an individual property by zoning the property and buildings into logical areas, primarily based on the integrity of original use and design – with integrity meaning that a critical mass of essential uses and physical features is intact and visible, on the degree of public access and exposure, as well as on the extent of alteration. The delineation of a property into historic zones seeks to identify degrees of significance. Exterior and interior areas are herein divided into four historic zones – Very Significant, Significant, Contributing, and Non-Contributing.

An historic resource, whether a district or an individual building, is an integrated whole consisting of site and landscape, building exterior and interior spaces, features and materials. However, each of those landscape and building areas is not, of course, of equal historic significance. Historic properties are generally considered from the outside in. We also look at historic properties from the perspective of public versus private, with greater significance granted to the former due to the understanding that historic resources generally benefit society over-and-above individuals. One can, therefore, generally conclude that formal and public exterior spaces and building elevations are of the greatest significance, and that significance recedes towards the ‘rear’ of a property, as well as towards the interior – increasingly so with more and more utilitarian and ‘back of house’ uses and their spaces. This method of interpretation parallels the way that landscape and architectural design acknowledge the relative importance of public place and form, resulting in greater formality and consequence at primary public spaces and facades, versus simplification and utility at, for example, service areas, which relatively few might appreciate, and where utility is expedient.

It is thus recognized that there are degrees of significance within any given historic resource, regardless of scale. Such degrees may be measured by a general grading system that implicitly identifies exterior landscapes, elevations, spaces and features as more significant and thus of greater sensitivity than interior spaces.

Zoning the historic property into areas of greater and lesser historic significance also delineates areas of relatively greater and lesser sensitivity to maintenance, alteration, rehabilitation or change. Relative significance is important in the context of planning for the future of historic resources. Giving consideration to the relative
importance of one space to another, or one material to another, allows for the prioritization of individual landscapes, buildings, spaces, elements and materials. It is an attempt to define what is most important, in this case to the potential significance of a resource, and thus what deserves the greatest attention towards preservation. Conversely, designating relative significance allows for a consideration of what is of lesser significance and least sensitive to change, thus suggesting where necessary alterations are best focused.

It is not the intent of preservation and rehabilitation standards to prohibit alteration and additions to an historic property. All active properties necessarily undergo change in order to maintain uses, or adapt new uses in order to sustain existence. In fact, Cloyne Court already experienced a change of primary ownership and use when it was adapted to student housing in the 1940s. The property is also over 100 years old, and has undergone periodic alteration, while its present state requires comprehensive intervention.

Such actions as are required to maintain and sustain historic properties are allowed under the guidance of the Secretary of the Interior’s Standards. The two applicable treatment standards are

“Preservation, [which] places a high premium on the retention of all historic fabric through conservation, maintenance and repair. It reflects a building’s continuum over time, through successive occupancies, and the respectful changes and alterations that are made.”

“Rehabilitation, [which] emphasizes the retention and repair of historic materials, but more latitude is provided for replacement because it is assumed the property is more deteriorated prior to work.”

(from the Secretary of the Interior’s Standards for Rehabilitation @ http://www.cr.nps.gov/hps/tps/standguide/overview/choose_treat.html)

In this case, as the property was previously adaptively reused, as there has already been comprehensive material alterations (for ex: exterior siding and roofing), as interior integrity has been lost, and since additional, extensive repairs are anticipated (ex: windows), Preservation is not the applicable standard, since it emphasizes protection and conservation. Rather, the relevant treatment Standard is Rehabilitation:

“When repair and replacement of deteriorated features are necessary; when alterations or additions to the property are planned for a new or continued use; and when its depiction at a particular period of time is not appropriate, Rehabilitation may be considered as a treatment.

In Rehabilitation, historic building materials and character-defining features are protected and maintained as they are in the treatment Preservation; however, an assumption is made prior to work that existing historic fabric has become damaged or deteriorated over time and, as a result, more repair and replacement will be required. Thus, latitude is given in the Standards for Rehabilitation and Guidelines for Rehabilitation to replace extensively deteriorated, damaged, or missing features using either traditional or substitute materials.”

(from http://www.cr.nps.gov/hps/tps/standguide/rehab/rehab_approach.htm)

Historic Preservation Zones are further described below, followed by plan diagrams applying and illustrating these zoning principals to Cloyne Court. The relative significance of individual features of the site, building exterior and interior are presented in the subsequent HSR section, Descriptions

**Very Significant Historic Preservation Zone**

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**Fig.20: Cloyne Court**

*Very Significant West Elevation*
The Very Significant zone consists of exterior areas and elements that are relatively intact and of primary importance to the historic property due to their original location, use and design, as well as their prominence.

Very Significant areas and elements are highly sensitive to alteration. It is strongly recommended that Very Significant spaces, elements and materials remain in place, and every effort made to faithfully restore them to their original locations, forms and materials. Where replacement is necessary due to the loss, deterioration or failure of the original, replacements should faithfully match the original, based on historical evidence.

Alterations to Very Significant areas may be allowed, but must be limited, and any alteration must not destroy or impose on identified historic features. Where past alterations have been made that are identified as non-contributing, such alterations may be removed.

Significant Historic Preservation Zone
Exterior and (very limited) interior areas that are of secondary importance to the historic property, or are of less public prominence than Very Significant zones, or potentially Very Significance spaces that have suffered past alterations affecting their significance, are herein identified as Significant.

Like the Very Significant zone, Significant spaces, elements and materials are recommended to be retained and repaired rather than replaced, and missing or altered historic features may be restored. Where past alterations have been made that are identified as non-historic, such alterations may be removed or further altered based on the Secretary of the Interior’s Standards for Rehabilitation.

New additions and alterations to Significant areas may be allowed, but must be guided in order to strictly meet the Secretary of the Interior’s Standards for the Treatment of Historic Properties. In particular, new work shall not destroy identified historic fabric, and is also recommended to modestly differ from the identified historic character, elements and material while, at the same time, being compatible.

Contributing Historic Preservation Zone
Exterior and interior areas of secondary importance to the overall historic resource, as they are less prominent than Significant areas, or potentially Significant spaces that have suffered past alterations affecting historic significance, are herein identified as Contributing.
Contributing areas are recommended to be retained wherever possible. Required alterations and additions shall be designed to be compatible with existing spaces, elements and materials. New program requirements may otherwise be introduced into these areas, yet again following the Standards and Guidelines for Rehabilitation.

Non-Contributing Historic Preservation Zone
Non-Contributing are exterior and interior areas that are of tertiary importance to the resource, or they are potentially contributing spaces that have been altered such that their historical identity is absent. Non-Contributing zones are not specifically limited by preservation recommendations. Their uses and elements may be altered or changed, but not without consequence to the historic property and, therefore, the Standards and Guidelines for Rehabilitation generally apply.
Note: Base Plan derived from 1929 Sanborn Fire Insurance Map.
Note: Base drawing is from a set of unlabeled "Clover Court Originals" provided.
dated plans
by the USCA.

7.27.2007
BASEMENT PLAN
not to scale

Non-Contributing
North

Clogue Court HSR HP2
Historic Preservation Zones
Note: Base drawing is from a set of unlabelled "Cloane Court Originals" provided by...
Note: Base drawing is from a set of unlabeled "Clogae Court Originals" provided.

Very Significant

Significant

Contributing
Note: Base drawing is from a set of labeled "Cloyne Court Originals" provided.

Very Significant

Significant

Contributing
Note: Base drawing is original elevation sheet (red)

Very Significant

Significant

Contributing
Note: Base drawing is original elevation sheet.
"Situation: Cloyne Court is located on the southeast corner of Ridge Road and Le Roy Avenue, just north of the University Grounds. It has a frontage of 275 feet on Ridge Road and 145 feet on Le Roy Avenue. It is within less than a block of the University Grounds and is one block from the Euclid Avenue cars. It can be reached in forty minutes from San Francisco.

Its site is high and well drained. It commands a beautiful view of San Francisco Bay to the west, and the Coast Range hills to the east. It is located in a quiet residence district of fine homes."

(from “Cloyne Court - A High Class Modern Apartment House in Berkeley, California”)

SETTING AND SITE

Cloyne’s setting is central to its character. The surrounding neighborhood is one of Berkeley’s earliest, as it is located directly adjacent to the UC Berkeley campus, the origins of which established this very neighborhood, geographically as well as culturally, just this side of the mid-1800s, coincident with the initial settlement of the University. The image of this neighborhood was one of open hills dotted with maturing redwood, oak and bay trees, and sprinkled with remarkable wooden homes. This locale is where the Bay Tradition of architecture is rooted. In the form of another type of tradition, it is also the locale of a conflagration that devastated those cultivated woodlands and homes, in 1923, but which Cloyne survived. Cloyne thus represents that earlier place, now largely gone or, where not, altered beyond specific recognition of what the character of this vicinity once was.

With respect to its topography, Cloyne is situated on a plot near the point of which the Berkeley Hills are beginning to rise steeply. To the east, and within the short distance of two city blocks, the slope of the hills rises precipitously. The Cloyne site is long in the east-west direction, thus rises somewhat dramatically in and of itself, although its grade is not that steep.

As the NR nomination records in its first statement under the heading “Characteristics,” this is a building
that is dual in character, with its public outside – stoic, solid and protected – differing markedly from its private inside – with its embracing form and open garden. Though the NR record goes on to say that “the building turns its back on the streets,” in fact, Cloyne Court unequivocally faces the streets, frontwards, in a very stoic yet formal way. To the west and north are its street frontages and, thus, its building fronts. Nonetheless, its uses are definitively oriented inward, to the south, thereby making the connection between building and environment that is, as discussed above, an attribution of Bay Area architecture. Lastly, the eastern orientation faces a service drive to Cloyne and an entry drive to the adjoining parking garage. The eastern orientation is, as a result, the rear of the building, being the least formal of its orientations. And it is here that the utilitarian service and kitchen wing projects.

From the perspective of its outside – the surrounding streets – downward to the west, it is sited, literally, on a bench that is built up to support the structure. Historic photos show this bench as an intentional embankment upon which the building stands well above the street corner of Le Roy and Ridge (fig. 26). But to the east, the building is sunk into the hillside, though not into it by means of a sunken basement. Rather, the building and a shallow yard are sunken, so the building is not concealed as it dips below grade, yet is sunken relative to the street.

What’s more, the middle of the site and the middle of the building coincide. And where, naturally, the main entrance to the building stands as a fulcrum.

The Cloyne Court building is set back from the streets so that landscaped yards are formed between the street and building. During its original phase as the Cloyne Court Hotel, these yards were, no doubt, formally picturesque, as historic photos again indicate. They formed a bucolic distance between the streets and the occupants. Today, those same yards are informal landscapes. Though still a relief, perhaps even more so in today’s context, they form landscaped setbacks. Both then and now, they are a foil to the building. But they were and are not open spaces to be enjoyed. That role was and is unequivocally provided by the open, south facing, and relatively private courtyard that results from
the form of the building on the interior portion of the site.

Here again, the building and its site are wedded, as the U-shaped building forms the space of the courtyard, which allows the site to have been leveled within that space.

And though the surrounding building is the design subject, there can be no mistake but that the resulting courtyard space is a primary objective of Howard's original design. That courtyard is the primary, character defining feature of this historical resource, as it unequivocally forms the basis of the original design.

The following describes and summarizes characteristics of the site on a space-by-space basis and with respect to their relative significance.

**COURTYARD**

Historic Designation: Very Significant

Cloyne’s landscaped courtyard is located at the inside of the site, and within the U of the building’s form. Thus, the courtyard is bound on three sides by the exterior building walls, and on the fourth side by a high fence separating it from an adjoining property directly to the south. The courtyard is not visible from the outside. In fact, it is not even particularly imaginable from the outside, as the hard exterior of the site is a stark contrast to its soft interior. That Cloyne was once a hotel is also most evident from the courtyard, as hotel uses very often command some form of private outdoor or semi-outdoor space.

Originally, this courtyard was a generously landscaped garden. Indeed, historic images show it to be so – the earliest such image revealing a near symmetrical space with a central mound and tree about which informal paths meander. This image is very early in Cloyne’s history, since the music room, reportedly of 1911, was yet to be. So the landscape is as yet quite immature, with the exception of the tree, which is fairly large and assuredly older than a few years, suggesting that it was either transplanted, or belonged to this site before it was built upon. The latter option might explain the tree being off center, in what is otherwise a symmetrical space. It also provides a 19th century context around which the hotel may have been imagined.

In any event, this tree no longer remains. In fact, it is very probable that few, if any, individual landscape features or patterns of the original courtyard remain.

At this juncture, the courtyard has been subdivided into distinct use areas, so its overall, garden-like character has been altered, though not entirely. Its western half retains a private, garden like character, with meandering
paths and informal seating areas amidst mature landscape, including plant and flower beds, shrubbery, and a variety of trees, young and old. This portion of the courtyard seems to convey the origins of this place.

In the center of the courtyard, where the tree and its mound originally stood, is a grass yard with a number of palm trees just east of its center.

The eastern third of the courtyard is now hard space, with a paved court that is an active outdoor space, as well as heavily trafficked by the coming and going of Cloyne’s residents. This area also provides service access to the building, with an informal trash collection area in the southeast corner of the courtyard.

Other physical alterations of consequence are the bays that project from the building’s south facing exterior wall into the space of the courtyard. There are essentially three of these bays. The primary one is on center, and was added as a music room at the main level, with an exterior deck at the second floor above. A top that second floor deck is another projecting form, much smaller in plan than the music room and its roof deck. This bay appears to have been original, or a very early addition, as it appears by the time of the 1911 Sanborn Map, when the Music Room was as yet unbuilt. In any event, it appears to have always been enclosed, and its doors and windows appear to be original, although its exterior construction was post-and-beam with rustic siding, rather than the shingled walls of today.

Then there are two other bays projecting from the south facing wall, one at each side of the music room, and thus maintaining the building’s symmetry. These bays are similar to the central bay above the music rooms, yet also appear to have been, originally, a covered deck space at the upper level with an enclosed sunroom below. Each of the projecting bays also serve the purpose of providing a roof over and landings at sets of entry doors into the first floor public spaces.

At the eastern entry, and corresponding to the hardscaped area of the courtyard, the entry landing area has been extended by the addition of a large trellis, creating semi-enclosed space below, which in turn creates an outdoor gathering and eating area. This trellis supports an aged wisteria vine (that appears in historic photos of c1910s - see fig.14), which fills in the entire first floor level between the east side of the music room addition, to the west facing courtyard wall of the building, and appears to be coincident with the construction of the sunroom.

Another, although minor alteration is the addition of a ramp, again from the hardscaped area into the dining room at the east wing.

Finally, the very rear and center of the courtyard has
been given over to a large bicycle parking area with a barbecue area adjacent.

Courtyard – Very Significant features:
• The overall space of the courtyard, confined and defined by the building’s exterior walls and the rear fences.
• Landscaped spaces, including mature trees and plantings amidst meandering paths and patios in the courtyard’s western third.
• Timber trellis and vines.

Courtyard – Non-contributing features:
• Hardscaping.
• Palm trees.
• Outdoor furnishings.
• Bicycle parking area and equipment.
• Barbecue area and equipment.
• East gate and fence.
• Landings, ramps, and railing structures.

NORTH AND WEST YARDS

Historic Designation: Very Significant.

Situated between the building’s north and west elevations and the two abutting streets, Ridge Road to the north, and Le Roy to the west, the north and west yards form a contiguous, L-shaped yard. Although the two corresponding building elevations aren’t entirely equal – the north being the front and the west being a side elevation – these two yards are relatively equal. They are informal landscape spaces that are banked either uphill or downhill, depending upon the grade relative to the building. A cluster of large trees, eucalyptus on Ridge and Live Oak on Le Roy, terminate the extreme ends of each yard, thus reinforcing their contiguity. Various, informal, paved and gravel paths pass thru these yards:
• A rock-lined, concrete paved path crosses the north yard from the Ridge sidewalk to the building entry on center.
• A pair of angled, gravel paths also cut through the north yard to the main entry.
• Another gravel path runs along the top of bank to connect the north and west yards.
• A brick path ascends the corner of the site.
• A long set of concrete steps that ascends the west yard from the sidewalk to the west side.
entry, also on center.

- A brick path traverses the top of the bank from the top of these steps to the south end of the west yard.
- And another set of concrete steps ascend the grade from the sidewalk at the south end of the west side yard, which meets up with a paved path and another set of rock lined, concrete steps to a gate into the courtyard.

Several structures have been added in these yards:

- An attached, utility shed at the west end of the north elevation.
- Two detached garages in the west yard, dating from 1926-27.

Lighting of these yards is presently via floodlighting from the building, and ambient lighting from the street. There are remnants of pole mounted fixtures at primary pathways. Site lighting is generally either in poor condition or of a poor design quality.

Finally, the sidewalks fronting these yards are concrete, most of which appears aged and likely original. Sidewalks at the upper portion of the Ridge Road are more recent, very likely as a result of the encroaching Eucalyptus trees directly adjacent. The sidewalk at the very south end of the Le Roy side appears quite new, perhaps as a result of the recent construction on the southward site. It also appears that, except in front of the main entry, there was a planting strip between the sidewalk and the curb that has been infilled. The older sidewalks are mostly in rather poor condition, in particular at primary access areas.

North & West Yards – Very Significant features:
- The open yards defined by the streets and the north and west exterior walls of the building
- Landscaped banks with rock terraces
- Mature stands of trees
- Pathways and steps
- Garages

North & West Yards – Non-contributing features:
- Low wall with plaque at north entry way
- Paving materials
- Site furnishings
- Light fixtures

EAST SERVICE YARD

Historic Designation: Contributing

Though the east side of the Cloyne site is unenclosed, and since the eastward adjoining property is an open parking lot, this side, dedicated as it is to service of the building, is exposed from the neighboring site and nearby streets.
In addition to service activities and their detritus, the east yard is occupied by a paved driveway that ascends the shallow slope of the east property line before making a 90 degree turn west, past the end of the building’s east wing and through a gate into the courtyard. The space between this drive and the building’s east wing is largely occupied by a low lying (i.e., a single story yet partially below grade), somewhat rambling (in what is otherwise a fairly small space), and flat roofed kitchen and utility wing. A tall, slightly tapered and ornamentally capped brick masonry chimney stands as tall as a story and a half above the ground from which it projects, and is thus a prominent structural feature of this service yard. Excepting, that is, for the enormous oak tree that stands toward the rear of this yard, shadowing and, gratefully, concealing some of this area from scrutiny.

As this yard has always been the back of house for this institution, concealment would seem a natural consideration, in particular when it served as a hotel to what were well cared for people. As noted elsewhere in this report, until 1967 there were a set of garages in the northwest corner of this site, and which stood alongside the entry drive, where there is currently angled parking (fig.36). Indeed, one can yet imagine their exact position, based on the partial height concrete walls between the north edge of the kitchen wing and the angled parking, which look to have supported some structure. Thus, this service yard would have been well concealed, and perhaps fully so if there had been some form of a gate at the driveway, as is also imaginable.

The kitchen wing is in two parts: a kitchen and utility wing that juts out from the center of the west elevation; and a serving wing that flanks the dining room. These structures adjoin yet differ from one another, so appear to have been built at separate times. Indeed, the first of these wings was indicated in the original drawings. Yet, the latter appears in the 1911 Sanborn Map, so is assumed to have been another immediate or very early addition.

Another balcony structure projects into and overhangs this yard from the east side of the building, much the same as the two others that project into the courtyard, and similarly enclosed. This also appears to have been a set of either decks, or perhaps sun porches that have always been enclosed, or a combination thereof – though an open porch in this location would not make a lot of sense, perched as this structure is atop the kitchen wing. In any event, this structure is also not original but, based on the 1929 Sanborn Map, appears to date from 1928-29.

Oddly, for a service yard, there is only one means of direct access from the kitchen and service wing into this yard, and that means is a single doorway, then down a set of constrained steps.

East Service Yard – Contributing features:
• Brick chimney
• Low-lying kitchen wing structures with flat roofs and pyramidal skylights
• Mature trees

East Service Yard – Non-contributing features:
• Paving and curbs
• Concrete block walls
• Wood fences and gates
• Service enclosures, walls and equipment
• Rooftop equipment
• Lighting
“Construction: Cloyne Court is being constructed in the best possible manner after the plans and supervision of John Galen Howard, of New York, the supervising Architect of the University. The building will be attractive, inside and out, and every attention has been given to insure safety, comfort, and privacy.

The building will be three stories high, around three sides of a square central court opening to the south. This sheltered court will be made attractive by a garden, while from the several balconies will be had the unequaled marine view. The different sections of the building will be separated by heavy brick fire walls with automatic fireproof doors wherever pierced. The plumbing and fixtures will be modern and of the best workmanship.”

(from “Cloyne Court- A High Class Modern Apartment House in Berkeley, California”).

**BUILDING EXTERIORS**

Cloyne is a rigorously symmetrical composition of the Beaux Arts architectural tradition, consisting of a large, elongated U-shaped structure that is centered upon its rectangular site, with long front and courtyard elevations facing yards north and south, respectively.

The building is three-stories over a basement level that is only partially underground. Thus, from its downhill (west) side, the building stands four stories tall, though three stories at the uphill (east) side.

Cloyne has a wood shingled exterior into which openings with wood doors and windows have been punched. Its wood shingling once extended to its sloped, hipped roofs - though the roofs are now composition shingle. Unlike other Shingle Style buildings, Cloyne is, in fact, more rustic than picturesque, in the same way that log buildings are. It is dark and rough and without much in the way of explicit ornamentation, excepting the pent roof assembly atop the front entry (fig.43).

The following describes the exterior of the building, elevation-by-elevation, summarizing each with respect to their relative significance and individual characteristics.
MAIN WING, NORTH ELEVATION

Historic Designation: Very Significant

Cloyne's north (front) elevation is some 200 feet long and three stories in height for its full length, with a partial fourth story tucked below its west end, where the site descends. The main body of the building exhibits a rigorous symmetry, excluding the offset kitchen wing as well as the building's relationship to grade, the slope of which renders its long, front elevation at different heights. Attesting to the rigor of its symmetry, the original architectural drawing illustrates half of the front elevation, while simply inferring the other half (fig.38).

Given its breadth, one of the primary characteristics of Cloyne's exterior walls, and of the front elevation in particular, is its deep and long, overhanging eave, which creates a dark shadow atop the wall, adding to the facade's massiveness. This eave is constructed of the tails of regularly spaced wood timber rafters that carry the roof deck and a straight, vertical fascia board, which in turn supports continuous sheet metal gutters of an ogee style.

A continuous, painted wood water table assembly projects out from the building wall at the line of the first floor, and forms a building base that goes from being merely a foot or so high where the building is three stories in height, to a full story high where it is four stories.
The face of the building base also stands proud of the upper building wall by 3 or 4 inches.

The north façade is punctuated by a low, overhanging roof at its very center, with the main entry door recessed below. This low roof is supported by exuberant and massive timber bracketing that is the only conspicuous ornamentation on the building. Above the entry roof is a vertical bay, slightly recessed into the wall, that ascends to the top of the third story windows. Into this bay is inset another shallow, vertical bay with a projecting, wood framed balcony, accessed via a pair of tall balcony doors and transom windows that altogether form an ensemble. These features all correspond to a central stair way at the interior, the balcony being accessed from the stair landing between the second and third floors.

Similarly, there are four other interior stairs that correspond to inset bays with balconies on the front façade, two at the east half of the elevation and two at its west half. These balcony bays do not rise the full height of the façade, as they nearly do at the central bay, and recess into the wall with but a shallow step.

Altogether, these five balcony bays establish a rhythm to the front facade that reflects the way the interior was separated into discreet dwelling areas. While the interior pattern of use has changed, these interior stairs...
remain and thus retain a semblance of a primary historical pattern of use. Though all five bays were originally delineated as having semi-circular, arched heads, they were constructed square, as was the case with all of the originally design arched openings. The rhythm of the facade is furthered by a relatively complex pattern of windows in singles, pairs and triples (this pattern is described in detail in the NR record).

As elsewhere described, Cloyne's windows are cleanly punched into the shingled exterior walls, so are without any trim, except for a simple, painted wood sill, without which the paired and tripled windows would be dissociated.

The projecting balconies are of unpainted redwood "sticks," including the two support beams that project from the wall, overlain with a wood frame deck, and with a railing assembly of square corner posts, square balusters, and a flat lower rail and cap. These assemblies strongly reinforce the rusticity of Cloyne's architecture.

Given the available perspective and the presence of large trees at the northeast, the north facing roof is not particularly visible as an associative part of the north elevation. Nonetheless, it is of sloped, gray, composition shingle. Its sole feature is an original brick chimney that is visible toward the west end.

Six, regularly spaced, painted metal downspouts descend the facade from the roof eave, down and attached to the wall, then out and over the projecting water table. Though the metal gutters and downspouts appear to be placed at the locations of the originals, they are not of the original material type and design, so appear to be of recent vintage, likely associated with the most recent reroofing.

Finally, at the west half of this elevation, an array of utility and service equipment has been attached to and visually clutters this portion of the facade. An early shed structure was also added at its very western end, though its low profile and shingle cladding are not so visually intrusive.

North Elevation – Character defining features:
- Wood and timber pent roof assembly (at entry)
- Wood balcony assemblies
- Shingled wood frame walls, including inset bays
- Wood and timber roof eave assembly
- Sloped, hipped roof
- Continuous, projecting wood water table
- Recessed entry alcove with wood entry door
- Wood and glass, stile-and-rail type doors and transoms (at balconies)
- Typical, wood double hung windows (of various sizes) with sash horns
- Miscellaneous, wood awning and transom windows
- Wood window sills

North Elevation – Non-contributing features:
- Composition roof shingles
- Painted, sheet metal gutters and downspouts
- Exterior lighting
- Utility and service equipment
- Security grills (at windows)
WEST WING, WEST ELEVATION
Historic Designation: Very Significant

Cloyne Court is less a composition of independent exterior areas and walls as it is a three dimensional structure. And though the north facade clearly serves as the front, or at least main elevation, as the northwest corner of the building is prominent, the north and west elevations are together perceived as the main facades.

The west elevation is 1/2 the length of the north facade, including a short bay at its south end, the west wall of which is inset by several feet from the main plane of the facade. Thus, taken as a whole, the west facade is asymmetric. While the main portion of this facade gives the impression of symmetry, and was drawn to be entirely symmetric, openings in fact vary in their placement and pattern. The formal features of the west elevation is also limited to a single balcony bay at its center, though this bay is twice as wide as those on the north facade, and has two balconies, one at the second and another at the third floors. Whereas the front balconies relate to interior stair landings, the west balconies are within dwelling spaces. These stacked balconies have slightly different railing designs, due to the upper balcony railing having been altered.

Beneath these balconies, an exterior door enters the ground/basement level. Originally a wood and glass, stile and rail door, the current door is flush, with a single, grilled window. Another utilitarian door has been inserted at both ends of this facade.

At the south ends of both the east and west wings stand distinct, three-story building bays that were once veranda-like sunrooms at the second and third floors, and which were windowless – seasonally, one might assume – at their south ends and facing the courtyard. Original drawings indicate their outward openings were to be windowless as well, but early photos indicate otherwise (fig. 48). At the west elevation, the relatively narrow breadth of this recessed bay allows for a single window unit, with a pair of tall, 1-over-4 wood casements and an equally wide 1-over-4 fixed wood lite at each side.

As at the north facade, exterior wall finishes, wood windows and the pattern of their openings, the overhanging roof eave, wood balconies, roof drainage assemblies, and the continuous water table are, again, typical yet primary characteristics.

Unlike at the north elevation, the sloped, composition shingle roof is visible from the west. In keeping with this elevation, there is a main, hipped roof atop the
symmetrical portion of this wing, and a narrower and lower hipped roof atop the south bay.

In addition to the altered door and balcony noted above, alterations to the west elevation include:

- Security grills barring each of the basement windows
- A set of window boxes perched below the northmost window at the second floor
- A window converted to a doorway with flush door at a north and south openings of the ground (basement) floor

West Elevation – Very Significant features:
- Wood balcony assemblies
- Shingled wood frame walls
- Wood and timber roof eave assembly
- Sloped, hipped roof
- Continuous, projecting wood water table assembly
- Wood and glass, stile and rail doors and sidelites (at balconies)
- Wood casement windows with fixed sidelites and wood apron (at south-most openings)
- Typical, wood double hung windows (of various sizes) with sash horns
- Wood window sills

West Elevation – Non-contributing features:
- Flush doors
- Composition roof shingles
- Painted, sheet metal gutters and downspouts
- Rooftop equipment
- Exterior lighting
- Security grills (at windows)
- Window boxes
EAST WING – EAST ELEVATION

Historic Designation: Very Significant & Significant

The East Elevation is the last of the three exterior elevations oriented outwards, although this elevation does not directly face an adjoining street, but instead faces Cloyne’s service drive and yard, as well as parking and drives on the eastward adjoining lot.

The east elevation of the east wing is, in most respects, a reflection of the west elevation of the opposite wing. It is of the same general architectural form, elements and materials, consisting of wood shingled walls, a deep overhanging eave, and double hung wood windows within punched openings. Its roof exactly reflects the west wings'.

However, given the eastward and upward sloping site, the east elevation is three overall stories while the west is four. Moreover, this elevation is interrupted by the single story kitchen wing, so the central-most segment of the east elevation is but two-stories high (the kitchen wing elevations are described separately, below). This arrangement is the reason that the East Elevation is assigned both Very Significant and Significant ratings, with the former applying to the portion forward (north) of the kitchen wing, and the Significant portion adjoining the wing (fig.51).

A recessed veranda sunroom bay also stands at the south end of this wing, corresponding to the one at the west wing. Lastly, a full height projecting bay further interrupts the horizontality of this facade, breaking it into parts where the other exterior elevations are monolithic. This bay, which appears to have originally been a balcony, was not indicated in the original drawings or in the earliest Sanborn Map, so must have been an addition.

As many of the windows of this elevation can be reached, there are a large number of security grills on windows, and a doorway with flush door has been added from the second floor to the roof. There is also a fire escape accessed from the southernmost windows at the second and third floors, which probably dates to the late 1940s.

Fig.50: Cloyne Court Hotel – East Elevation, 1904
John Galen Howard, Architect (Courtesy Environmental Design Archives)

Fig.51: Cloyne Court – East Elevation
East Elevation above kitchen wing roof
East Elevation – Very Significant & Significant features:

- Shingled wood frame walls
- Wood and timber roof eave assembly
- Sloped, hipped roof
- Projecting wood water table assembly
- Wood casement windows with fixed sidelites and wood apron (at south-most openings)
- Typical, wood double hung windows (of various sizes) with sash horns
- Wood window sills
- Floor and roof structures at projecting bay

East Elevation – Non-contributing features:

- Wall assemblies at projecting bay
- Composition roof shingles
- Painted, sheet metal gutters and downspouts
- Flush doors
- Miscellaneous wood windows
- Fire escape
- Rooftop equipment
- Exterior lighting
- Security grills (at windows)
KITCHEN WING ELEVATIONS

Historic Designation: Contributing

The kitchen wing projects eastward from the primary building volume. It is a flat-roofed, low-lying, single-story appendage that is at grade, yet with a small portion at its easternmost extent below grade. The plan of this wing is irregular and in two interconnected parts: a shallow wing directly flanking and attached to the rear two-thirds at the base of the east elevation and, eastward, an outlying and offset volume partially attached to the former. Its exposed exterior walls are wood frame and shingle clad on concrete foundations, and its roof is wood frame with gravel surfacing and an array of ventilators and skylights atop, including two pyramidal, venting skylights that were original to this wing.

An original square, tapered, brick masonry chimney with a stepped cap rises nearly one-and-a-half stories above the kitchen wing roof, and within a cut-out in the east wall of that structure.

Overall, the exterior character of this wing is of a largely utilitarian and otherwise rambling structure. There is no formality or ornamentation. Windows are limited to three sets of casements with sidelites at the southeasternmost corner. A single door exits into a below grade landing with a covered stair up to grade.

Kitchen Wing – Contributing features:
- Shingled wood frame walls
- Wood casement windows with fixed sidelites
- Wood framed and trimmed eave (at southeastern corner)
- Low-slope roof form with pyramidal skylights
- Brick masonry chimney

Kitchen Wing Elevations – Non-contributing features:
- Wall assemblies at projecting bay
- Painted, sheet metal gutters and downspouts
- Flush doors
- Stair enclosure
- Rooftop equipment
- Exterior lighting
SOUTH COURTYARD ELEVATION

Historic Designation: Very Significant

Exterior courtyard elevations – the south elevation, in particular – are articulated forms compared to the stoic and monolithic forms of the street-front elevations. These courtyard elevations are uniformly three stories under broad, sloping roofs.

The south elevation is also a long and symmetrical, shingled building wall, with sets of double hung wood windows punched therein. Three, full height projecting bays enliven this wall, the central one having been original to the building (though it is not in the original drawings, it can be seen in early images, fig.28, and in the 1911 Sanborn, fig.16), with what was originally two covered yet open balconies over a covered door landing. This original balcony bay is now enclosed and shingle clad, as it has been apparently since the music room was added c.1911. Wood windows, both fixed and casement, appear to be original to the 1911 alteration, although there have been some losses at both the east and west walls of the third floor. And where a wood panel door exited the second floor to the roof deck, there is now a dutch-like flush door. Of particular interest to this structure are its overhanging eaves at both the roof and at the line of the third floor. In each case, the existing eaves are built-up of wood members, trellis-like. While the upper eaves make sense as a roof overhang, the lower eave is but a remnant of what appears to have been an actual trellis that served as an overhang, and which has since been truncated by the loss or removal of its outermost members.

The c.1911 music room addition is also shingle clad. Windows at the south and west sides of the first floor addition are pairs of 1-over-4 casements with matching sidelites and wood aprons below, which match the original windows elsewhere at the courtyard elevations (and which may have simple been relocated from the south elevation to the Music Room when the latter was built). A flat, overhanging roof eave shadows the top of this story, above which is the flat roof deck surrounded by a wood railing assembly on its three open sides. The current railing is not original, but was likely to have been replaced along with the roof at one of the reroofing intervals (1958 and 1985-87 are two possibilities).

Two other bays project from the underlying wall, one at each side of the elevation, each of which cover entry doors and their landings at the first floor, and with
enclosed space at their second and third floors. These two balcony bays are not original, though they may have been added at the same time as the Music Room addition. The enclosed floors of these bays are treated much the same as the central bay, with shingle cladding, and mostly casement or fixed windows. Both of their upper levels have a unique feature specific to the support of the roof, in the form of an exposed, post and beam roof frame with diagonal wood knee braces at the corners. This roof design, along with the unusual windows infilling these walls, suggests (but does not prove) that the original space was an open veranda that has since been enclosed. An historic photo seems to indicate that the upper level was partially open, but this image is also not definitive (fig.14).

Contiguous with the open base of the eastern bay is a robust timber trellis supporting a wisteria. Beneath the bay and trellis structure is a semi-sheltered, outdoor gathering space (fig.59).

And yet another set of wooden balconies project, at each side of center, from the south facing courtyard wall at the third floor.

Finally, the building’s sloped, hipped roofs are visible from the courtyard level, with the south facing courtyard roof supporting a large array of solar panels.

South C’yard Elevation – Very Significant features:
- Exposed wood structures of projecting bays
- Wood balcony assemblies
- Shingled wood frame walls
- Wood and timber roof eave assembly
- Sloped, hipped roof
- Continuous, projecting wood water table assembly
- Wood and glass doors and sidelites (at entries)
- Pairs of wood casement windows with sidelites and wood aprons
- Typical, wood double hung windows (of various sizes) with sash horns
- Miscellaneous, wood awning and transom windows
- Wood window sills

South C’yard Elevation – Non-contributing features:
- Wood shingle siding at balcony bays
- Composition roof shingles
- Rooftop solar panels
- Wood railings (at roof deck)
- Wood trellis
- Painted, sheet metal gutters and downspouts
- Flush doors
- Miscellaneous wood windows
- Exterior lighting
- Utility and service equipment
EAST AND WEST COURTYARD ELEVATIONS

Historic Designation: Very Significant

Together with the south courtyard elevation, these two elevations, opposite one another and perpendicular to the south wall, form the distinctive U-shaped building and its resulting courtyard. The east and west elevations nearly mirror one another in their shape and form (fig.60), so are here described together.

These elevations continue the three-story, shingle-clad and sloped-roof building form. Again like the south elevation, they are each given distinction by projecting forms, in this case a three-story tall, semi-octagonal bay with a semi-pyramidal roof, each of which houses a stair. Into the base of this stair bay is a single story, enclosed hallway that forms an arm across the bottom of each elevation from the stair bay to the south elevation. Were it
not for the interrupting trellis and bay structures along the south wall, such enclosed hallways with their generous and rhythmic window openings, would form a continuous pattern of large openings, loggia-like.

Interestingly, the original elevations show this continuous, arcade-like first story. That proposed arcade was further enhanced by arched openings that were to begin in the south extent of each wing, and march across the courtyard elevations. However, no arches were employed in the realized design, and the concatenation of the arcade was interrupted when with the music room and trellis additions.

The roofs of these enclosed hallways are sloped, shingle roofs, with overhanging wood frame eave assemblies. At the west roof is a skylight, the location of which appears in early images.

Otherwise, the east and west courtyard elevations are typical, with windows punched into shingled walls, continuous wood water tables, deeply overhanging eaves, metal gutters and downspouts (though circuitously routed), and broad, sloped roofs above.

East & West C’yard Elevs. - Very Significant features:
- Semi-octagonal, projecting stair bays with pyramidal roofs
- Shingled wood frame walls
- Wood and timber roof eave assemblies
- Sloped, hipped roof
- Continuous, projecting wood water table assembly
- Wood and glass doors and sidelites (at entries)
- Pairs of wood casement windows with sidelites and wood aprons
- Typical, wood double hung windows (of various sizes) with sash horns
- Miscellaneous, wood awning and transom windows
- Wood window sills

East & West C’yard Elevs. - Non-contributing features:
- Composition roof shingles
- Painted, sheet metal gutters and downspouts
- Fire escapes
- Exterior lighting
- Utility and service equipment
SOUTH ELEVATIONS - EAST AND WEST WINGS

Historic Designation: Very Significant

At the south end of each of the building wings are projecting bays. Though their forms and materials are in keeping with the adjoining walls and roofs, these bays are narrower in width than the wings themselves, and are given distinction thereby, as would have suited their original use as partially open verandas, at least at the two upper stories.

In each of these south facing walls are a pair of broad openings at each floor. Today, all of these openings are infilled with windows, but the original openings were designed as full height and open, with wood guardrailings. From historic photos, we know that the upper two floors at the west wing were open, as designed. However, there is no evidence that the upper openings at the east wing were, and the first floor openings would have been in the Dining Room, as they are today.

In fact, in an historic interior photo from the c1910s, we can see a set of diamond paneled windows (fig.67), which would correspond with such existing windows at the upper two floors of the east wing (fig.65). These windows are conspicuously different than any other window in this building. At the south elevation of the west wing, where original openings were likewise infilled, the windows are again different than any others (fig.66).

South Elevations at Wings - Character defining features:
- Shingled wood frame walls
- Wood and timber roof eave assemblies
- Sloped, hipped roof
- Continuous, projecting wood water table assembly
- Pairs of wood casement windows with sidelites and wood aprons (at first floor, east wing)
- Pairs of diamond paneled wood casement windows with sidelite, (at second and third floors, east wing)
- Three-unit wide casement and picture windows at second and third floors, west wing
- Wood window sills

South Elevations at Wings - Non-contributing features:
- Composition roof shingles
- Replacement sash at first floor, west wing
- Painted, sheet metal gutters and downspouts
- Flush doors
- Exterior lighting
Primary patterns of Cloyne Court’s interior uses and spaces are, today, and despite 60+ years of adapted use as student housing, quite similar to the original building, including:

- At the first floor, a central entry hall that feeds a main hallway which, in turn, distributes circulation to seven equally spaced stairways.
- At the two upper floors, these seven stairways establish congregations of rooms, such discrete areas reinforced by masonry cross walls that further (albeit, today, but partially) confine each zone.
- Again at the first floor, several primary, communal rooms, including a music/living room that occupies a central bay appended to the south facade, and a main dining room that occupies nearly all of the east wing.
- A set of bays projecting southward from the ends of each wing, and rising the full 3 stories with rooms at each floor.
- A trio of 2 story high projecting bays equally spaced across the south facade, with rooms at the second and third floor.
- A single story kitchen/service wing appended to and standing east of the main building.

With respect to these characteristic spaces and patterns of use, identifiable changes from the original building include:

- Whereas, at the original entry hall, those entering the original building would have viewed directly south into the courtyard via central doors and windows opposite the entry door, the music/living room has been added, and the central opening made into a solid wall.
- The entry hall originally had open spaces adjoining both sides, and which, like the entry hall, opened into the main hallway, altogether forming a relatively spacious lobby. Moreover, each of those flanking spaces once had fireplaces, adding to the original lobby experience. Today, the room at the north side of the entry hall is closed off, and the fireplaces are gone.
- The main dining room appears to be in its original configuration, though it too had a set of
fireplaces where the main room steps into the large window bay at its south end. These fireplaces are also gone, and the floor of the window bay space is raised up, platform-like.

- The east wall of the dining room, which was originally shown with a trio of large window openings facing east, has been internally opened into an undated extension of the kitchen wing.

- The second and third floors of each of the south projecting bays (1 at each end of the wings, 3 at the south elevation, and 1 at the north elevation), were once open verandas but have since been enclosed.

- The hallways and stairways appear to remain in their original locations, yet the materials and finishes have been much altered.

- At the upper 2 floors, the masonry cross walls that once established discrete suites of rooms centered about a given stairway have been opened to allow passage along newly created hallways.

Thus, and though a characteristic pattern of primary spaces and spatial relationships remain, and even though various original elements remain within – including stairs and their parts, ornamental columns and exposed beamwork, wood casings and trimwork, plaster, and even some original plumbing fixtures – given the extensive degree of alteration and disrepair, there are no specific interior materials or elements that can justifiably be identified as historically important. To do so would be to create a short list of vestigial elements that would not, in the aggregate, add up to a meaningful rehabilitation opportunity. In addition, as noted in the NR record, “the build-
ing has been a student residence hall since 1946. The upstairs rooms have lost most of their original features; hallways, closets and baths have been eliminated more than once, and long hallways have been created where once there were suites of rooms.”

Nevertheless, Cloyne Court’s several primary interior spaces maintain spatial relationships original to the building, and these spaces and their interrelationships are thus of contributing importance. Each contributing space is identified and summarized below.

Entry Hall (fig.69)

The primary entrance to Cloyne is located at the center of its long north facade on Ridge Road, via a single, wide and slightly recessed doorway that enters into a short and narrow hall, with a quick, three steps up into the entry hall at the first floor. Wood posts and beam assemblies separate the entry hall from the main hallway. As noted above, the character of this space has been much altered from the original, to the extent that it is currently a abrupt and graceless space.

Main Hallway (fig.70-71)

Like the main body of the overall building, the main hallway is largely symmetrical in its plan and purpose. It
runs practically the length of the building in the east-west direction, connecting along the way to interior spaces and stairways lying north thereof. At its east end, a node-like vestibule connects to a short stair hall to the north, and directly to the dining room to the south. The main hallway also turns at this point and runs south to a stairway in the middle of the east wing. The main hallway’s west end is similar – it too connects to a north stair and also turns southward to a stairway at the center of the west wing – the difference being that there is no connection to a dining room, so there is no vestibule at this node.

A primary characteristic of the main hallway is that it traverses the perimeter of the building’s courtyard walls, so the hallway has an open feeling, via its windows, and thus a good, strong relationship to the courtyard. It also opens into the only space that projects into the courtyard, the music/living room.

Music/Living Room (fig.72-73)

This space is, today, a multi-purpose room that serves as a lounge, meeting and computer room. It is rectangular in plan, with two wide interior openings (originally exterior window openings) from the main hallway, one at each end of its north wall. The other three walls are exterior, with sets of windows opening directly out to the courtyard. It also has an exposed, wood beam ceiling.

Although this room is not original to the building, it was added very early on (c.1911), and remains a central space that contributes to the building’s communal character. This bay-like structure is also an exterior feature of the overall structure. The exposed wood ceiling beams are secondary characteristics.
Main Dining Room (fig.74)
The first floor of the east wing is occupied by the dining room. In the scheme of Cloyne Court, this room is a large space. Accessed from the main hallway via a wide opening at the north wall, it is oriented southward toward the large window bay projecting at the south end of the room. Spatially and functionally, it is original to the building, although it connects into an expanded kitchen and serving area at the east, where there were apparently once more windows, and is thus not as balanced or open as it may have been originally. Two rows of wood columns and beams are also original to the room.

The characteristics of this space are its open plan, its relationship to the main hallway, and its windows. The two column and beam lines are secondary characteristics.

Upper Stairways (fig.76-78)
All seven original staircases remain in use. They are important to this building architecturally, in that they inform and order the architectural plan – by the congregation of spaces that result from their arrangement –
and elevation, with their prominent exterior doors and balconies at the north elevation, and their distinctive semi-octagonal forms and pyramidal roofs within the courtyard.

Thus, while these stairways are elemental and without interior architectural character, like the main hallway, they are important characteristics of the original building.

Balconies and Bays

The enclosed balconies and bays, all facing southward except for a single such structure at the east elevation, are either original (the central bay at the south elevation) or early to the structure (i.e., c1910s), appear to have been originally uninclosed. Nonetheless, their subsequent enclosure has retained the character of these structures and, at the same time, converted them to interior spaces within or attached to private rooms.

As these uses have changed, no one of these spaces is individually characteristic. However, they are altogether a pattern of spaces that again recall the uniqueness of the historic architectural plan and design.
This HSR section evaluates and documents treatment recommendations, including:

- General recommendations and standards
- Specific site and building recommendations
- Recommendations for the treatment of historic materials and assemblies

Various subject headings conclude with the identification of pertinent reference documents (copies of which are attached to this HSR).

**General Recommendations**

The following general recommendations apply to the care and repair of historic buildings.

1. The work discussed herein is intended to maintain and preserve the historic Cloyne Court at 2600 Ridge Road. Proposed work must be undertaken by persons, whether professional or tradespersons, with fore-knowledge of the extent of the historic building and its identified features and elements.

2. To the greatest extent possible, identified historic spaces, materials, elements and assemblies should be retained, repaired and reused in their original locations. Where replacement is unavoidable, replace the identified existing historic materials and assemblies "in-kind". The phrase "in-kind" means the provision of materials and elements to exactly match the equivalent, restored, existing materials and elements to be replaced.

3. Alternate materials are acceptable for the repair and replacement of identified historic materials and elements in concealed locations, so long as the alternate material or element matches characteristics of the existing in all other respects.

4. Restoration and repair techniques and procedures require the testing of all proposed applications to determine the efficacy of the repairs and their compatibility with original materials. Repair materials and procedures should be carefully modified to best meet the requirements of each required repair application.

**The Secretary of the Interior’s Standards and Guidelines for Rehabilitation**

The U.S. Secretary of the Interior’s Standards and Guidelines for Rehabilitation of Historic Properties are the standard bearer of rehabilitation practices in the United States. Each of the rehabilitation Standards are listed below. Specific documents that apply the Standards are also referenced under this section.

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

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

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

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

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

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

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

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

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

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

Each of these ten Standards apply to any proposed alteration project, with the overall intent being to minimize change to identified character defining materials, features, spaces, and spatial relationships.

Site Recommendations

Site Recommendation 1: Kitchen Wing and Service Area

Systematically address service and service areas, by comprehensively modernizing building service programs and spaces, outside and in.

This work must include the consolidation and enclosure of outdoor service areas, along with the creation of improved service access from the kitchen wing to the service yard. The service drive should also be improved with new paving and lighting. Moreover, some form of entry gate and enclosing fences are recommended, in order to further consolidate these service areas. All trash areas and bicycle storage should be located outside of the courtyard, in order to restore the integrity of the courtyard space.

Fig. 80: Cloyne Court – Service Drive and Kitchen Wing
Parking area at original garage location

Fig. 81: Cloyne Court – Service Entry and Stair
At Kitchen Wing
Site Recommendation 2: Courtyard

The courtyard is, historically and literally, the core of this property. As a space, it is intact, and its potential quality is in evidence. But it has also been altered by its intensive use, with large paved areas, bicycle parking, and refuse areas.

Given its present day use, the courtyard cannot be restored to the tranquil garden it was originally. But it may be rehabilitated to more closely embody its garden origins. Specifically, by dispersing some of the more active and, thus, encroaching service and recreational uses, to the greatest extent feasible. Including, if it is feasible, the relocation of the ball court to the end of the service drive, allowing for the reintroduction of yard and garden into the eastern portion of the courtyard.

This recommendation must be considered in conjunction with the service yard recommendation, as service activities, including trash collection, occur within the courtyard.

Also, given that the wisteria trellis is a part of the historical resource, it should be maintained. Other mature landscape areas at the western side of the courtyard should also be maintained, as should all existing, mature trees.

Fig. 82: Cloyne Court – Courtyard
Looking South across Ballcourt at Fence

Fig. 84: Cloyne Court – Courtyard
Looking South across Yard at Bike Parking & BBQ

Fig. 83: Cloyne Court – Courtyard
Ramp to East Wing

Fig. 85: Cloyne Court – Courtyard
Trellised Area
Site Recommendation 3: Front Entry Way

The front (north) entry way into the building must be improved, including new walkway paving, lighting, plantings, and signage. The existing paving and landscape patterns appear to be original, and should be replicated with new. Informal paths may also be improved with the addition of new paving, preferably pervious. Lighting and signage should be added to enhance the entry sequence, but neither should be affixed directly to the building. And the miscellaneous wiring and equipment in and around the building entry should be removed.

The styles of new elements should be informed by the character of this place, i.e., of a rustic style relating to the historical period. The existing part wall on which an historical plaque is placed should also be removed and replaced with a more dignified plaque at the sidewalk, per the City’s current standards for the identification of historical resources.

See Site Recommendation 5: Utilities; and Building Recommendation 2: Building Entry, for associated recommendations.

Site Recommendation 4: Pathways and Stairs

All pedestrian pathways are in need of improvements, including paving and lighting. Per Site Recommendation 3, hard paving should replace the existing essentially in-kind, since most pathways appear to be original or early. Where informal paths are to be retained, some form of impervious paving may be introduced. And new lighting should not be attached to the building, but made freestanding, and of a style to complement the historic site and structure.

Existing concrete stairways appear to be in good condition, but each stair requires new railings, lighting, and safety improvements.

Site Recommendation 5: Utilities

A plethora of building service and utility equipment are strewn around the site and upon the building’s primary elevations. These elements detract from the importance of the historic site and structure. To the greatest extent possible, and in conjunction with building systems upgrades, exposed equipment and services should be relocated and rerouted to be concealed from primary view.
Building Exterior Treatment Recommendations

Building Recommendation 1: Structural and fire safety

At this juncture, and as an historical resource, Cloyne Court is both invaluable and irreplaceable. Given that it is a wooden structure in a place threatened by fires and earthquakes, that it has survived as intact as it has is an historical accomplishment of the first order. During the course of its 100 plus years of existence, there have been many building-life threatening possibilities. Therefore, a primary recommendation is, necessarily, to take basic actions that will continue to ensure Cloyne’s future.

Fire and seismic protection are, obviously, the highest priority, since those threats are without equal. Treatment recommendations therefore begin with the primary need to assess and address structural and fire safety engineering requirements.

Building Recommendation 2: Building Entries

The building’s front entry way should be upgraded, including site and utility improvements addressed above. With respect to building features, work specific to the front entry would include the replacement of the original entry door with a new wood and glass door to match the design of the original. New lighting should be installed in the vestibule ceiling, and miscellaneous equipment removed and/or replaced. In conjunction with building systems upgrades, the opportunity to conceal fire sprinklers in the vestibule ceiling should be exercised.

Each of the other building entry ways require a similar range of improvements. For example, at the south courtyard doors, new landings are required, along with new doors, hardware, lighting and signage. Each of these doors appear to be original or early, and should therefore also be replaced with new to match the originals. And lighting and signage should not be affixed directly to the building walls.

Several secondary doorways and doors occur at the west and east elevations. Each of these doors is, presently, a flush type door, and each should be replaced with a door style more appropriate to the historic building, although metal egress doors are in order.
Building Recommendation 3: Garages.

The garage structures may be stable, but their cement work is in poor material condition and requires repairs. Wood garage doors are recent and, thus, in good condition. The open top of the north garage appears to be generally used as a work area, and is a poor location for such a use. Some enclosure may be appropriate here, as is the case at the south garage. However, this is not a preferred location for a structure that will obscure the building, again as the south garage exemplifies. Therefore, the relocation of this work area should be explored. If no more appropriate location is identified, then some form of enclosure may be the next best treatment.

Historic Material Treatment recommendations

Originally, Cloyne Court was of a more integral design, with a design rigor that is not as apparent today.

There was also once a rigor of line to the overall exterior, with the horizontal alignment of shingle and opening, added to by the bold lines of water table, roof eave and gutter, altogether strongly uniting the whole.

The original edifice was materially integral as well – wood shingle siding and wood shake roofing, with, according to the original drawings, a galvanized iron gutter, although a redwood gutter might also have been substituted, much as wood shakes were substituted for clay tiles at the original roofs. There was also a more generous use of wood railings, in particular in the south facing openings of the wings, which were once verandas at the two uppermost stories. The original building thus employed a narrow range of rustic materials.

Material Recommendation 1: Wood Shingle Siding

Wood shingles, the single-most characteristic material upon this structure, cover 70% or more of the exterior walls. As repeatedly stated, this is a shingled building. Its character is very much a consequence of the combination of its overall mass and its shingled exterior walls, the regularly spaced and perfectly horizontal bands of which form an impervious wooden shell set against the outside forces of rain and sun. Windows punctuate these walls in an incidental way, seemingly cut into it, almost as if an afterthought. Even the low-lying kitchen wing is shingle clad, although somewhat skimply so.

And yet, wood shingles aren't the equal of sound stone and masonry, so require replacement as their integrity wanes. Originally bright reddish-yellow, the weather beats cedar shingles through stages of rust and grey into a deep, dark brown, following which they tend to deteriorate into silvers – in particular those to the south and the west, which face the sun – and within 100 years no longer fully protect the wall.

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Fig.91: Cloyne Court – Garage
North Garage at West Yard

Fig.92: Cloyne Court – Garage
South Garage at West Yard

Fig.93: Cloyne Court – Wood Shingle Siding
At West Elevation
There's more to it than that, of course, since the original shingles would have hailed from some barely imaginable mega-trees, their wood far superior to the farmed species of today, and thus, during the first era of the life of Cloyne Court, most probably a golden red beyond comparison, at least on the building's sunny sides.

Such is the nature of wood shingled buildings, morphing from one thing to another, from bright gold and reddish to dark brown almost black, as no other building or building material does. To again compare it with stone and masonry, over time, cleaning isn't an option. The only way to clean the stuff is to replace it with new shingles.

And it is that simple of a material, that it can be removed and replaced with ease and without changing much of anything, as long as the replacement follows the pattern of the original.

The current shingles date from the 1995, having at that time replaced the darkened and silvered originals. Yet even now, in no later than ten years, the darkening is very apparent. In fact, it is interesting to note that the aging process is so apparent, making it hard to guess just when the shingles were replaced.

The wood shingles that cover Cloyne Court's exterior walls are its most characteristic feature and material. Exterior wood shingling is in good condition, since it was recently replaced. Therefore, no treatment recommendation is in order.

Nonetheless, it is worth noting that the original shingle coursing was not maintained in the course of their replacement. That the shingles should have been replaced in-kind - i.e., in the very kind, sizes, dimensions and pattern as the originals - is an apt illustration of thorough and appropriate preservation practices.

Material Recommendation 2: Exterior woodwork

Restore and selectively replace exterior woodwork.

Cloyne's exterior wood timber and frame assemblies are the next most distinctive. Some might, in fact, argue that the wooden eaves, entry roof and balconies are the most special of the building's features, since such deep, dark, overhanging features are, today, what seem to be the most visually important aspects of the place. At the same time, it is true that the timber assemblies, in particular, are the most unique, as they are, unlike the shingles, relatively one-of-a-kind features, and of essentially irreplaceable materials, since the redwood of these original elements is no longer available.

Window, door and transom sills, and the continuous water table assembly at the level of the first story are another set of wooden features that add to the overall wooden aspect of this building exterior.

Exterior woodwork, in particular exposed wood frame and timber assemblies require repairs and selective replacement, including at:

- Balcony and deck structures
- Railing assemblies,
- Exposed rafter and eave assemblies
- Trellises and porches

This wood restoration work requires a detailed survey of conditions to identify specific treatments. The overriding aim being to replace only which is necessarily
replaced, and to otherwise selectively repair with appropriate repair treatments identified by way of detailed investigation and analysis.

Existing exterior woodwork should be retained and repaired to the maximum extent possible. Where retained, woodwork repairs shall include:

- Repairs shall be made using the materials and methods exhibited in the original doors.
- Remove all deteriorated paints and coatings.
- Repair deteriorated surfaces and elements by removing affected areas and replacing with new pieces and/or fillers to match the surfaces of the existing materials.
- Prepare wood surfaces and repaint. Replacement paint colors shall be similar to the original paint colors, which shall be determined visually by paint layer analysis of the existing.

Wood restoration—References

- Preservation Brief #10: Exterior Paint Problems on Historic Woodwork

Material Recommendation 3: Wood Windows

Replace and selectively repair wood windows.

Wood windows consist of a variety of types.

- The predominate window style is 4-lite over 4-lite double hung.
- At the first floor south and courtyard elevations, large window units line the corridors and public spaces, each with a pair of casement style windows set between fixed outer units, all 4-lites high. This type of unit is also present at the music room addition, along with single fixed units at its east wall.
- In each of the semi-octagonal towers at the east and...
west wings, narrow single or double hungs are employed.

- At the south walls of each wing, there are sets of 4-wide diamond-paned casements.
- At the south and west elevations, wood balconies are accessed via sets of multi-lite, window-like doors with fixed transoms above.
- Each of the modified balcony bays employ miscellaneous window types.

Wood windows require a comprehensive program of in-kind replacement, while also meeting other building requirements, including egress and energy.

Additionally, the window repair work will necessarily extend to security features, such as window grills. Wherever new grilles are to be installed, they should be installed in a manner that is reversible.

Windows – References
- Preservation Brief #09: The Repair of Historic Wooden Windows
Material Recommendation 4: Roofing

With the exception of the low roof at the main entry, the roof is not a prominent feature. Nonetheless, it is a significant assembly, and will likely require attention in the near future, at which time its replacement with materials appropriate to the original building is recommended - i.e., with shingles that better resemble wood shake roofing.

Roofing and roof drainage assemblies - References
• Preservation Brief #4: Roofing for Historic Buildings

Material Recommendation 5: Masonry Chimney

The brick chimney amidst the kitchen wing is character defining, and should be retained, cleaned, repointed, and, if necessary, strengthened.

Masonry chimneys that remain at the roof are not identified as historic features, so may be removed if necessary.

Roofing and roof drainage assemblies - References
• Preservation Brief #1: Assessing, Cleaning and Water-Repellent Treatments for Historic Masonry Buildings
• Preservation Brief #2: Repointing Mortar Joints in Historic Masonry Buildings
Interior Recommendations

This HSR makes no attempt to recommend specific interior treatments, other than to acknowledge remaining historical spaces and patterns of use. The reality is that, both physically and materially, the interior of this facility has been adversely affected by the intensity of use. The need to comprehensively renovate the interior of this facility is unarguable, while historical rehabilitation recommendations and consequent efforts should be reserved for and concentrated at the building site and exterior, where it can be most beneficial.

Nevertheless, Cloyne’s original, communal spaces and patterns of use survive, which at least attest to the building’s success. It has simply never been underutilized, and so is remarkably worn, to the extent that there is almost no restoration potential at the interior, and little rehabilitation potential, excepting the retention and reuse of first floor communal spaces and original stairways.

Interior Recommendation: Interior Retention

Retain and rehabilitate communal spaces at ground floor, including entry spaces, hallways, dining room, and stairways from the first through third floors.

Selective Protection Recommendations

Understanding that this HSR is being drafted in the context of potential building rehabilitation projects, it is also worth acknowledging that selective protection actions are required throughout rehabilitation planning, design, documentation and construction processes.

During the planning and design stages, selective protection actions are specific to identifying what is significant about the resource, in so doing setting up a list of historical forms, features and materials that are recommended to be protected throughout the remainder of the process, including during design, when the intention of retaining the identified elements and assemblies begins.

During subsequent documentation efforts, specific protection requirements shall be furthered by the development of protection plans and specifications. Finally, during construction, protection measures take physical form – with the use of identification signs and physical barriers – but management and procedural processes dedicated to protection measures are of equal importance.

The intent of these measures is to protect the character defining features of the subject property. Its characteristic forms, features and elements must be considered irreplaceable, and thus invaluable. A lapse in protection efforts can mean the irreversible loss of significant historic fabric. Specific protection measures include:

- Identified historic elements of the building that are to remain during the course of construction must otherwise be protected from physical damage and deterioration that can occur as a matter of course on a construction site.
- Fire and water damage are also serious threats to historic structures during the course of construction. Protection measures thus include fire protection, and temporary protection against inclement weather during those periods when the building is temporarily open.
- Protection measures also extend to salvage activities, and in particular where historic materials, finishes, or assemblies are proposed to be removed and reinstalled, and likewise when an assembly will be removed and replicated. Such salvage activities must effectively document and track what has been removed.
The following resource and reference materials were utilized in the preparation of this HSR. For an additional bibliography, see attached NRHP nomination.

Archives:
Environmental Design Archives, University of California, Berkeley.
Bancroft Library, University of California, Berkeley.
Berkeley Architectural Heritage Association (BAHA).

Reports:
National Register of Historic Places Inventory-Nomination Form; Cloyne Court Hotel, June 8, 1992.

Books:
John Galen Howard and the University of California; Sally B. Woodbridge; University of California Press; 2002.
The Campus Guide - University of California, Berkeley; Harvey Helfand; Princeton University Press; 2002.
On the Edge of the World: Four Architects in San Francisco at the Turn of the Century; Richard Longstreth; Architectural History Foundation, 1983.
McKim, Mead & White Architects; Leland M. Roth; Harper & Row, NY, 1983.
The Houses of McKim, Mead & White; Samuel G. White; Rizzoli, NY, 1998.
American Architecture - An Illustrated Encyclopedia; Cyril M. Harris; W.W. Norton & Company.

Regulatory Documents:


State of California Public Resources Code, Sections 5024 and 5024.5 (@http://ohp.parks.ca.gov/pages/1DT/files/Public%20Resources%20Code%205024.pdf)

Articles and Periodicals:

“John Galen Howard 1864-1931,” William C. Hays; Architectural Record; October, 1931, p.278.

Unpublished and On-line Resources:
Miscellaneous records and correspondence from City of Berkeley Planning and Building Department files re Cloyne Court, 2600 Ridge Road, Berkeley.
Miscellaneous building maintenance records from the University Student Cooperative Association.


“Cloyne Court Hotel, 2600 Ridge Road, Berkeley, CA;” Daniella Thompson; for the Berkeley Architectural Heritage Association; @www.berkeleyheritage.com/berkeley_landmarks/cloyne_court/html.

“Cloyne Court History: Cloyne Court Hotel;” Tim Banuelos and Linda Robinson; @www.well.com/user/calton/hotel.html.

References:
The following references, by the National Park Service Technical Preservation Services, are taken from their series Preservation Briefs (http://www.cr.nps.gov/hps/tps/briefs/presbhorm.htm):

Preservation Brief 4: Roofing for Historic Buildings.
Preservation Brief 9: The Repair of Historic Concrete - Problems and General Approaches.
# 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 16). Complete each item by marking "X" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900e). Type all entries.

1. **Name of Property**
   - **historic name:** Cloyne Court Hotel
   - **other names/site number:** Cloyne Court

2. **Location**
   - **street & number:** 2600 Ridge Road
   - **city, town:** Berkeley
   - **state:** CA
   - **county:** Alameda
   - **zip code:** 94709

3. **Classification**

<table>
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<th>Category of Property</th>
<th>Number of Resources within Property</th>
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<td>object</td>
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</tr>
</tbody>
</table>

   Name of related multiple property listing: N/A

   Number of contributing resources previously listed in the National Register: 0

4. **State/Federal Agency Certification**

   As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

   In my opinion, the property meets the National Register criteria. See continuation sheet.

   Signature of certifying official: [Signature]
   Date: 11/19/92

   California Office of Historic Preservation
   State or Federal agency and bureau

   In my opinion, the property meets the National Register criteria. See continuation sheet.

   Signature of commenting or other official: [Signature]
   Date:

   State or Federal agency and bureau

5. **National Park Service Certification**

   I, hereby, certify that this property is:

   - [ ] entered in the National Register.
   - [ ] determined eligible for the National Register.
   - [ ] determined not eligible for the National Register.
   - [ ] removed from the National Register.
   - [ ] other. (explain:)

   Signature of the Keeper: [Signature]
   Date of Action: [Date]
At first glance it appears to be a simple building, but in fact the design displays a disciplined application of Howard's Beaux Arts training. The classic symmetrical composition subtly reflects a complex interior floor plan. Cloyne Court, is a large three and four-story U-shaped, multiple dwelling, with an attic and partial basement. The building is entirely sheathed in naturally weathered shingles over a wood frame, and has a hipped roof with overhanging open eves. With the exception of modestly carved, heavy wood brackets holding the entrance roof, there is a complete absence of ornamentation. It is an exceptional example of The First Bay Tradition, an attitude toward building design, popular between approximately 1895 and 1915, in the San Francisco Bay Area. The First Bay Tradition stressed that a building should "harmonize with its surroundings...by leaving the natural material to the tender care of the elements...wood is a material (best) used in straight, angular lines...and left in its natural finish." (1) Cloyne Court is one of the few remaining large-scaled shingled, multi-residential buildings in the First Bay Tradition in the Bay Area. (2) Cloyne Court is located on the north/western two-thirds of a city block, at 2600 Ridge Road, one block from the original Northern boundary of the University of California Berkeley Campus. From the intersection of Ridge Road on the north, and Le Roy Avenue on the west, the building appears to be a large rectangular block, set sufficiently back from the streets to allow for trees and shrubbery. The north section of the building, the center of the "U", is approximately 200 feet long, while the building's east and west wings are each approximately 100 feet long. The three sections of the building surround an open courtyard on the south side of the property. The building's exterior is essentially in original condition with the exception of minor and reversible alterations. The interior has been adapted from its original use as a hotel, with suites of rooms, to a single-room occupancy student dormitory. According to the 1928 Sanborn Insurance Map, the building, as it stands today, has the same footprint as it had in 1928, except for the very minor addition of an attached shed-roofed utility room located on the north/west corner. The only other additions to the original building, whose foot-prints are noted on the 1928 Sanborn Map, are a music room, built in 1911, and two two-car garages, which are non-contributing structures, and are not attached to the building. The fenestration appears to be original and is consistent with the architect's drawing (Figure 1) and an early photograph (Figure 2). The majority of the exterior window frames themselves (except the few noted below) appear to be original, or have been replicated. The building, however, appears to be in only fair condition. In 1904, when Cloyne Court was constructed, it was located in a strictly residential neighborhood. Today this block, and the blocks to the east and west, are part of the University, and contain parking lots, a parking garage, dormitories, office buildings and research laboratories. The blocks to the north have remained residential.
Setting: Neighborhood

Cloyne Court was built as a residential hotel, a block north of the University campus, to serve people associated with the University. In 1904, when Cloyne Court was constructed, this neighborhood was removed, and up the hill, from the center of the campus and the Shattuck and Telegraph Avenue commercial districts. The campus was oriented to the south and west rather than to the north. The only University buildings on the north side of campus were a small observatory and a glass conservatory for the University Botanical Gardens. (3) The residential neighborhood which developed on the north side of the campus was predominantly of a rustic nature, featuring unpainted wood siding and set in lush gardens. (4) Even the first two campus buildings built in this neighborhood, the Architecture Building (1904) and the Drawing Building (1907), both designed by Howard, were sheathed in brown shingles. This is the neighborhood that escaped the 1923 Fire, which burned 500 buildings in north Berkeley. The fire stopped only one block north of Cloyne Court. Of the buildings in the immediate area that survived the fire and are still standing are the former Architecture and Drawing Buildings, the former Beta Theta Pi Fraternity House (1893, Ernest Coxhead) now the School for Public Policy, next door to the south, and the three residential blocks to the north, north/east and north west.

Today the block where Cloyne Court stands is owned by the University and contains the former Beta Theta Pi House, a parking lot where the 1906 Newman Hall once stood, and a three story concrete parking garage where a shingled dormitory once stood. The block to the east and west are also owned by the University. Residences which survived the 1923 Fire have been demolished for Foothill Housing (dormitories constructed in 1989) on the block to the east, and on the west block, seven-story Etcheverry Hall in 1969. A new computer science building, also seven stories tall, is planned for construction in the Fall of 1992 across the street from Cloyne Court. The blocks to the north have remained residential. Cloyne Court and the former Beta Theta Pi House, serve as transitional structures between the large campus research and academic buildings, and the residential neighborhood. (Figure 3)
Setting: Placement on lot

Although Cloyne Court is a large structure in comparison to the single-family residential structures which once dominated the neighborhood, the building is set back from the streets to provide for generous plantings. The set-back on the Le Roy Avenue side is approximately 30 feet and on the Ridge Road side approximately 20 feet. The east side the building is approximately twenty feet from the property line and on the south, the ends of the east and west wings, are approximately 20 feet from the property line. The site slopes down from east to west. On the west side of the property, on Le Roy Avenue, at street level, are two two-car garages. (Figure 3) These garages are non-contributing structures and are not seen in the original drawing (Figure 1) or early photograph (Figure 2).

General Characteristics:

The character of the exterior walls of the building differ on the sides exposed to the streets from those facing the courtyard. The walls facing the courtyard are part of the private interior of the building, rather than part of the public exterior.

From the street, the wood framed building is a free interpretation and adaptation of a classical arrangement. The identifying characteristics are: a rectangular shape, a simple hipped roof, symmetrical facade with a centrally located recessed entry accentuated by a covered portico flanked by one or more sections (or bays), a smooth flat wall surface, and a belt course between the basement and main floors. (5) The courtyard, although also treated symmetrically, features projecting bays, shed-roofed single story sections, large window openings, balconies and arbors, and two polygonal staircase “towers”, resulting in a picturesque and lively ensemble quite different from the smooth walls that face the street.

The overall shape of the building is a wide U, but from the streets, its public view, the building looks like a three and four-story rectangular block; the U-shape is not apparent from the streets. The building turns its back on the streets, so that on the south facing side, the wings of this “U” surround a large sheltered and private garden. Although the site slopes to the west, the courtyard is level. Under the west wing there is a basement set against the hillside and there is a basement under the west half of the north
section of the building. On the east side a large kitchen is located in a single-story wing which is tuck
g against the hillside. Two two-car garages are built into the hillside on the west side at street level.

The foundations are concrete and post and beam construction. The beams are huge twelve by twelve
 timbers. The outside walls are diagonally sheathed with wood planks and then covered with shingles.
Post and beam construction is also evident on the main floor; in the entrance and in the dining room. Two
brick fire walls were built into the building and separate the three wings. In the case of a fire, a steel fire
door will slide automatically across the open hallway to separate the three wings. These walls are
indicated on the 1928 Sanborn map extend up the full three stories.

The interior spaces are arranged so that the main entrance to the building is in the center of the north
section, the center of the U. The entrance level, or main floor, is used today as when it was originally used
as a hotel, with the "public rooms", lounges and dining rooms, opening off a wide hallway located on the
south side facing the courtyard. Upstairs there are two floors of private sleeping rooms. There are seven
staircases, and originally only two suites of rooms opened off the staircases at each floor so that there
were no long hallways, but in the 1970's hallways were created to provide for more private dormitory
rooms. The basement is used for recreation, laundry, wood working and utilities. The attic is accessible but
not used.

The building has no decorative ornamentation except simply carved brackets under the entry roof. The
entire building is clad in unpainted brown shingles, which are laid in simple overlapping rows. Where
the hillside slopes, the building is set on a raised basement and a belt course, of painted wood,
approximately eight inches deep and three or four inches high, slightly sloping and with a rounded outer
edge, runs around the entire building at the point where the floor level of the first floor of the building is.
For example, on the west and north wings, this belt course visually separates the basement level from the
first floor, or main part of the building, and it also indicates the parts of the building which do not have
basements since the string course in these areas is at ground level. Since the building is entirely clad in
unpainted brown shingles this is the only delineation indicating the basement level.

The belt course, and the window frames and sills are painted dark olive green or faded brown/beige or
light green. These are the only parts of the exterior of the building which are painted. Although the
color varies around the building, the colors are earth-toned and the variation is not particularly noticeable. Chipped paint indicates that at one time the paint color was forest green, but no other paint colors are visible. There is no window trim, the shingles come right up to the window frame. The roof is hipped and the eves are open and project about three feet from the wall surface. Exposed square, six by six, unpainted wood rafter-ends are spaced approximately three feet apart around the entire building. The roof is covered in dark grey composition shingles. Originally the roof, as consistent with the period, would have been wood shingles, but by 1946 the roof had been resurfaced to a "fireproof material" (8).

North side of the building: The entrance facade on Ridge Road:
The public entrance to Cloyne Court is located in the center of the north facing wing, off Ridge Road. The entry is recessed and is defined by a low overhanging shed roof held by four large, simply carved, wood brackets. The front door, most likely original, is a twelve-light door with thick sturdy unpainted wood mullions. Above the entry is a shallow wood balcony, two feet deep and four feet wide, with four, four-light casement doors opening onto the balcony. This wall is symmetrical in design, and subtly divided into five sections. Flanking the entry, are two sets of four, four-light casement doors and balconies which define the center of each section. The casement doors and balconies are located between the second and third floors; they express, on the exterior, the staircases which are on the interior. They also define the center of the separate sections of the building. On either side of the balconies are windows grouped singly, in pairs and threes and the pattern is slightly varied, but overall it is symmetrical. Most of the windows are four over four light sash. The sash windows below the five casement doors and balconies are eight over eight light. (6) The balconies are unpainted wood, held by projecting square six by six inch beams, the railings and balustrades are three by three wood pieces.

An important, but very subtle accent feature is the treatment of the casement doors. They are treated differently than the windows by being set back about two inches from the surface of the wall and set in another two or three inches. This shallow recess is shingled like the wall surface, but casts a shadow, accenting this important feature of the wall which is the center of the individual parts of the facade and the building. The group of casement doors over the entrance is accented even further by being set back twice in this manner rather than once.
The entry facade appears to be in almost original condition and the pattern of windows follows the pattern in Figure 1. However, fire escapes in silver colored metal have been added to the first set of windows on either side of the entry on all floors, and first floor windows have been covered with black metal protection grates. A one story utility bay, eight feet deep by twelve feet wide, with a shed roof, has been added, very recently, at the basement level on the west side about eight feet from the north/west corner of the building. In comparison to the size of the building, and its location at basement level, and because it has been shingled, it is unobtrusive.

The landscaping on this side consists of six huge eucalyptus trees and three acacias on the east end. On the west end there are two plum trees, a tall leafy deciduous tree, several black acacias, a couple of camellias, and an attempt to create a flower garden on the west facing slope which has been terraced with grey granite stones. The plantings blend with the building's dark brown shingles.

The west facing wing: the LeRoy Avenue Side

The west facing wing of Cloyne Court is on the lower end of the sloping hillside and the three main floors are set above a full basement. Like the entrance facade, a symmetrical pattern of windows has been created with single, paired and triple groupings. However, the main section of this side of the building is treated as a one-part composition, with a stepped-back sunroom-bay on the south end. There are two sets of balconies and casement windows, one between the first and second floors and one between the second and third floors, in the center. The groupings of windows are symmetrically arranged on either side of the balconies. A basement doorway is beneath the balconies. On the south end of this wing is a stepped back bay which originally contained sunrooms on all three floors. On the west and east facing side there are four casement windows grouped together, and on the south side there are two sets of four casement windows. In the early photograph (Figure 2) it appears that these openings were originally open balconies with railings. It is not known when they would have been glazed and the lower portion filled in, but the windows are not original to the building and the lower portion is covered with plywood siding. This is not highly visible from the street.

At street level there are two, two-car concrete garages set into the hillside. These are non-contributing structures and are not shown in the early drawings or photograph (Figure 1 & 2) but were added by 1928. They are placed approximately twenty feet apart and between the two garages a path and steps lead to a secondary, basement entrance. The door is smaller than the main entrance and is flush with the wall of the building and shaded by a small overhanging shed roof. The path and steps can be seen in the early photograph (Figure 2), but the roof sheltering the doorway is not present in this photograph. The garages
have a simple geometric pattern of squares at the corners and rectangles on the long surfaces of the "posts" and "beams" molded into the natural colored concrete. The doors of three of the four garages are vertical board siding, painted brown, with small arched windows in the center. These are original, but the doors on the garage on the south end have been changed and replaced with white painted plywood. The roofs of the garages would have originally been flat or slightly sloping and covered with tar and gravel. This is consistent with many other garages of this type built in Berkeley during the 1920's and 30's. Today, covering the roofs of both garages are wooden structures which have been erected in recent years, and visually obscure the view of this side of the building. The garage roof addition on the north side is about seven to eight feet high and has shingle siding, and a very low gable on the north and south ends. There is some green corrugated plastic laid on top of part of this structure, serving as a partial roof. The addition to the garage roof on the south is about eight to nine feet high and has vertical board siding. On the east side of this addition there is a shed roof, with open ends, over one-third of the enclosed space.

The dominant foliage on this side is acacia and other tolerant bushes, but there are two small oak trees growing near the garages. To see the building from the sidewalk it is necessary to cross the street. The building is most prominent from the corner of LeRoy and Ridge. The "scrubby" or informal nature of the plantings was indicated on the architect's drawing (Figure 1) and is therefore not inconsistent with his original intention for the landscaping.

The east wing

The east wing contains the dining room with residential rooms above. The kitchen is in an adjoining one story wing perpendicular to this and tucked against the hillside where three of its four walls double as concrete retaining walls. The kitchen wing's roof is flat with two hipped roofed skylights. In the center of this, and at the east end of this wing, there is a large brick chimney. The kitchen appears on the 1928 Sanborn Map, but it is not known whether this is original to the structure. However, placing kitchens apart from the main structure was not uncommon due to the threat of fire.

The three story "main" wing of the east side is treated in a similar manner to the west side of the building, with the exception of a rectangular sunroom bay, set against the building at right angles, with multi-paned windows on all three sides, in the center of this facade, (like the ones also present in the courtyard). This wing also has a set-back sunroom "bay" at the south end. The windows of these sunrooms are the same as those at the end of the west wing, with the exception that the casement windows on the south side are
diamond paned leaded glass on the second and third story. From the available documents it is not known if these windows are original. The east wing, as well as the north/east corner of the building, is obscured from view by the thick foliage of acacia trees and eucalyptus. There is a mature oak tree at the south/east corner of this wind.

The inner courtyard

Cloyne Court is a U-shaped building forming a south facing courtyard which is both protected from the public streets and shielded from the prevailing west and northwest winds. A protected, secure and private place. It is the central focus of the building and its residential rooms.

The three wings surrounding this courtyard are treated symmetrically. Directly opposite the main entry is the "music" room, a bright multi-windowed room, added in 1911. It extends out from the center of this wing, about 15 feet, into the courtyard. On the two stories directly above the "music" room there are two sunroom bays which are probably original. The roof of the "music" is flat and doubles as a sitting deck surrounded by simple square wood balustrades. Symmetrically placed on either side of the "music" room addition are two rectangular bays extending the full three story height with sunrooms on the second and third floors. These sunroom bays are square, like the one on the east side of the building, and are set at right angles to the body of the building (Figure 5). The 1928 Sanborn map shows the three bays evenly spaced across this side and they are duplications of the bay at the center of the east facade. The primary entrance to the courtyard is now made through casement doors on the east side of the "music" room, under a wood framed trellis covered with vines. However, access to the courtyard can be made from the dining room, again through casement doors, or from the polygonal stair case towers located in the center of the east and west wings. These polygonal stair towers with pyramidal roofs, the rhythm of the protruding sun-room bays, the trellis and the non-repetitive pattern of window groupings give these walls a picturesque quality which is only hinted at on the street facades.

The historic photograph (Figure 2) shows a single oak tree in the center of a lawn. A later, but undated Cloyne Court Hotel brochure shows the building opening onto a lush courtyard garden. (Figure 4). The courtyard, recently fenced with a six foot wood fence topped with three more feet of pre-made lattice work, is a multipurpose outdoor space, obviously appreciated and much used by current residents. The east side of the courtyard is paved to the edge of the "music" room. This is used as the entry paving into the building, and doubles as a basket ball court with hoop attached to trellis. A potter's wheel sits under the trellis. Beyond the "basket ball court", is designated motorcycle parking (formally a car park as shown in Figure 5) and a driveway wraps around the south/east end of the east wing. Presently a huge skateboard ramp has been constructed and serves as a transition between the driveway and the gardens.
Overlooking all this is the concrete wall of the University parking garage. (The site of the shingled College Hall)

The shadier west side of the courtyard is devoted to lawn, shrubbery and flowers. Against the newly built fence the student residents are building a brick bar-b-que pit and a stone pond. Vines are growing happily up and into the towers; ivy in the west tower and wisteria into the east tower. Like the street facades, the courtyard remains essentially intact, but windows need repair and the building needs reshingling.

The interior

The building has been a student residence hall since 1946. The upstairs rooms have lost most of their original features; hallways, closets and baths have been created and eliminated more than once, and long hallways have been created where once there were suites of rooms, but the window openings have not been

From the sidewalk off Ridge Road there is a gentle rise before coming to the front door. The floor of the vestibule is paved in concrete and then there are three shallow steps up before the main hallway is reached. There are thick square, seemingly wood, posts and beams separating the entry hall from the main hallway. Directly opposite is the back wall of the "music" room which blocks direct sunlight into the hall. There are two entrances to the "music" room on either side of this wall. It could be speculated that this hallway, which faces south into the courtyard, originally would have been a wall of windows (like the south-facing hallway of North Gate Hall) and that the wall blocking the light was built when the "music" room was added in 1911. In any case the "music" room appears to have much of its original integrity as do the wide hallways on either side. Rooms off this hallway are on the north side of the building. The dining room occupies almost the entire ground floor of the east wing. simple tapered columns are probably original and the post and beam structure is visible here.

The building was designed to provide the tenants with the maximum of privacy, with each section having its own entrance and stairway from outside. Not more than two suites on each floor were to open on to the same vestibule. An advertising brochure summed up Cloyne Court’s advantages: "The building is designed particularly for members of the faculty of the University and their families.... who wish to avoid the annoyance and cost of housekeeping..." Each unit was self-contained in that it had its own living room, bedrooms, and bathroom. (4) On the ground floor these walls and their steel doors are still extant, but the students say the walls have been opened on the upper stories to allow for more hallways.

All seven original staircases are extant and usable, according to student residents. The building was designed so that there would be no long hallways. Pairs of hotel apartment suites were entered from these stairways. Today these hotel apartment suites have been converted into 94 dormitory rooms housing approximately 150 students and the hotel suites have been adapted to accommodate this use. (5)
Footnotes for Cloyne Court Descriptions


2. There are two or three shingled apartment buildings in San Francisco in Pacific Heights. On Telegraph Avenue, in Oakland, there is a smaller shingled apartment house by Edna Deakin and Clarence Dakin, who studied architecture with Howard. (The Residential work in Berkeley of Five Women Architects, Berkeley Architectural Heritage Association, 1984) There was an other shingled multi-unit women's dormitory on the south/east corner of this block, College Hall, constructed in 1909, but demolished for a University Parking lot and garage in the 1950's.

3. Jones, William Carey, Illustrated History of the University of California, 1895, Berkeley, University of California


6. The pattern of windows and casement doors and balconies moving out from the entrance is:
   on the first floor...
   1-4-2-eight over-eight light -2-2-eight-over-eight- 2
   on the second floor...
   1-3-3 balcony -3-3 balcony- 2
   on the third floor...
   1-3-3 casement door -3-3 casement door- 2

7. On the first floor (north to south) the pattern is:
   3-1-2-2, eight-over-eight-2-2-3 sunroom;
   on the second floor
   3-2-2-casement/balcony-1-2-3-sunroom;
   on the third floor
   3-2-2-casement/balcony-1-2-3-sunroom.


4. Cloyne Court Brochure, date and author unknown, archives of the Berkeley Historical Society, Louis Stein Collection

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

Criteria Considerations (Exceptions)

☐ A  ☐ B  ☐ C  ☐ D  ☐ E  ☐ F  ☐ G

Areas of Significance (enter categories from instructions)

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Significant Person

NA

Architect/Builder

Howard, John Galen

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

Cloyne Court Hotel is significant under Criterion C in the area of architecture as an example of the work of John Galen Howard and as an example of the First Bay Area Tradition style. Howard, Supervising Architect for the University of California at Berkeley and Director of its School of Architecture, worked mainly in the Beaux-Arts idiom, but explored the woodsly, Bay Area tradition through some of his work. Cloyne Court Hotel was Howard’s first large scale shingled building and is highly reflective of a style that had a huge influence on design in the Bay Area.

Cloyne Court represents a pivotal role in the career of John Galen Howard (1864-1931), who served as Supervising Architect for the University of California Campus (1901-1924), designed the complex of buildings which comprise the core of the campus, and founded the first school of architecture west of the Rockies in 1903. Cloyne Court is the first large scaled shingled building by Howard in Berkeley and the only one not on the University Campus. It is an important building in Howard’s career because it assimilates his East Coast and Ecole des Beaux Arts architectural background with the design trends which prevailed in the San Francisco Bay Area at the turn of the century. In Cloyne Court, Howard has applied these concepts on a much larger scale than he had in his previous small scaled single family dwellings, and has achieved a design of inherent simplicity, in contrast to his classically decorated masonry buildings on the campus. Howard would subsequently design seven large shingle buildings also on the University Campus. (1)
As a good representative example of the First San Francisco Bay Tradition, Cloyne Court is one of the few surviving large shingled residential buildings in the Bay Area, and is the largest in Berkeley. The First San Francisco Bay Tradition was the architectural expression of the belief that buildings should complement and enhance their natural surroundings and, stylistically, was an assimilation and integration of the American Arts and Crafts Movement, the American Shingle Style, and the teachings of the Ecole des Beaux Arts in Paris. The Bay Tradition began in the late 1870’s and became widely popular in the mid-1890’s and remained popular until around 1915. The concept that buildings should complement and enhance their natural surroundings was primarily confined to picturesque single family residences, making Cloyne Court among the rare examples of a large multi-residential building in this Tradition. Cloyne Court is also a unique and singular expression of the First Bay Tradition in the restrained classic symmetry of its exterior. In this neighborhood, Cloyne Court is one of only fifty buildings to have survived the 1923 Berkeley Fire, where 500 buildings were destroyed, and where the First Bay Tradition dominated the built environment, before 1923. Of the fifty surviving buildings, Cloyne Court, whose exterior is essentially intact, is one of seven important and distinguished structures, each one a unique and singular expression of the First Bay Tradition, which are still standing within two blocks. (2) Among these are Howard’s North Gate Hall (1906) and Naval Architecture Building (1909), both listed on the National Register of Historic Places, which form a cluster with the residential buildings designed by Bernard Maybeck, Ernest Coxhead, and A. C. Schweinfurth. It is one of Howard’s most dignified and innovative designs in shingle. Cloyne Court is also historically associated with distinguished men and women with ties to the University and this association is testimony to the inter-relationship between the University and the neighborhood at the turn-of-the-century. Cloyne Court, named for the home of Bishop Berkeley of Cloyne, Ireland, (for whom Berkeley is named) was designated a City of Berkeley Landmark in 1982 and was included in the State Historic Resources Inventory, in 1977, and rated "appears eligible for listing on the National Register". Cloyne Court not only provides a large and important contribution to the cultural heritage of the immediate neighborhood, and to Berkeley and the Bay Area, but more importantly, to that part of its architectural heritage that was so badly fragmented by the 1923 Berkeley fire; an architectural heritage, which had a profound influence on post World War II domestic architecture and continues to have an ongoing, though not consistent, significant influence on design theory and practice internationally. (3)
John Galen Howard

John Galen Howard, the architect of Cloyne Court, came to Berkeley in 1901 to serve as Supervising Architect for the University of California at Berkeley, and served in that position until his retirement in 1924. "The core of the Berkeley campus by John Galen Howard is one of the largest, most complete Beaux-Arts ensembles ever to be executed in permanent materials in the history of American architecture." (4) Howard also designed several wood framed campus buildings that were sheathed with unpainted wood shingles. Cloyne Court, built only three years after his arrival in the San Francisco Bay Area, is the first large scaled shingled building that he designed in Berkeley. It is an important building in his career because it assimilates his East Coast and Ecole des Beaux Arts architectural background with the design trends which prevailed in the San Francisco Bay Area at the turn of the century.

"While Howard was influenced by the Bay Area Tradition developed in the 1890's, his wood buildings on campus (Architecture Building, Drawing Building, Women's Faculty Club) were primarily indebted to the shingle style buildings of Henry Hobson Richardson and McKim, Mead, and White. " (5) This is also evident in the design for Cloyne Court whose boldness is present in the stone work of Richardson and the "U" shaped plan reminiscent of the Newport Casino of McKim, Mead and White. However, while the earlier East Coast shingle tradition was highly picturesque and linked to the massing of Victorian buildings, Cloyne Court (like McKim, Mead and White's Low House of 1889) has become an essay in simplicity and is looking forward in its massing rather than back into a cluttered past.

Howard was born near Boston in 1864, studied architecture at the Massachusetts Institute of Technology, and then served as draughtsman in the offices of Henry Hobson Richardson, "...the genius who brought order to American
architecture after the Civil War" (6) and McKim, Mead, and White, "...the most influential firm in the history of American architecture." (7) A loan from McKim sent him to Paris for two years of study at the Ecole des Beaux Arts. (8)

The forces which led to Howard's tenure as University Architect begin with the founding of the University. From the beginning the founding fathers of the University were concerned with the physical appearance and location of the campus. This history began in 1860 when a small private college called the College of California purchased 160 acres of land in 1860 in order to have the "benefits of a country location". In 1864 Frederick Law Olmsted, best known as the principal designer of Central Park in New York City (1857), was commissioned by the Trustees of the College of California to develop a plan for a new campus in what is now Berkeley, and to design a residential neighborhood east of the College properties. Olmsted's "asymmetrical, informal and picturesque design of the campus and community...on axis with the Golden Gate...reflected a nationwide park movement. In 1866 Frederick Billings, standing at Founder's Rock, named the new community Berkeley for George Berkeley, Bishop of Cloyne who is quoted as saying "westward the course of the empire takes its way". (9)

By 1868 the college joined forces with the agricultural college proposed by the State Legislature and the University of California was formed. The newly chartered University engaged architects David Farquharson and Henry Kenitzer to develop a new plan. When the campus opened in 1873, only two buildings had been built. South Hall, one of the two, is still standing. In the 1890's student enrollments greatly increased and the need for new facilities was pressing. There was also a growing feeling that the campus buildings were also visually inadequate.

In 1895 architect Bernard Maybeck suggested to the Regents that there be an international competition for a comprehensive master plan for the campus. Because Phoebe Apperson Hearst, widow of Senator George Hearst and mother of William Randolph Hearst (Hearst Castle, San Simeon) wished to donate two buildings to the campus, one as a memorial to her late husband, she offered to finance the international competition.

The type of comprehensive plan envisioned by Maybeck and the Regents was based on the axial, formal, classicizing architecture demonstrated at the Chicago World's Fair of 1893 which was in-turn based on the large-scale ensemble planning originating in the Ecole des Beaux-Arts in Paris. The winning plan was by a Frenchman, Emile Bernard. John Galen Howard was chosen as one of eleven finalists in the Competition and ultimately placed fourth. However, Mrs. Hearst personally asked Howard to design the Hearst Memorial Mining Building. (10)

When Emile Bénard refused to leave Paris for Berkeley to supervise his own prize-winning plan, the Regents, in 1901, asked Howard to oversee the Bénard Plan. Among the buildings Howard designed in the Classic Beaux Arts tradition during his tenure as Supervising Architect Howard are: Hearst Memorial Greek Theater (1903), California Hall (1905) Hearst Mining Building (1901-07), The Campanile (Sather Tower) (1914), Doe Memorial Library (1911,1917), Durant
Hall (1911), Wheeler Hall (1917), Havaland Hall (1924), all are listed on the National Register of Historic Places. Howard was enchanted with Berkeley and called it "the greatest site for a university in the world." In the 23 years of his tenure as Supervising Architect, with the help of President Benjamin Ide Wheeler and Mrs. Hearst, he was able to give the campus the stamp of monumental classical order and grandeur which was the hallmark of the training. (11)

Despite Howard's grand Beaux Arts buildings on the University Campus, he also had a keen appreciation for nature and took pains with his University plans to preserve the natural glades of the site, meandering Strawberry Creek, and the eucalyptus grove. In addition to his Beaux Arts campus buildings, Howard also designed seven buildings in the First San Francisco Bay Tradition which were sheathed in unpainted brown shingles: Northgate Hall (1906) Naval Architecture Building (1914) The Women's Faculty Club (1923) additions to the Men's Faculty Club, Dwinelle Annex (1915), The Drawing Building (demolished) and Decorative Arts Building (demolished). Though Howard's private architectural office was in San Francisco, he lived in two self-designed craftsmen houses in the North Berkeley hills and drew many of his clients from Berkeley's intellectual community. (12)

Howard was appointed Professor of Architecture in 1903 and established the first school of architecture west of the Mississippi, which under his strong guidance, trained another generation of progressive regional architects. In the homelike, shingle building called "The Ark" (Northgate Hall), which he designed for the school, he was nicknamed "Noah". As a professor, his students included the second generation of San Francisco Bay Area architects many of whom became prominent designers. Howard also had a large private architectural practice and gave employment to many of his students during the summers and after they graduated. Julia Morgan, one of the Nation's most celebrated woman architects (William Randolph Hearst's Castle at San Simeon) and the first woman to graduate from the Ecole des Beaux Arts in Paris worked in Howard's office until she set up her own office in 1905 (10) Among the other notable architects who studied under Howard and found their first positions in Howard's office were: John Hudson Thomas, Walter Ratcliff, Henry H. Gutterson, Walter Raymond Yelland, (all of whom have buildings listed on the National Register of Historic Places) as well as William W. Wurster, Ernest A. Born, Theodore C. Bernardi, Vernon A. DeMars and John Funk (13). Besides his work at the University, Howard also designed four downtown Berkeley buildings, all of which have been demolished, including the Carnegie Library. Howard's contribution to the architecture of the San Francisco Bay Region and the west has not yet been fully researched and documented and can only be hinted at by the list of important architects who studied with him.

In 1924, due to increasing difficulties with the Regents, Howard's position as Supervising Architect was terminated. Three years later he resigned as Professor of Architecture. Howard died in 1931.
Historical context: The First Bay Tradition

Cloyne Court is architecturally significant as an important example of the First San Francisco Bay Tradition, a building type which was the architectural expression of an attitude that buildings should complement and enhance their natural surroundings. The First San Francisco Bay Tradition assimilated and integrated a wide assortment of styles including the American Arts and Crafts Movement, the American Shingle Style, the teachings of the Ecole des Beaux Arts in Paris. Cloyne Court is one of the few surviving large shingled residential buildings in the Bay Area, and is the largest in Berkeley, and it is among the rare examples of a multi-residential building in the Shingle Style in the country. (14)

The American Shingle Style had been popular on the East Coast mostly for summer homes and resort hotels beginning in the 1880's (15) In the Bay Area, and particularly in Berkeley, the Shingle Style was urbanized and integrated with the philosophy of the American Arts and Crafts Movement and the teachings of the Ecole des Beaux Arts in Paris. Very few cities can be identified with an architectural idiom; Berkeley became known for its rustic woodsy houses and identified with them. When shingled buildings were built in other California towns at the turn-of-the-century they were called "Berkeley Brown Shingles" (16)

The essence of what Berkeley stands for in the history of American residential architecture was developed and fully expressed in this small neighborhood just North of the Berkeley Campus between 1892 and 1923. The presence of the University was a key element in this process, for it drew intellectuals, artists, writers and businessmen to Berkeley, who found the tenets of the Hillside Club compatible with their own dreams.

In 1949 Elizabeth Kendall Thomson, Senior Editor, Architectural Record, wrote: "from about 1895 to around 1920....the hills of Berkeley under the sure hands of such men as....Joseph Worcester, Louis Christian Mullgardt, Willis Polk, Bernard Maybeck, John Galen Howard, Julia Morgan, Bruce Porter....became a picturesque area covered with wood houses, shingled for the most part, with low pitched gable roofs fitting into the landscape with a completely indigenous air. Their structure is deceptive in its simplicity, for it incorporates a variety of inventive detail well adapted to the native material. The wood of these buildings was left to weather naturally, and in the buildings still remaining (many were destroyed by the fire of 1923) the shingles have acquired a golden brown beauty." (17)

As early as 1904 the unique quality of this neighborhood was recognized and aptly described by the San Francisco Chronicle: "Ramble if you will on the Berkeley slopes north of the University of California campus to have your faith in human kind renewed. Wander up Ridge Road until you come to the shingle and clinker brick houses set in the midst of gardens, a lesson in peaceful, harmonious, artistic and natural living, an architectural picture rarely attained" and where "90% of the houses are built in brown shingle".
Daley's Scenic Park and the Hillside Club

Such an "architectural picture" was not achieved accidentally or by chance, but was created by the efforts of a group of Northside neighbors whose ranks included the architects Bernard Maybeck, Almeric Coxhead and John Galen Howard, developer Frank M. Wilson, as well as poet, naturalist and diligent proponent of the American Arts and Crafts Movement, Charles Keeler.

The neighborhood where Maybeck, Keeler and their friends first built these "wooden houses" is the area immediately North of the University Campus, bounded by Hearst Avenue, Cedar Street, Arch Street and Highland Place (some 28 city blocks) known historically as "Daley's Scenic Park", but now known as "Northside". (Figure 4)

Daley's Scenic Park was the first residential subdivision in the North Berkeley Hills. The 1879 edition of Thompson and West's Alameda Atlas shows that the tract was, at that time, owned by Theodore LeRoy. In 1889 the tract was owned by Thomas Daley who subdivided it, but by 1891 the entire tract and its eastern neighboring tract were purchased by Frank M. Wilson, who had come to California from Chicago apparently already a man of wealth. He immediately began to sell lots for houses saving a large and prominent site for his home at the top of Scenic Avenue, now the site of the Graduate Theological Union's library building.

The tract was originally laid out in the standard grid pattern and the earliest houses in this tract were built in the currently popular late Victorian style featuring tall vertical sash windows, some decorated scroll work, asymmetrical massing, a turret or gabled bay and painted horizontal wood siding. Of the Victorian styled houses which still stand only 2531 Ridge Road (c1890), 1730 LaVereda (1880's) and 1631 LaVereda (1895) retain an obvious Victorian design. 1675 LaLoma (1891), 1732 LaVereda (1880's) and 2727 Hearst (1880's) have been covered with shingles.

Frank Wilson's house was one of the first to reflect the dramatic and influential new thought in residential design that was to pervade the North Berkeley Hills. The Wilson house was completed in 1894. Designed by Frederick Estey, who is known to have designed in the Victorian style, it was harmoniously sited on the hillside, simple in outline, with a single gabled roof, and sheathed with unpainted singles. Surviving the fire it was demolished in 1976. "Building with nature" or the shingle style was more fully expressed in the Beta Theta Pi house at Hearst and LeRoy completed in 1893 and in Maybeck's design for Charles Keeler at Highland Place in 1895.

The area, however, remained sparsely populated until after 1900. The 1906 Earthquake and San Francisco fire contributed to Berkeley's rapid population growth so that between 1900 and 1910 the population increased by 29,000, from 13,000 in 1900 to 42,000 in 1910 according to the 1914 map of Berkeley published by Lederer, Street & Zeus Co. The type of house that was built by this influx of new Berkeley residents was predominantly in the rustic style most
commonly covered with unpainted wood shingles. "In the area immediately North of the Campus this rustic style had taken root and flowered", noted Grey Brechin, architectural historian, in 1976, and it was the direct result of a "deliberate campaign" by members of the Hillside Club "to preserve the landscape by retaining the existing trees and using natural materials in home building".

The Hillside Club was founded in 1898 by the wives of men such as Charles Keeler, Bernard Maybeck and John Galen Howard to "encourage artistic homes built of materials complementing the natural beauty of the Berkeley Hills". It was the women's version of a club that Charles Keeler had founded in 1896 called the "Ruskin Club" where members discussed art, life and the simple home. By 1902 the men were invited to join the Hillside Club. (18)

In 1904 the Club published Keeler's The Simple Home (recently republished by Peregrine/Smith Press) which details the philosophy and design concepts which are reflected in the residential work of these architects as well as AC Schweinfurth, Julia Morgan and William Knowles, Lillian Bridgeman, George Plowman and John Hudson Thomas. Members of the Hillside Club, subscribing to these ideals, advocated the "relationship between nature and simplicity, truth and beauty": design should be "free of superficial ornament, architecture should be rational, simple, expressive, never ambitious or pretentious, well adapted to their sites, color should not be glaring: essentially, the whole should appear to have grown out of the hillside and to be a part of it". Through the efforts of the Hillside Club, who hoped to influence the creation of a new kind of city which was in harmony with the beauty of the land, "the North side of the Berkeley Campus became the prime example of enlightened environmental planning," said Grey Brechin "where city and country blended harmoniously." In Berkeley, more than in any other city, the ideals of the Arts and Crafts movement were widely adopted.

Reverend Joseph Worcester, a Swedenborgian minister, is often credited as being the source of initial inspiration for Maybeck and Keeler. Reverend Worcester had built himself a shingled country house in Piedmont in 1876 and, in a memoir retold by Dimitri Shipponoff in his introduction to Charles Keeler's The Simple Home visited this house with Bernard Maybeck, and remembered it as an "experience which profoundly affected his whole artistic outlook". In 1895 Bernard Maybeck's first private commission was the house for Charles Keeler which stands today at 1770 Highland Place, having miraculously survived the fire and the rash of demolitions which began in the late 1950's. It was "a house of redwood within and without, all the construction exposed, left in the natural mill-surface finish on the inside and shingled on the outside." (19)

In his treatise on early Bay Region architecture, Richard Longstreath says of Maybeck that he "has been a major source of inspiration to designers in the Bay Area from the early twentieth century to the present". The inspirational designs built by Maybeck and the ideas written by Charles Keeler were assimilated from ideas set forth
in the mid-nineteenth century by John Ruskin, William Morris, Viollet-le-Duc and Pugin as well as the early shingled work of architects McKim, Mead and White and H.H. Richardson. (20) Vincent Scully referred to the shingle style, in his book of that name, as the "gentlest forms... the most relaxed and spiritually open and...the most wholly wedded to the landscape...that the United States has produced...generous and gentle....whose purpose was humane." The simplicity of the early Bay Area buildings was initially a sophisticated and eclectic expression by a highly trained group of architects, many of whom had attended the prestigious L'ecole des Beaux Arts in Paris or the Royal Academy in London and it is the work of these architects which best describes the term First Bay Tradition.

However, The First Bay Tradition went beyond a strictly architectural expression; it also reflected a lifestyle, as described in the introduction to California Design 1910: "The original ideas expressed by Ruskin concerned a value statement not a design style. Within the attitude, styles could be as diverse as the visions which created them...it is expressive, experimental ....the use of this woodsly Craftsman style was no simple coincidence, it has an ideological, even moral significance."

In 1949 the San Francisco Museum of Art held an exhibit titled "Domestic Architecture of the San Francisco Bay Region". The exhibit traced the relationship between the design philosophy, which had flowered at the turn of the century, and the work of contemporary architects, such as William Wurster and Joseph Esherick. By 1949 the work of many Bay Area architects was being published in the major architectural magazines and had achieved national, even international attention. The work of the post-war architects expressed a similar design philosophy that had been expressed by Bernard Maybeck, Ernest Coehead and John Galen Howard. This exhibit was the beginning of a renewed interest in the work of the early Bay Area architects. The words of William Wurster are testimony to this quality of life:

"The year was 1913 and the impressions were those of a seventeen-year-old freshman coming from the great valley of California...to begin the study of architecture...the moving experience of the first evening was to be repeated....it was a big room with four-foot-wide boards in panel form on the walls and ceiling. The redwood was left unfinished as it came from the trees....it took great skill to bring about this room. It meant giving up the idea of windows as holes in the wall....it meant steering free of the ruffles of existence. The gain was rewarding, for I know that many were inspired by this sort of thing, and you find it in much of the work of Schweinfurth, Coehead, the Greenes, Polk, Howard and Maybeck. The magic of the room I described...was a way of living and the house a frame for such a life....The Berkeley fire of 1923...swept away much of the very thing I have described."  William Wurster, 1949"
Lewis Mumford, well known architectural historian and critic, wrote in the exhibit catalogue: "This exhibition repairs a serious omission in the existing histories of American architecture: it establishes the existence of a vigorous tradition of modern building, which took root in California some half a century ago...as we drove around Berkeley in 1941, that I first was able to trace, from the inside, the origins and continuities of this vital modern tradition. Here the architects have absorbed the universal lessons of science and the machine and have reconciled them with human wants and human desires....with all those regional qualities whose importance Frederick Law Olmsted wisely stressed two generations ago..." Lewis Mumford, 1949

The 1923 Berkeley Fire

By 1920 almost every lot in this neighborhood had been built upon in this distinctive architectural idiom. Even the neighborhood school had been built of unpainted redwood and clad in brown shingles at the insistence of the Hillside Club. The Hillside Club, which had been designed by Maybeck in 1906, was the Club's preeminent example of their building with nature philosophy. John Galen Howard's two academic buildings adjacent to this residential neighborhood, North Gate Hall, which housed the first school of architecture west of the Rockies, and his Naval Architecture Building, just up the hill, are still standing on Hearst Avenue, and are covered in brown shingles, complementing and enhancing the Northside neighborhood, as well as Cloyne Court.

Disaster struck on the hot, dry, windy afternoon of September 17, 1923 when a raging fire swept out of the North Berkeley Hills totally destroying an estimated 500 buildings. The Berkeley Fire is a disaster which has faded from memory although it was second only to the 1906 Earthquake and Fire in terms of property lost, people displaced and a cultural and architectural heritage badly fragmented. (21)

Although the devastating Berkeley Fire wiped out much of what had been achieved, a small section of the Northside neighborhood, which was most of the Northeast section of Daley's Scenic Park, survived the fire. Among these buildings several are of local, State or National significance; many are City, as well as, National Registered Landmarks.

North Gate Hall, 1904, John Galen Howard, The Drawing Building, 1913, John Galen Howard, and 2717 Hearst Avenue, 1914, John Reid, Jr. are listed on the National Register of Historic Places. Cloyne Court, 2600 Ridge Road, 1905, John Galen Howard; "Allanoke" 2601 Hearst and 1777 Le Roy, 1904, Ernest and Almeric Coxhead, 1772 Le Roy Avenue; Oscar Mauer Studio, 1906, Bernard Maybeck, and 2607 Hearst Avenue, Beta Theta Pi, 1893, Ernest Coxhead are City of Berkeley Landmarks. 1775 Le Roy, The Volney Moody House, Albert Schwienfurth, 1896, is a City of Berkeley Structure of Merit. Additionally, within the three block area 1736 and 1750 Highland Place, Charles
Keeler House and Studio, 1895-1902, Bernard Maybeck and 1865 Euclid Avenue, The Euclid Apartments, 1912, John Galen Howard are considered eligible for the National Register of Historic Places.

Today within the boundaries of the Daley's Scenic Park Tract there are approximately fifty buildings remaining which survived the fire and redevelopment (twenty buildings have been demolished which survived the fire.) Cloyne Court is among the fourteen or fifteen structures out of the fifty remaining in the neighborhood that are excellent examples of the First Bay Tradition (listed above) and it is the largest and the most classical. The quality of this neighborhood before the 1923 Fire is evidenced by the quality of the buildings which remain.

The cultural significance of this neighborhood, its life style and values, its art, music, poetry and architecture reflected the spirit of Berkeley as the "Athens of the West" being both a magnet for like minded souls and hearth for nurturing the spirit. It was rooted in an anti-materialism which shunned the ostentatious and sought refuge in nature. It was the values that saved Yosemite Park and created the Sierra Club.

Cloyne Court is a significant and important building which is part of this cultural heritage.

History of Cloyne Court and its Historic Associations

The men and woman who were associated with the building of the Cloyne Court Hotel and the distinguished people who visited there are testimony to the high quality of the building's design and the services that the hotel once provided. It is also testimony to the relationship of the emerging University and the neighborhoods which surrounded it, where the town was of equal importance to the gown.

Cloyne Court was built in 1904 for $80,000, a large amount at the time, by the University Land and Improvement Company, which included several University professors, University benefactresses Phoebe Apperson Hearst (Hearst Memorial Mining Building, Greek Theater, Hearst Gym) and Jane K. Sather (The Campanile, Sather Tower), future Regent James K. Moffit, (for whom a library is named) Dr. Louis Lissner, John L. Howard, Warren Olney, Dr. Kasper Pishel and Louis Titus, John Galen Howard, the architect of the building and James M. Pierce, the later owner of the hotel (22) James M. Pierce and his family managed the hotel from its opening in 1904 until 1914 when the Pierces purchased it from the investors. The Pierces continued operating Cloyne Court as a hotel until it was sold in 1946 to the University Student Cooperative Housing Association. In the 1960's the Regents of the University of California purchased Cloyne Court and leased it back to the Co-op until the year 2005.

Cloyne Court was described in an early brochure as a hotel/apartment house designed "particularly for members of the faculty of the University and their families, graduate students, and people who wish to live in Berkeley and also wish to avoid the annoyance and cost of housekeeping there. To these Cloyne Court offers the
combined advantages of housekeeping and boarding. It will give the comfort and privacy of a home with the freedom from care. The tenants will not have to wrestle with the servant problem, nor will they be thrown into constant close association with each other as in the usual hotel or boarding house. We believe Cloyne Court will offer to people of moderate means the much desired opportunity to live comfortably in Berkeley and enjoy the society and all the advantages which the location the University affords. " Cloyne Court it had its own chef. Recitals and lectures were given in a large music room. (This is described in detail in the appendix)

The January 1992 Physics Today reprinted Viennese Physicist Ludwig Boltzmann's 1905 diary describing his trip to Berkeley, California to lecture at the University. Boltzmann resided in Cloyne Court during the summer of 1905. "Tuesday, 4 July, was 'Independence Day' the greatest American holiday...I watched the magnificent fireworks displays from the roof of Cloyne Court, whose hillside location affords a panoramic view of San Francisco Bay, the Golden Gate and Mount Tamalpais. The old English bishop can hardly have looked out onto anything more beautiful." He goes on to note that "My trip to America was of course paid by her (Mrs. Phoebe Apperson Hearst) with her money" (The relationship between Phoebe Apperson Hearst and the University went further than the mere building of buildings !)

Cloyne Court remains an integral part of the early history of the University and the City of Berkeley, whose period of growth are parallel, and during the first quarter of the 20th century, were complimentary. Cloyne Court stands in a neighborhood where the "Town and the Gown graciously blended in a harmonious relationship where a residential neighborhood and the University blended congenially with verdant creek beds and lush gardens."
Footnotes for section 88: Cloyne Court Historic Significance


Footnote: Mallester, Virginia and Lee, Guide to American Houses, Alfred A. Knopf, 1984 page 290 "Most Shingle houses...reached its (sic) highest expression in seaside resorts in the northeastern states...it never gained wide popularity...and thus Single houses are relatively uncommon except in coastal New England" This quote is incorrect and was made through ignorance because the Mallesters are most familiar with the east coast, where they were educated and Texas, where they reside.

3. Domestic Architecture of the San Francisco Bay Region San Francisco Museum of Art, 1949
4. Partridge, page 6
5. Ibid. page 4
7. Ibid. page 80
8. Partridge, page 6
9. Ibid. page 1
10. Ibid. page 3
11. Ibid. page 3
13. Partridge, page 20
14. This statement is based on information contained in The Single Style and the Stick Style Vincent Scully, Princeton University Press, 1955 & 1971
15. Ibid
17. San Francisco Museum, Exhibition Catalogue, 1949
18. Hillside Club Papers, Bancroft Library, University of California, Berkeley
21. Cerny page 16
22. Cloyne Court Collection, ms. no. 75/35 c Bancroft Library, University of California
23. Cloyne Court Brochure, date and author unknown, archives of the Berkeley Historical Society, Louis Stein Collection
overriding philosophy the Pierces abided by in the management of the hotel resolved "to give everyone what they want, set an attractive table and keep charges within reason." Mrs. James Pierce was the popular lyric and operatic soprano, Margaret Cameron, who had come west with her parents as a child, in the early 1850's, later to sing regularly as the soloist in Grace Cathedral, on Nob Hill for ten years. She was appreciated in Berkeley for recital performances, which were given in the "Music Room" at Cloyne Court. (The music room was not part of the original design as implemented by John Galen Howard. Located on the first floor of the hotel, directly across from the front door, main entrance, this annex of sorts was constructed in 1911, before the Pierces had procured ownership of the hotel outright, and construction and design by builder George Patton was paid for by James Pierce himself. It was large and open enough to accommodate a small to regular group of music patrons for an afternoon recital.) James M. Pierce himself
remained in the management of the hotel with the
helpful assistance of his daughters, Mary, Lucy and
Virginia, until his own death in 1929. Mr. Elliott
Pierce took over operation of the hotel, upon the
death of his father, but remained in that position
himself only seven more years, due to his own untimely
death. Between the years of 1936 and 1946, the hotel
was under the management of Miss Mary Pierce, one of
the sisters of Elliott Pierce, with whom it remained
until the sale of the hotel in 1946. Since 1946
Cloyne Court has been in use as a dormitory residence
for students, within the University Students Cooperative
housing system, but has incurred little physical or
virtual transformation of any of the structural elements
of the building beyond regular misuse, and the change
of purpose of community rooms which were formerly
more conventionally designated for the business purposes
of the hotel. After purchasing the hotel the Students
Cooperative Assn. retained the name "Cloyne Court",
while dropping the designation hotel, so that the building
may retain the rich historical association which its
heritage might indicate.
and impressive public figures, not to mention the more permanent guests who made Cloyne Court their home for quite a number of years. Noted or famous guests at Cloyne Court include: Susan B. Anthony (1905), Charles E. Bancroft (1939), Wolfgang Pauli, Nobel Prize winning physicist (1941), Dr. Ludwig Boltzmann, noted physicist from the University of Vienna (1905), Count Carlo Sforza Italian Minister of Foreign Affairs (1943), British Ambassador to the U.S., Lord James and Lady Bryce (1909), England's Consul General, Sir Walter R. Hearn, and France's Consul General Henri Meroe (1940). The attraction and important academic resource which the University of California represented, virtually assured the Cloyne Court Hotel, during its years of operation a constant flow of regular visitors.

The management of the Cloyne Court Hotel was handled by the James Pierce family, from 1914 until 1946, when the hotel was sold to the University Students' Cooperative Assn. Mrs. Pierce passed away in 1921; her death was indeed a sad blow to the regular "Cloyne-Courters" who thought of her almost as though she were a part of their family. Mr. Pierce, who was then almost 90 years old.
was a successful businessman, having owned at some time previously a profitable storage warehouse, as well as, apparently, having ventured a certain extent into building construction. James Pierce was responsible for the construction of the Treehaven apartment building (1907) which is located across the road, and down a bit, less than a block away on Ridge road, in the direction of Euclid Ave., from the location of Cloyne Court itself. 20

The services and hospitality at Cloyne Court were always highly complimented by the many visitors who had the pleasure of staying at the hotel. Registered compliments in the hotel guest book included:

"Cloyne Court, -- Silence and peace in an insane world."
Ernest Bloch 1944

"Cloyne Court, a haven and aplace where the gentle art of hospitality is made manifest to the unknown stranger as well as to the great ones of our day."
Mary Lambert 1942

"Giving people a happy home is a divine service"
Benjamin Ide Wheeler 1923

as well as this comment, offered by an unknown visitor:

"I came a stranger, stayed a guest and departed a friend."

Patrons of the Cloyne Court hotel form an impressive list of professors on lecture tour, famous composers, diplomats,
Footnotes -- Historic Significance -- Cont.

10. The Bancroft Library
John Galen Howard Collection
ms. no. 67/35 c

11. The Howards: First Family of Bay Area Modernism
by Stacey Moss
1988 Oakland Museum

12. The Campus Historic Resources Survey
Dean Richard Bender Director

13. The Bancroft Library
U C Berkeley
John Galen Howard Collection
ms. no. 67/35 c
ctn. -5


15. The Bancroft Library
John Galen Howard Collection
ms. no. 67/35 c, 1967.16 PIC

16. John Galen Howard Collection
ms. no. 67/35c, Vol.

17. The Bancroft Library
Manuscripts Division
Cloyne Court Collection
ms. no. 75/35 c

18. The Early History of Cloyne Court
by Tim Banuelos and Linda Robinson
Berkeley Architectural Heritage Assn.
Historical Block Files

19. The Bancroft Library
Cloyne Court Collection
ms. no. 75/35 c

20. Ibid

See continuation sheet

10. Geographical Data

Acreage of property: 39.737.5 Sq. Ft. -- 0.912 Acres

UTM References

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See continuation sheet

Verbal Boundary Description

All of lots 5,6,7,8,10,12 and the northerly 15.35 feet, more or less, of lot 4, in block 20, Map of Dailey's Scenic Park, having a frontage of 275 feet on Ridge Road and 144.5 feet on LeRoy.

See continuation sheet

Boundary Justification

The boundaries are the same as when the building was constructed.

See continuation sheet

11. Form Prepared By

name/title: Charles Bucher, Jr. with revisions and editing by Susan Cerny and Lesley Emmington
organization: Berkeley Architectural Heritage Association
street & number: 2218 Durant Avenue
city or town: Berkeley

* U.S.GPO 1986-0 223-916
National Register of Historic Places
Continuation Sheet

Section number 9 Page 2

BIBLIOGRAPHY FOR CLOYNE COURT


Bender, Richard, Director, Campus Historic Resources Inventory, Berkeley, University of California Planning Office, 1978


Bohn, David, East of these Golden Shores. Oakland, Scrimshaw Press, Oakland Junior League, 1971


Jones, William Carey, Illustrated History of the University of California, 1895, Berkeley, University of California


Domestic Architecture of the San Francisco Bay Region. San Francisco S F Museum of Art, 1949, S F Museum of Art


Woodbridge, Sally, Editor, *Bay Area Houses*, New York, Oxford University Press, 1976


Prospectus drawing of Cloyne Court, designed by John Galen Howard, 1904, from "Cloyne Court: A High Class Modern Apartment House in Berkeley, California." Courtesy The Bancroft Library.

Cloyne Court Hotel
2600 Ridge Rd.
Berkeley, CA
Alameda County
Figure 2. Cloyne Court (2600 Ridge Road), featured in the center of this rare panoramic photograph dating from about 1905 shortly after Cloyne Court was completed by the University Land and Improvement Company whose members included benefactresses Phoebe Apperson Hearst and Jane Sather and future regent James Moffitt, as well as, University Architect John Galen Howard, the architect of this building. Built as a "well appointed" apartment house and hotel for associates of the University, Cloyne Court offered a regular program of cultural events. Behind Cloyne Court, tucked amongst the trees, is a picturesque cluster of shingled houses designed by Bernard Maybeck. Coxhead's 1893 Beta Theta Pi House (2607 Hearst Avenue), is on the right and his Allen Freeman house (1777 LeRoy) is on the left.

Figure 4. Although Cloyne Court is a large building, four stories plus attic, it fits the tenets of the Hillside Club by being entirely clad in unpainted brown shingles, set sufficiently back from the streets to allow for large trees and shrubs and its wide "U" shape provides for a generous south facing garden courtyard giving testimony to the attention paid to gardens and the quiet enjoyment of nature which was an important part of "building with nature".
FIGURE # 3

Site of Newman Hall
19 (Demolished)
UC Parking Lot

Site of College Hall, 1909
(Demolished)
UC Garage

UC Development Site
residential buildings here survived the
fire of 1923, but have been demolished
City zoning map of Daley's Scenic Park, overlaid in bold outlines indicating the edges of the 1923 Berkeley Fire. The buildings which survived the fire are highlighted in black, while the areas where buildings survived the fire but have since been demolished are indicated by an "X". The fine lines show the path of the fire and extent of destruction in this tract. The Fire burned a wider area than is indicated here.
CALIFORNIA REAL ESTATE ASSOCIATION STANDARD FORM

DEPOSIT RECEIPT

Oakland, California, June 29th, 1948

Received from The University of California Students Cooperative Association
the sum of Five Thousand and No/100 ($5000.00) Dollars

as a deposit on account of the purchase price of the following described property, situated in the City of Berkeley County of Alameda State of California, to-wit: All of lots 5, 6, 7, 8, 10, 12 and the northerly 15.35 feet, more or less, of lot 4, in block 20, Map of Bailey's Scenic Park, having a frontage of 275 feet on Ridge Road and 144-1/2 feet on LeRoy Street, together with the improvements now thereon and all furniture, fixtures and equipment used in the operation of the property and belonging to the James M. Pierce Estate Co., but excepting all of that personal property owned by the Misses Pierce, who now live in and operate the property, and excepting also all personal property belonging to tenants

for the purchase price of One Hundred Twenty-five Thousand and No/100 ($125,000.00) Dollars.

The balance of the purchase price is to be paid within Forty-five (45) days from date hereof, as follows, to-wit:

$35,000.00, including the $5000.00 above received for, in cash, at the time of transfer of title, and the remainder of $90,000.00 by the buyers giving and the owners accepting a note in the sum of $90,000.00 due July 1, 1951, payable $2000.00 per month, which shall include principal and interest at the rate of five per cent per annum, on the first of each month following date of transfer, with the proviso that

This bid is made with the proviso that the sellers in accepting the bid agree that the rate of interest to be paid on the note shall be reduced after July 1, 1951, or any July 1st thereafter, to four per cent, provided the makers of the note can obtain a bonafide offer to refinance the note at that rate of interest at that time.

Agreement of Sale and the rents, insurance, if policies be satisfactory to purchaser, and other expenses of said property shall be prorated as of the date of delivery of said Deed or Agreement of Sale, unless otherwise set forth herein.

That the deposit and all other payments called for herein, if made with other than lawful money of the United States of America, may be converted into cash immediately, unless otherwise provided for herein, and held subject to the terms of this Deposit Receipt.

That the essence of this Agreement is time and the undersigned real estate agent may, without notice, extend the time for an additional period of thirty days should said agent deem the extension advisable. That the property is sold subject to the approval of the seller.

[Signature]
CALIFORNIA REAL ESTATE ASSOCIATION STANDARD FORM
DEPOSIT RECEIPT

Oakland, California, June 29th, 1946

Received from The University of California Students Cooperative Association
the sum of Five Thousand and No/100 ($5000.00) - Dollars

as a deposit on account of the purchase price of the following described property, situated in the
City of Berkeley, County of Alameda
State of California, to-wit: All of lots 5, 6, 7, 8, 19, 20 and the northerly 15.55 feet more or less of lot 4, in block 20, Map of Dailey's Scenic Park, having a frontage of 275 feet on Ridge Road and 144-1/3 feet on LeRoy Street, together with the improvements now thereon and all furniture, fixtures and equipment used in the operation of the property and belonging to the James M. Pierce Estate Co., but excepting all of that personal property owned by the Misses Pierce, who now live in and operate the property, and excepting also all personal property belonging to tenants

for the purchase price of One Hundred Twenty-five Thousand and No/100 - Dollars.
The balance of the purchase price is to be paid within Forty-five (45) days from date hereof,
as follows, to-wit:

Copied from originals in The Bancroft Library for reference use only. Copies may not be deposited in other libraries or institutions without express permission. Please return all copies to The Bancroft Library upon completion of your research. Permission to reproduce in full or in part must be obtained in writing from the Director, The Bancroft Library, University of California, Berkeley, California, 94720.

(1st) That should the purchaser fail to pay the balance of the purchase price, or fail to complete the purchase, as herein provided, the amounts paid hereon may, at the option of the seller, be retained as the consideration for the execution of this agreement by the seller.

(2nd) That the evidence of title shall be a Policy of Title Insurance issued by a responsible title company to be furnished and paid for by the Purchaser. That should the title to said property prove defective or unmerchantable and should the seller be unable to perfect the same within a reasonable time from date hereof all amounts paid hereon shall be returned to the purchaser unless the purchaser elects to accept the title in said condition.

(3rd) That the improvements on said premises be destroyed or materially damaged prior to delivery of Deed or Agreement of Sale to supersede this Deposit Receipt, all amounts then paid hereon shall be returned to the purchaser unless the purchaser elects to complete the purchase regardless of the then condition of the improvements.

(4th) That the taxes for the fiscal year in which this Deposit Receipt is superseded by a Deed or an Agreement of Sale and the rents, insurance, if policies be satisfactory to purchaser, and other expenses of said property shall be prorated as of the date of delivery of said Deed or Agreement of Sale, unless otherwise set forth herein.

(5th) That the deposit and all other payments called for herein, if made with other than lawful money of the United States of America, may be converted into cash immediately, unless otherwise provided for herein, and held subject to the terms of this Deposit Receipt.

(6th) That the essence of this Agreement is time and the undersigned real estate agent may, without notice, extend the time for an additional period of thirty days should said agent deem the extension advisable. That the property is sold subject to the approval of the seller.

(c) ____________________________
By ____________________________
The property, together with the improvements now thereon and all furniture, fixtures and equipment used in the operation of the property and belonging to the James M. Pierce Estate Co., but excepting all of that personal property owned by the Misses Pierce, who now live in and operate the property, and excepting also all personal property belonging to tenants for the purchase price of One Hundred Twenty-five Thousand and No/100 Dollars.

The balance of the purchase price is to be paid within Forty-five (45) days from date hereof, as follows, to wit:

(1st) That should the purchaser fail to pay the balance of the purchase price, or fail to complete the purchase, as herein provided, the amounts paid hereon may, at the option of the seller, be retained as the consideration for the execution of this agreement by the seller.

(2nd) That the evidence of title shall be (a) Policy of Title Insurance issued by a responsible title company to be furnished and paid for by the (b) Purchaser. That should the title to said property prove defective or unmerchantable and should the seller be unable to perfect the same within a reasonable time from date hereof all amounts paid hereon shall be returned to the purchaser unless the purchaser elects to accept the title in said condition.

(3rd) That should the improvements on said premises be destroyed or materially damaged prior to delivery of Deed or Agreement of Sale to supersede this Deposit Receipt, all amounts then paid hereon shall be returned to the purchaser unless the purchaser elects to complete the purchase regardless of the then condition of the improvements.

(4th) That the taxes for the fiscal year in which this Deposit Receipt is superseded by a Deed or an Agreement of Sale and the rents, insurance, if policies be satisfactory to purchaser, and other expenses of said property shall be prorated as of the date of delivery of said Deed or Agreement of Sale, unless otherwise set forth herein.

(5th) That the deposit and all other payments called for herein, if made with other than lawful money of the United States of America, may be converted into cash immediately, unless otherwise provided for herein, and held subject to the terms of this Deposit Receipt.

(6th) That the essence of this Agreement is time and the undersigned real estate agent may, without notice, extend the time for an additional period of thirty days should said agent deem the extension advisable. That the property is sold subject to the approval of the seller.

I agree to purchase the above described property on the terms and conditions herein stated. 

I agree to sell the above described property on the terms and conditions herein stated and agree to pay the above signed agent as commission the sum of _______ Dollars, or one-half of the deposit should same be forfeited by purchaser, provided said amount shall not exceed the full amount of said commission.

Note: (a) Insert or print title of title to be furnished. (b) Insert or print "purchaser" or "seller." (c) Insert or print name of agent. When the (a) or (b) or (c) insertions are printed, the letters preceding the blank lines should be omitted.

For these forms address California Real Estate Association, Los Angeles.

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CLOYNE COURT CLOSING

Cloyne Court, 2600 Ridge Rd., is closing its doors to campus intellectuals to become a college dormitory for men. For 42 years Cloyne—California's unique residential hotel, has been the permanent home of many outstanding faculty members and retired professional men and women, and the local residence of world famous savants here on their sabbatical leaves or on lecture tours.

Cloyne Court's register reads like the pages of a global "Who's Who," but now, as soon as it can be completely evacuated of its choice tenants, (who, like the proverbial "O'Brien," have no place to go—) it will become the latest unit of the University of California Students' Cooperative Association, and will house about 130 men.

Sale of the property, for $125,000, was concluded June 20th, the day that the atomic bomb at Bikini went off—and was a far greater shock to Cloyne Courtiers than was the crash of the bomb! However, the new owners are giving tenants time to find other living quarters—"a number already have left, and the association hopes soon to take full possession.

Cloyne Court has 80 living rooms, 32 suites of one to five rooms, 32 baths, 14 balconies, a large sunny dining room overlooking the south garden, a lounge and a dining room comfortably seating 90 guests. Owing to the unusual plan of separate stairways leading to each two suites, there are no long hallways on the second and third floors.

Rooms facing the street overlook a beautiful garden which is a miniature park, sheltered from the wind by the U-shaped redwood building, with fire resisting roof. The property occupies almost the Ridge Rd. block between La Roy and La Loma Ave., and extends halfway through to Hearst Ave. Cloyne Court was constructed after the plans and under the supervision of John Galen Howard of New York, supervising architect of the University. It was completed and opened Dec. 4, 1904.

The 42 years which have followed the opening of Berkeley's "Grand Hotel" have been enjoyable ones for the Pierce family. They often were faced with trying problems, Cloyne Court has had its great moment in spectacular events. The San Francisco earthquake and fire of April, 1906, brought 44 additional guests—refuges from across the Bay who found a ready welcome. Babies were comfortably bedded in bath-tubs.


The late Mr. and Mrs. James M. Pierce were asked to take over the management, and around 1914 they purchased the property from the other stockholders. Mr. Pierce had never had any previous hotel experience, but he had a theory of how a hotel should be run: "Give everybody everything they want, set an attractive table and keep charges within reason," he said.

We shall tell you something more about the late Mr. and Mrs. Pierce tomorrow. His ideas made Cloyne Court popular but not particularly profitable. Tenants rarely moved, unlike in Berkeley or their own home. Many lived there until they died.

One tenant, who has summered there for years has definitely refused to move and it is doubtful if the new owners will attempt to evict him. He is "Willie," a squirrel, always friendly—if not on speaking terms—with all the other tenants. But "Willie" has never let anyone know where he has spent his winters.

Letters TO THE EDITOR

Communications presented here do not necessarily reflect the Gazette's views, but space is provided that democracy may be served. Writers must give correct name and address, continue expression to less than this column, and must refrain from using this column as a space for vitriolic personal spleen. The Gazette reserves the right to edit articles to meet space requirements.

Editor:

Replying to the article, "Honing the Work," appearing in the Gazette's Whirl of the World on September 3rd, I should like to report that there are relatively few employers who are forbidden by union contract to recruit their workers from the pool.
Editor

Replying to the article, "Hogging the Work," appeared in the Gazette's Whirl of the World on September 3rd, I should like to report that there are relatively few employers who are forbidden by union contract to recruit their workers from the U.S.E.S. In actual practice this is what usually happens. An employer seeks workers calls the U.S.E.S. and he is referred those applicants who are best qualified to fit the job. Of course if it is a company covered by a union contract the man must become a member within a stipulated length of time.

For those who are concerned about the return of the Employment Service to the States, let them rest easily. On November 16th the Employment Service sheds its federal cloak and will once again be under State jurisdiction. Believe me, as an employee of the Employment Service for 16 years, and having worked under city, State and Federal jurisdictions, it makes not a whit of difference one way or the other.

The local office is where the work is done and if the people who work in it are honest, hard working, conscientious and know their business, and if the employers list their job offerings and if the community as a whole accepts it as a part of the community, it's a good office, no matter what the top brass.

The gentleman who said the U.S.E.S. has failed in the paramount duty of guaranteeing that no man or organization may "hog" the job of a U.S. veteran, doesn't know what he is talking about. If he did how could the U.S.E.S. have gotten jobs for 1,434,300 veterans from September 1, 1943, to June 1946? How could we in the Berkeley office have gotten jobs for 2,222 veterans for V-J Day?

Sincerely yours,

MARIORIE WALKER
Manager Berkeley Office

LETTER TO EDITOR

Dear Sir:

Berkeley is a most logical center for a discussion of Juvenile crime. We have among our important citizens those who are truly qualified for this tremendous task. Our city is noted for having the most healthful climate for children and grownups as well. We have the beginning of a great metropolis that should and will stand out as a beacon light toward a spiritual awakening. And, our chamber of commerce knows that the material development of Berkeley is not neglected. The Safety Council is a most efficient group, our police department is second to none.

Thelma Michael
Cloyne Court Hotel

2600 Ridge Road, Berkeley, CA

Daniella Thompson

Cloyne Court Hotel (John Galen Howard, 1904) shortly after completion, looking northeast from Le Roy Avenue. Also visible are Allenoke Manor (left), Beta Theta Pi chapter house (right), and a cluster of five steep-roofed Maybeck houses on Ridge Rd. and Highland Place, including Charles Keeler’s house & studio just above the eastern Cloyne wing. (photo: Louis L. Stein Jr. collection)

Tim Banuelos and Linda Robinson, architectural researchers of the Cloyne Court Hotel, record that it was a development of the University Land and Improvement Company. Investors in the company included Phoebe Apperson Hearst, Jane K. Sather, James K. Moffitt, John Galen Howard, James M. Pierce, et al. The hotel was named after the philosopher George Berkeley, Bishop of Cloyne, and was built at the substantial cost of $80,000.

John Galen Howard designed Cloyne Court with 32 suites made up of one to five rooms. An unusual design feature for that time were the separate stairways leading to each two suites, with no long
hallways on the second and third floors. The building also boasted a unique fireproof system, whereby different sections of the house were separated by brick firewalls and automatic sliding fire-proof doors.

The building looked out onto a protected courtyard, which was described in 1946 as having “Lambay poplars, Italian cypress, weeping willows, apple trees, flowering peach, two avocado trees, silver birch, palms, Scotch heather, the velvety green lawn and neatly arranged plots of gorgeous and fragrant flowers.” Fourteen balconies overlooked this courtyard and San Francisco Bay (although the Bay view today is obstructed by Etcheverry and Soda Halls).

The hotel was completed in December 1904 and used for housing university faculty, visiting professors, and people waiting for their Northside homes to be completed. James and Margaret (Maggie) Pierce ran the hotel on these principles: “to give everyone what they want, set an attractive table and keep charges within reason.” In 1914, the Pierces purchased the hotel from the other investors.
The Pierce family ran the hotel for 42 years. In 1946, Cloyne Court was sold to the University Students Cooperative Association (USCA) for $125,000. By 1970 USCA was strapped for cash, having purchased several former sororities and built new co-ops. It sold Cloyne Court to the Regents of the University of California and has been leasing it back ever since. In the fall of 1972, the formerly all-male facility went co-ed with the arrival of 62 new female residents. Over the years, changes have been made to the room layout, the most
significant occurring in 1976, when the suites were cut up and hallways added in the upper floors. Today, Cloyne Court houses 151 students and is affectionately known in the neighborhood as “Animal House.”

Ridge Road façade (photo: Daniella Thompson, 2004)  Le Roy Avenue façade (photo: Daniella Thompson, 2004)

Courtyard, looking northeast (photo: Daniella Thompson, March 2005)
In *A Cheap Place to Live: A Biography of the University Students Co-operative Association, 1932–1971*, Guy H. Lillian III reveals that during the 1950s and ’60s, an ongoing feud raged between the Cloyne Court co-op and the Berkeley chapter of Beta Theta Pi, located next door to the south and later across Ridge Road in what is now the Jesuit School of Theology’s Chardin Hall. The feud did not abate until the end of the ’60s, when the Beta Theta Pi chapter moved across campus to the Southside.

This and other fascinating stories are told in Calton Bolick’s [Cloyne Court Unofficial Website](http://www.berkeleyheritage.com/berkeley_landmarks/cloyne_court.html). Cloyne Court was designated a City of Berkeley in

Front entrance (photo: Daniella Thompson, 2004)

East tower (photo: Daniella Thompson, 2005)

Cloyne Court from the air (1994). At bottom right is the Goldman School of Public Policy (formerly Beta Theta Pi chapter house), before the new addition was built on its parking lot. Allenoke Manor

http://www.berkeleyheritage.com/berkeley_landmarks/cloyne_court.html
is at the bottom left-hand corner. The large white square at center left is the Jesuit School of Theology's Chardin Hall, home of the Beta Theta Pi chapter during the 1960s. At the top right-hand corner with tennis courts on the roof is the upper Hearst parking structure, former site of College Hall. The parking lot to its left is the former home of Newman Hall. The two structures at top left are 19th century residences. Click the photo for an aerial view of Daley’s Scenic Park.
Foreword

LOYNE COURT HOTEL is attractively situated at the foot of the Berkeley Hills, one block north of the University of California, and within three minutes' comfortable walking distance of the University Library, Wheeler Hall, the Greek Theatre and various class rooms.

By street car and both the Southern Pacific and Key Route ferry system it is forty minutes to San Francisco. One may drive by auto and Golden Gate Ferry to San Francisco in the same time.

LOYNE COURT is built around three sides of a central court opening to the south. The suites are from two to five rooms and on the second and third floors, look out on to this Garden Court.

There are fifteen individual garages connected with the hotel, and a public garage within one and a half blocks.

The Hotel is operated only on the American plan. The Dining Room is not open to the general public, and the atmosphere of the place is quiet and home-like.

Rates will be found on the last page of this folder, and where not quoted, will be cheerfully supplied on application.

E. H. PIERCE, Manager.
The rates, which include table and hotel service, are as follows:

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Monthly rates and rates on four and five room suites quoted on application.
Inappropriate cleaning and coating treatments are a major cause of damage to historic masonry buildings. While either or both treatments may be appropriate in some cases, they can be very destructive to historic masonry if they are not selected carefully. Historic masonry, as considered here, includes stone, brick, architectural terra cotta, cast stone, concrete and concrete block. It is frequently cleaned because cleaning is equated with improvement. Cleaning may sometimes be followed by the application of a water-repellent coating. However, unless these procedures are carried out under the guidance and supervision of an architectural conservator, they may result in irrevocable damage to the historic resource.

The purpose of this Brief is to provide information on the variety of cleaning methods and materials that are available for use on the exterior of historic masonry buildings, and to provide guidance in selecting the most appropriate method or combination of methods. The difference between water-repellent coatings and waterproof coatings is explained, and the purpose of each, the suitability of their application to historic masonry buildings, and the possible consequences of their inappropriate use are discussed.

The Brief is intended to help develop sensitivity to the qualities of historic masonry that makes it so special, and to assist historic building owners and property managers in working cooperatively with architects, architectural conservators, and contractors. Although specifically intended for historic buildings, the information is applicable...
to all masonry buildings. This publication updates and expands *Preservation Briefs 1: The Cleaning and Waterproof Coating of Masonry Buildings*. The Brief is not meant to be a cleaning manual or a guide for preparing specifications. Rather, it provides general information to raise awareness of the many factors involved in selecting cleaning and water-repellent treatments for historic masonry buildings.

## Preparing for a Cleaning Project

**Reasons for cleaning.** First, it is important to determine whether it is appropriate to clean the masonry. The objective of cleaning a historic masonry building must be considered carefully before arriving at a decision to clean. There are several major reasons for cleaning a historic masonry building: **improve the appearance of the building** by removing unattractive dirt or soiling materials, or non-historic paint from the masonry; **retard deterioration** by removing soiling materials that may be damaging the masonry; or **provide a clean surface** to accurately match repointing mortars or patching compounds, or to conduct a condition survey of the masonry.

**Identify what is to be removed.** The general nature and source of dirt or soiling material on a building must be identified to remove it in the gentlest means possible—that is, in the most effective, yet least harmful, manner. Soot and smoke, for example, require a different cleaning agent to remove than oil stains or metallic stains. Other common cleaning problems include biological growth such as mold or mildew, and organic matter such as the tendrils left on masonry after removal of ivy.

**Consider the historic appearance of the building.** If the proposed cleaning is to remove paint, it is important in each case to learn whether or not unpainted masonry is historically appropriate. And, it is necessary to consider why the building was painted. Was it to cover bad repointing or unmatched repairs? Was the building painted to protect soft brick or to conceal deteriorating stone? Or, was painted masonry simply a fashionable treatment in a particular historic period? Many buildings were painted at the time of construction or shortly thereafter; retention of the paint, therefore, may be more appropriate historically than removing it. And, if the building appears to have been painted for a long time, it is also important to think about whether the paint is part of the character of the historic building and if it has acquired significance over time.

**Consider the practicalities of cleaning or paint removal.** Some gypsum or sulfate crusts may have become integral with the stone and, if cleaning could result in removing some of the stone surface, it may be preferable not to clean. Even where unpainted masonry is appropriate, the retention of the paint may be more practical than removal in terms of long range preservation of the masonry. In some cases, however, removal of the paint may be desirable. For example, the old paint layers may have built up to such an extent that removal is necessary to ensure a sound surface to which the new paint will adhere.

**Study the masonry.** Although not always necessary, in some instances it can be beneficial to have the coating or paint type, color, and layering on the masonry researched before attempting its removal. Analysis of the nature of the soiling or of the paint to be removed from the masonry, as well as guidance on the appropriate cleaning method, may be provided by professional consultants, including architectural conservators, conservation scientists, and preservation architects. The State Historic
Preservation Office (SHPO), local historic district commissions, architectural review boards, and preservation-oriented websites may also be able to supply useful information on masonry cleaning techniques.

Understanding the Building Materials

The construction of the building must be considered when developing a cleaning program because inappropriate cleaning can have a deleterious effect on the masonry as well as on other building materials. The masonry material or materials must be correctly identified. It is sometimes difficult to distinguish one type of stone from another; for example, certain sandstones can be easily confused with limestones. Or, what appears to be natural stone may not be stone at all, but cast stone or concrete. Historically, cast stone and architectural terra cotta were frequently used in combination with natural stone, especially for trim elements or on upper stories of a building where, from a distance, these substitute materials looked like real stone. Other features on historic buildings that appear to be stone, such as decorative cornices, entablatures and window hoods, may not even be masonry, but metal.

Identify prior treatments. Previous treatments of the building and its surroundings should be researched and building maintenance records should be obtained, if available. Sometimes if streaked or spotty areas do not seem to get cleaner following an initial cleaning, closer inspection and analysis may be warranted. The discoloration may turn out not to be dirt but the remnant of a water-repellent coating applied long ago which has darkened the surface of the masonry over time. Successful removal may require testing several cleaning agents to find something that will dissolve and remove the coating. Complete removal may not always be possible. Repairs may have been stained to match a dirty building, and cleaning may make these differences apparent. De-icing salts used near the building that have dissolved can migrate into the masonry. Cleaning may draw the salts to the surface, where they will appear as efflorescence (a powdery, white substance), which may require a second treatment to be removed. Allowances for dealing with such unknown factors, any of which can be a potential problem, should be included when investigating cleaning methods and materials. Just as more than one kind of masonry on a historic building may necessitate multiple cleaning approaches, unknown conditions that are encountered may also require additional cleaning treatments.

Choose the appropriate cleaner. The importance of testing cleaning methods and materials cannot be over emphasized. Applying the wrong cleaning agents to historic masonry can have disastrous results. Acidic cleaners can be extremely damaging to acid-sensitive stones, such as marble and limestone, resulting in etching and dissolution of these stones. Other kinds of masonry can also be damaged by incompatible cleaning agents, or even by cleaning agents that are usually compatible. There are also numerous kinds of sandstone, each with a considerably different geological composition. While an acid-based cleaner may be safely
used on some sandstones, others are acid-sensitive and can be severely etched or dissolved by an acid cleaner. Some sandstones contain water-soluble minerals and can be eroded by water cleaning. And, even if the stone type is correctly identified, stones, as well as some bricks, may contain unexpected impurities, such as iron particles, that may react negatively with a particular cleaning agent and result in staining. Thorough understanding of the physical and chemical properties of the masonry will help avoid the inadvertent selection of damaging cleaning agents.

Other building materials also may be affected by the cleaning process. Some chemicals, for example, may have a corrosive effect on paint or glass. The portions of building elements most vulnerable to deterioration may not be visible, such as embedded ends of iron window bars. Other totally unseen items, such as iron cramps or ties which hold the masonry to the structural frame, also may be subject to corrosion from the use of chemicals or even from plain water. The only way to prevent problems in these cases is to study the building construction in detail and evaluate proposed cleaning methods with this information in mind. However, due to the very likely possibility of encountering unknown factors, any cleaning project involving historic masonry should be viewed as unique to that particular building.

Cleanin9 Methods and Materials

Masonry cleaning methods generally are divided into three major groups: water, chemical, and abrasive. **Water methods** soften the dirt or soiling material and rinse the deposits from the masonry surface. **Chemical cleaners** react with dirt, soiling material or paint to effect their removal, after which the cleaning effluent is rinsed off the masonry surface with water. **Abrasive methods** include blasting with grit, and the use of grinders and sanding discs, all of which mechanically remove the dirt, soiling material or paint (and, usually, some of the masonry surface). Abrasive cleaning is also often followed with a water rinse. **Laser cleaning**, although not discussed here in detail, is another technique that is used sometimes by conservators to clean small areas of historic masonry. It can be quite effective for cleaning limited areas, but it is expensive and generally not practical for most historic masonry cleaning projects.

Although it may seem contrary to common sense, masonry cleaning projects should be carried out starting at the bottom and proceeding to the top of the building always keeping all surfaces wet below the area being cleaned. The rationale for this approach is based on the principle that dirty water or cleaning effluent dripping from cleaning in progress above will leave streaks on a dirty surface but will not streak a clean surface as long as it is kept wet and rinsed frequently.

**Water Cleaning**

Water cleaning methods are generally the *gentlest means possible*, and they can be used safely to remove dirt from all types of historic masonry.* There are essentially four kinds of water-based methods: soaking; pressure water washing; water washing supplemented with non-ionic detergent; and steam, or hot-pressurized water cleaning. Once water cleaning has been completed, it is often necessary to follow up with a water rinse to wash off the loosened soiling material from the masonry.

* Water cleaning methods may not be appropriate to use on some badly deteriorated masonry because water may...
exacerbate the deterioration, or on gypsum or alabaster, which are very soluble in water.

**Soaking.** Prolonged spraying or misting with water is particularly effective for cleaning limestone and marble. It is also a good method for removing heavy accumulations of soot, sulfate crusts or gypsum crusts that tend to form in protected areas of a building not regularly washed by rain. Water is distributed to lengths of punctured hose or pipe with non-ferrous fittings hung from moveable scaffolding or a swing stage that continuously mists the surface of the masonry with a very fine spray. A timed on-off spray is another approach to using this cleaning technique. After one area has been cleaned, the apparatus is moved on to another. Soaking is often used in combination with water washing and is also followed by a final water rinse. Soaking is a very slow method—it may take several days or a week—but it is a very gentle method to use on historic masonry.

**Water Washing.** Washing with low-pressure or medium-pressure water is probably one of the most commonly used methods for removing dirt or other pollutant soiling from historic masonry buildings. Starting with a very low pressure (100 psi or below), even using a garden hose, and progressing as needed to slightly higher pressure—generally no higher than 300-400 psi—is always the recommended way to begin. Scrubbing with natural bristle or synthetic bristle brushes—never metal which can abrade the surface and leave metal particles that can stain the masonry—can help in cleaning areas of the masonry that are especially dirty.

**Water Washing with Detergents.** Non-ionic detergents—which are not the same as soaps—are synthetic organic compounds that are especially effective in removing oily soil. (Examples of some of the numerous proprietary non-ionic detergents include Igepal by GAF, Tergitol by Union Carbide and Triton by Rohm & Haas.) Thus, the addition of a non-ionic detergent, or surfactant, to a low- or medium-pressure water wash can be a useful aid in the cleaning process. (A non-ionic detergent, unlike most household detergents, does not leave a solid, visible residue on the masonry.) Adding a non-ionic detergent and scrubbing with a natural bristle or synthetic bristle brush can facilitate cleaning textured or intricately carved masonry. This should be followed with a final water rinse.

**Steam/Hot-Pressurized Water Cleaning.** Steam cleaning is actually low-pressure hot water washing because the steam condenses almost immediately upon leaving the hose. This is a gentle and effective method for cleaning stone and particularly for acid-sensitive stones. Steam can be especially useful in removing built-up soiling deposits and dried-up plant materials, such as ivy disks and tendrils. It can also be an efficient means of cleaning carved stone details and, because it does not generate a lot of liquid water, it can sometimes be appropriate to use for cleaning interior masonry.

**Potential hazards of water cleaning.** Despite the fact that water-based methods are generally the most gentle, even they can be damaging to historic masonry. Before beginning a water cleaning project, it is important to make sure that all mortar joints are sound and that the building is watertight. Otherwise water can seep through the walls to the interior, resulting in rusting metal anchors and stained and ruined plaster.
Some water supplies may contain traces of iron and copper which may cause masonry to discolor. Adding a chelating or complexing agent to the water, such as EDTA (ethylene diamine tetra-acetic acid), which inactivates other metallic ions, as well as softens minerals and water hardness, will help prevent staining on light-colored masonry.

Any cleaning method involving water should never be done in cold weather or if there is any likelihood of frost or freezing because water within the masonry can freeze, causing spalling and cracking. Since a masonry wall may take over a week to dry after cleaning, no water cleaning should be permitted for several days prior to the first average frost date, or even earlier if local forecasts predict cold weather.

Most important of all, it is imperative to be aware that using water at too high a pressure, a practice common to "power washing" and "water blasting", is very abrasive and can easily etch marble and other soft stones, as well as some types of brick. In addition, the distance of the nozzle from the masonry surface and the type of nozzle, as well as gallons per minute (gpm), are also important variables in a water cleaning process that can have a significant impact on the outcome of the project. This is why it is imperative that the cleaning be closely monitored to ensure that the cleaning operators do not raise the pressure or bring the nozzle too close to the masonry in an effort to "speed up" the process. The appearance of grains of stone or sand in the cleaning effluent on the ground is an indication that the water pressure may be too high.

Chemical Cleaning

Chemical cleaners, generally in the form of proprietary products, are another material frequently used to clean historic masonry. They can remove dirt, as well as paint and other coatings, metallic and plant stains, and graffiti. Chemical cleaners used to remove dirt and soiling include acids, alkalies and organic compounds. Acidic cleaners, of course, should not be used on masonry that is acid sensitive. Paint removers are alkaline, based on organic solvents or other chemicals.

Chemical Cleaners to Remove Dirt

Both alkaline and acidic cleaning treatments include the use of water. Both cleaners are also likely to contain surfactants (wetting agents), that facilitate the chemical reaction that removes the dirt. Generally, the masonry is wet first for both types of cleaners, then the chemical cleaner is sprayed on at very low pressure or brushed onto the surface. The cleaner is left to dwell on the masonry for an amount of time recommended by the product manufacturer or, preferably, determined by testing, and rinsed off with a low- or moderate-pressure cold, or sometimes hot, water wash.

More than one application of the cleaner may be necessary, and it is always a good practice to test the product manufacturer’s recommendations concerning dilution rates and dwell times. Because each cleaning situation is unique, dilution rates and dwell times can vary considerably. The masonry surface may be scrubbed lightly with natural or synthetic bristle brushes prior to rinsing. After rinsing, pH strips should be applied to the surface to ensure that the masonry has been neutralized completely.

Acidic Cleaners. Acid-based cleaning products may be used on non-acid sensitive masonry, which generally includes: granite, most sandstones, slate, unglazed brick and unglazed architectural terra cotta, cast stone and concrete. Most commercial acidic cleaners are composed primarily of hydrofluoric acid, and often include some phosphoric acid to prevent rust-like stains from developing on the masonry after the cleaning. Acid cleaners are applied to the pre-wet masonry which should be kept wet while the acid is
allowed to "work", and then removed with a water wash.

**Alkaline Cleaners.** Alkaline cleaners should be used on *acid-sensitive* masonry, including: limestone, polished and unpolished marble, calcareous sandstone, glazed brick and glazed architectural terra cotta, and polished granite. (Alkaline cleaners may also be used sometimes on masonry materials that are not acid sensitive--after testing, of course--but they may not be as effective as they are on acid-sensitive masonry.) Alkaline cleaning products consist primarily of two ingredients: a non-ionic detergent or surfactant; and an alkali, such as potassium hydroxide or ammonium hydroxide. Like acidic cleaners, alkaline products are usually applied to pre-wet masonry, allowed to dwell, and then rinsed off with water. (Longer dwell times may be necessary with alkaline cleaners than with acidic cleaners.) Two additional steps are required to remove alkaline cleaners after the initial rinse. First the masonry is given a slightly acidic wash--often with acetic acid--to neutralize it, and then it is rinsed again with water.

**Chemical Cleaners to Remove Paint and Other Coatings, Stains and Graffiti**

Removing paint and some other coatings, stains and graffiti can best be accomplished with alkaline paint removers, organic solvent paint removers, or other cleaning compounds. The removal of layers of paint from a masonry surface usually involves applying the remover either by brush, roller or spraying, followed by a thorough water wash. As with any chemical cleaning, the manufacturer's recommendations regarding application procedures should always be tested before beginning work.

**Alkaline Paint Removers.** These are usually of much the same composition as other alkaline cleaners, containing potassium or ammonium hydroxide, or trisodium phosphate. They are used to remove oil, latex and acrylic paints, and are effective for removing multiple layers of paint. Alkaline cleaners may also remove some acrylic water-repellent coatings. As with other alkaline cleaners, both an acidic neutralizing wash and a final water rinse are generally required following the use of alkaline paint removers.

**Organic Solvent Paint Removers.** The formulation of organic solvent paint removers varies and may include a combination of solvents, including methylene chloride, methanol, acetone, xylene and toluene.

**Other Paint Removers and Cleaners.** Other cleaning compounds that can be used to remove paint and some painted graffiti from historic masonry include paint removers based on N-methyl-2-pyrrolidone (NMP), or on petroleum-based compounds. Removing stains, whether they are industrial (smoke, soot, grease or tar), metallic (iron or copper), or biological (plant and fungal) in origin, depends on carefully matching the type of remover to the type of stain. Successful removal of stains from historic masonry often requires the application of a number of different removers before the right one is found. The removal of layers of paint from a masonry surface is usually accomplished by applying the remover either by brush, roller or spraying, followed by a thorough water wash.

**Potential hazards of chemical cleaning.** Since most chemical cleaning methods involve water, they have many of the potential problems of plain water cleaning. Like water methods, they should not be used in cold weather because of the possibility of freezing. Chemical cleaning should never be undertaken in temperatures below 40 degrees F (4 degrees C), and generally not below 50 degrees F. In addition, many chemical cleaners simply do not work in cold temperatures. Both acidic and alkaline
cleaners can be dangerous to cleaning operators, and clearly, there are environmental concerns associated with the use of chemical cleaners.

If not carefully chosen, chemical cleaners can react adversely with many types of masonry. Obviously, acidic cleaners should not be used on acid-sensitive materials; however, it is not always clear exactly what the composition is of any stone or other masonry material. For this reason, testing the cleaner on an inconspicuous spot on the building is always necessary. While certain acid-based cleaners may be appropriate if used as directed on a particular type of masonry, if left too long or if not adequately rinsed from the masonry they can have a negative effect. For example, hydrofluoric acid can etch masonry leaving a hazy residue (whitish deposits of silica or calcium fluoride salts) on the surface. While this efflorescence may usually be removed by a second cleaning--although it is likely to be expensive and time-consuming--hydrofluoric acid can also leave calcium fluoride salts or a colloidal silica deposit on masonry which may be impossible to remove. Other acids, particularly hydrochloric (muriatic) acid, which is very powerful, should not be used on historic masonry, because it can dissolve lime-based mortar, damage brick and some stones, and leave chloride deposits on the masonry.

Alkaline cleaners can stain sandstones that contain a ferrous compound. Before using an alkaline cleaner on sandstone it is always important to test it, since it may be difficult to know whether a particular sandstone may contain a ferrous compound. Some alkaline cleaners, such as sodium hydroxide (caustic soda or lye) and ammonium bifluoride, can also damage or leave disfiguring brownish-yellow stains and, in most cases, should not be used on historic masonry. Although alkaline cleaners will not etch a masonry surface as acids can, they are caustic and can burn the surface. In addition, alkaline cleaners can deposit potentially damaging salts in the masonry which can be difficult to rinse thoroughly.

**Poulticing to Remove Stains and Graffiti**

Graffiti and stains, which have penetrated into the masonry, often are best removed by using a poultice. A poultice consists of an absorbent material or clay powder (such as kaolin or fuller’s earth, or even shredded paper or paper towels), mixed with a liquid (a solvent or other remover) to form a paste which is applied to the stain. The poultice is kept moist and left on the stain as long as necessary for it to draw the stain out of the masonry. As it dries, the paste absorbs the staining material so that it is not redeposited on the masonry surface.

Some commercial cleaning products and paint removers are specially formulated as a paste or gel that will cling to a vertical surface and remain moist for a longer period of time in order to prolong the action of the chemical on the stain. Pre-mixed poulitces are also available as a paste or in powder form needing only the addition of the appropriate liquid. The masonry must be pre-wet before applying an alkaline cleaning agent, but not when using a solvent. Once the stain has been removed, the masonry must be rinsed thoroughly.
**Abrasive and Mechanical Cleaning**

**Generally, abrasive cleaning methods are not appropriate for use on historic masonry buildings.** Abrasive cleaning methods are just that--abrasive. Grit blasters, grinders, and sanding discs all operate by abrading the dirt or paint off the surface of the masonry, rather than reacting with the dirt and the masonry which is how water and chemical methods work. Since the abrasives do not differentiate between the dirt and the masonry, they can also remove the outer surface of the masonry at the same time, and result in permanently damaging the masonry. Brick, architectural terra cotta, soft stone, detailed carvings, and polished surfaces, are especially susceptible to physical and aesthetic damage by abrasive methods. Brick and architectural terra cotta are fired products which have a smooth, glazed surface which can be removed by abrasive blasting or grinding. Abrasively-cleaned masonry is damaged aesthetically as well as physically, and it has a rough surface which tends to hold dirt and the roughness will make future cleaning more difficult. Abrasive cleaning processes can also increase the likelihood of subsurface cracking of the masonry. Abrasion of carved details causes a rounding of sharp corners and other loss of delicate features, while abrasion of polished surfaces removes the polished finish of stone.

Mortar joints, especially those with lime mortar, also can be eroded by abrasive or mechanical cleaning. In some cases, the damage may be visual, such as loss of joint detail or increased joint shadows. As mortar joints constitute a significant portion of the masonry surface (up to 20 per cent in a brick wall), this can result in the loss of a considerable amount of the historic fabric. Erosion of the mortar joints may also permit increased water penetration, which will likely necessitate repointing.

**Abrasive Blasting.** Blasting with abrasive grit or another abrasive material is the most frequently used abrasive method. Sandblasting is most commonly associated with abrasive cleaning. Finely ground silica or glass powder, glass beads, ground garnet, powdered walnut and other ground nut shells, grain hulls, aluminum oxide, plastic particles and even tiny pieces of sponge, are just a few of the other materials that have also been used for abrasive cleaning. Although abrasive blasting is not an appropriate method of cleaning historic masonry, it can be safely used to clean some materials. Finely-powdered walnut shells are commonly used for cleaning monumental bronze sculpture, and skilled conservators clean delicate museum objects and finely detailed, carved stone features with very small, micro-abrasive units using aluminum oxide.

A number of current approaches to abrasive blasting rely on materials that are not usually thought of as abrasive, and not as commonly associated with traditional abrasive grit cleaning. Some patented abrasive cleaning processes--one dry, one wet--use finely-ground glass powder intended to "erase" or remove dirt and surface soiling only, but not paint or stains. Cleaning with baking soda (sodium bicarbonate) is another patented process. Baking soda blasting is being used in some communities as a means of quick graffiti removal. However, it should not be used on historic masonry which it can easily abrade and can permanently "etch" the graffiti into the stone; it can also leave potentially damaging salts in the stone which cannot be removed. Most of these abrasive grits may be used either dry or wet, although dry grit tends to be used more frequently.
Ice particles, or pelletized dry ice (carbon dioxide or CO2), are another medium used as an abrasive cleaner. This is also too abrasive to be used on most historic masonry, but it may have practical application for removing mastics or asphaltic coatings from some substrates.

Some of these processes are promoted as being more environmentally safe and not damaging to historic masonry buildings. However, it must be remembered that they are abrasive and that they "clean" by removing a small portion of the masonry surface, even though it may be only a minuscule portion. The fact that they are essentially abrasive treatments must always be taken into consideration when planning a masonry cleaning project. In general, abrasive methods should not be used to clean historic masonry buildings. In some, very limited instances, highly-controlled, gentle abrasive cleaning may be appropriate on selected, hard-to-clean areas of a historic masonry building if carried out under the watchful supervision of a professional conservator. But, abrasive cleaning should never be used on an entire building.

**Grinders and Sanding Disks.** Grinding the masonry surface with mechanical grinders and sanding disks is another means of abrasive cleaning that should not be used on historic masonry. Like abrasive blasting, grinders and disks do not really clean masonry but instead grind away and abrasively remove and, thus, damage the masonry surface itself rather than remove just the soiling material.

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**Planning a Cleaning Project**

Once the masonry and soiling material or paint have been identified, and the condition of the masonry has been evaluated, planning for the cleaning project can begin.

**Testing cleaning methods.** In order to determine the *gentlest means possible*, several cleaning methods or materials may have to be tested prior to selecting the best one to use on the building. Testing should always begin with the gentlest and least invasive method proceeding gradually, if necessary, to more complicated methods, or a combination of methods. All too often simple methods, such as a low-pressure water wash, are not even considered, yet they frequently are effective, safe, and not expensive. Water of slightly higher pressure or with a non-ionic detergent additive also may be effective. It is worth repeating that these methods should always be tested prior to considering harsher methods; they are safer for the building and the environment, often safer for the applicator, and relatively inexpensive.

The level of cleanliness desired also should be determined prior to selection of a cleaning method. Obviously, the intent of cleaning is to remove most of the dirt, soiling material, stains, paint or other coating. A "brand new" appearance, however, may be inappropriate for an older building, and may require an overly harsh cleaning method to be achieved. When undertaking a cleaning project, it is important to be aware that some stains simply may not be removable. It may be wise, therefore, to agree upon a slightly lower level of cleanliness that will serve as the standard for the cleaning project. The precise amount of residual dirt considered acceptable may depend on the type of masonry, the type of soiling and difficulty of total removal, and local environmental conditions.

Cleaning tests should be carried out in an area of sufficient size to give a true indication of their effectiveness. It is preferable to conduct the test in an inconspicuous location on the building so that it will not be obvious if the test is not successful. A test area may be...
quite small to begin, sometimes as small as six square inches, and gradually may be increased in size as the most appropriate methods and cleaning agents are determined. Eventually the test area may be expanded to a square yard or more, and it should include several masonry units and mortar joints. It should be remembered that a single building may have several types of masonry and that even similar materials may have different surface finishes. Each material and different finish should be tested separately. Cleaning tests should be evaluated only after the masonry has dried completely. The results of the tests may indicate that several methods of cleaning should be used on a single building.

When feasible, test areas should be allowed to weather for an extended period of time prior to final evaluation. A waiting period of a full year would be ideal in order to expose the test patch to a full range of seasons. If this is not possible, the test patch should weather for at least a month or two. For any building which is considered historically important, the delay is insignificant compared to the potential damage and disfigurement which may result from using an incompletely tested method. The successfully cleaned test patch should be protected as it will serve as a standard against which the entire cleaning project will be measured.

Environmental considerations. The potential effect of any method proposed for cleaning historic masonry should be evaluated carefully. Chemical cleaners and paint removers may damage trees, shrubs, grass, and plants. A plan must be provided for environmentally safe removal and disposal of the cleaning materials and the rinsing effluent before beginning the cleaning project. Authorities from the local regulatory agency--usually under the jurisdiction of the federal or state Environmental Protection Agency (EPA)--should be consulted prior to beginning a cleaning project, especially if it involves anything more than plain water washing. This advance planning will ensure that the cleaning effluent or run-off, which is the combination of the cleaning agent and the substance removed from the masonry, is handled and disposed of in an environmentally sound and legal manner. Some alkaline and acidic cleaners can be neutralized so that they can be safely discharged into storm sewers. However, most solvent-based cleaners cannot be neutralized and are categorized as pollutants, and must be disposed of by a licensed transport, storage and disposal facility. Thus, it is always advisable to consult with the appropriate agencies before starting to clean to ensure that the project progresses smoothly and is not interrupted by a stop-work order because a required permit was not obtained in advance.

Vinyl guttering or polyethylene-lined troughs placed around the perimeter of the base of the building can serve to catch chemical cleaning waste as it is rinsed off the building. This will reduce the amount of chemicals entering and polluting the soil, and also will keep the cleaning waste contained until it can be removed safely. Some patented cleaning systems have developed special equipment to facilitate the containment and later disposal of cleaning waste.

Concern over the release of volatile organic compounds (VOCs) into the air has resulted in the manufacture of new, more environmentally responsible cleaners and paint removers, while some materials traditionally used in cleaning may no longer be available for these same reasons. Other health and safety concerns have created additional cleaning challenges, such as lead paint removal, which is likely to require special removal and disposal techniques.

Cleaning can also cause damage to non-masonry materials on a building, including glass, metal and wood. Thus, it is usually necessary to cover windows and doors, and other features that may be vulnerable to chemical cleaners. They
should be covered with plastic or polyethylene, or a masking agent that is applied as a liquid which dries to form a thin protective film on glass, and is easily peeled off after the cleaning is finished. Wind drift, for example, can also damage other property by carrying cleaning chemicals onto nearby automobiles, resulting in etching of the glass or spotting of the paint finish. Similarly, airborne dust can enter surrounding buildings, and excess water can collect in nearby yards and basements.

**Safety considerations.** Possible health dangers of each method selected for the cleaning project must be considered before selecting a cleaning method to avoid harm to the cleaning applicators, and the necessary precautions must be taken. The precautions listed in Material Safety Data Sheets (MSDS) that are provided with chemical products should always be followed. Protective clothing, respirators, hearing and face shields, and gloves must be provided to workers to be worn at all times. Acidic and alkaline chemical cleaners in both liquid and vapor forms can also cause serious injury to passers-by. It may be necessary to schedule cleaning at night or weekends if the building is located in a busy urban area to reduce the potential danger of chemical overspray to pedestrians. Cleaning during non-business hours will allow HVAC systems to be turned off and vents to be covered to prevent dangerous chemical fumes from entering the building which will also ensure the safety of the building’s occupants. Abrasive and mechanical methods produce dust which can pose a serious health hazard, particularly if the abrasive or the masonry contains silica.

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**Water-Repellent Coatings and Waterproof Coatings**

To begin with, it is important to understand that waterproof coatings and water-repellent coatings are not the same. Although these terms are frequently interchanged and commonly confused with one another, they are completely different materials. **Water-repellent coatings**--often referred to incorrectly as "sealers", but which do not or should not "seal"--are intended to keep liquid water from penetrating the surface but to allow water vapor to enter and leave, or pass through, the surface of the masonry. Water-repellent coatings are generally transparent, or clear, although once applied some may darken or discolor certain types of masonry while others may give it a glossy or shiny appearance. **Waterproof coatings** seal the surface from liquid water and from water vapor. They are usually opaque, or pigmented, and include bituminous coatings and some elastomeric paints and coatings.

**Water-Repeptellent Coatings**

Water-repellent coatings are formulated to be vapor permeable, or "breathable". They do not seal the surface completely to water vapor so it can enter the masonry wall as well as leave the wall. While the first water-repellent coatings to be developed were primarily acrylic or silicone resins in organic solvents, now most water-repellent coatings are water-based and formulated from modified siloxanes, silanes and other alkoxy silanes, or metallic stearates. While some of these products are shipped from the factory ready to use, other water-borne water repellents must be diluted at the job site. Unlike earlier water-repellent coatings which tended to form a "film" on the masonry
surface, modern water-repellent coatings actually penetrate into the masonry substrate slightly and, generally, are almost invisible if properly applied to the masonry. They are also more vapor permeable than the old coatings, yet they still reduce the vapor permeability of the masonry. Once inside the wall, water vapor can condense at cold spots producing liquid water which, unlike water vapor, cannot escape through a water-repellent coating. The liquid water within the wall, whether from condensation, leaking gutters, or other sources, can cause considerable damage.

Water-repellent coatings are not consolidants. Although modern water-repellents may penetrate slightly beneath the masonry surface, instead of just "sitting" on top of it, they do not perform the same function as a consolidant which is to "consolidate" and replace lost binder to strengthen deteriorating masonry. Even after many years of laboratory study and testing, few consolidants have proven very effective. The composition of fired products such as brick and architectural terra cotta, as well as many types of building stone, does not lend itself to consolidation.

Some modern water-repellent coatings which contain a binder intended to replace the natural binders in stone that have been lost through weathering and natural erosion are described in product literature as both a water repellent and a consolidant. The fact that the newer water-repellent coatings penetrate beneath the masonry surface instead of just forming a layer on top of the surface may indeed convey at least some consolidating properties to certain stones. However, a water-repellent coating cannot be considered a consolidant. In some instances, a water-repellent or "preservative" coating, if applied to already damaged or spalling stone, may form a surface crust which, if it fails, may exacerbate the deterioration by pulling off even more of the stone.

**Is a Water-Repellent Treatment Necessary?**

Water-repellent coatings are frequently applied to historic masonry buildings for the wrong reason. They also are often applied without an understanding of what they are and what they are intended to do. And these coatings can be very difficult, if not impossible, to remove from the masonry if they fail or become discolored. Most importantly, the application of water-repellent coatings to historic masonry is usually unnecessary.

Most historic masonry buildings, unless they are painted, have survived for decades without a water-repellent coating and, thus, probably do not need one now. Water penetration to the interior of a masonry building is seldom due to porous masonry, but results from poor or deferred maintenance. Leaking roofs, clogged or deteriorated gutters and downspouts, missing mortar, or cracks and open joints around door and window openings are almost always the cause of moisture-related problems in a historic masonry building. **If historic masonry buildings are kept watertight and in good repair, water-repellent coatings should not be necessary.**

Rising damp (capillary moisture pulled up from the ground), or condensation can also be a source of excess moisture in masonry buildings. A water-repellent coating will not solve this problem either and, in fact, may be likely to exacerbate it. Furthermore, a water-repellent coating should never be applied to a damp wall. Moisture in the wall would reduce the ability of a coating to adhere to the masonry and to penetrate below.
the surface. But, if it did adhere, it would hold the moisture inside the masonry because, although a water-repellent coating is permeable to water vapor, liquid water cannot pass through it. In the case of rising damp, a coating may force the moisture to go even higher in the wall because it can slow down evaporation, and thereby retain the moisture in the wall.

Excessive moisture in masonry walls may carry waterborne soluble salts from the masonry units themselves or from the mortar through the walls. If the water is permitted to come to the surface, the salts may appear on the masonry surface as efflorescence (a whitish powder) upon evaporation. However, the salts can be potentially dangerous if they remain in the masonry and crystallize beneath the surface as subflorescence. Subflorescence eventually may cause the surface of the masonry to spall, particularly if a water-repellent coating has been applied which tends to reduce the flow of moisture out from the subsurface of the masonry. Although many of the newer water-repellent products are more breathable than their predecessors, they can be especially damaging if applied to masonry that contains salts, because they limit the flow of moisture through masonry.

When a Water-Repellent Coating May be Appropriate

There are some instances when a water-repellent coating may be considered appropriate to use on a historic masonry building. Soft, incompletely fired brick from the 18th- and early-19th centuries may have become so porous that paint or some type of coating is needed to protect it from further deterioration or dissolution. When a masonry building has been neglected for a long period of time, necessary repairs may be required in order to make it watertight. If, following a reasonable period of time after the building has been made watertight and has dried out completely, moisture appears actually to be penetrating through the repointed and repaired masonry walls, then the application of a water-repellent coating may be considered *in selected areas only*. This decision should be made in consultation with an architectural conservator. And, if such a treatment is undertaken, it should not be applied to the entire exterior of the building.

Anti-graffiti or barrier coatings are another type of clear coating—although barrier coatings can also be pigmented—that may be applied to exterior masonry, but they are not formulated primarily as water repellents. The purpose of these coatings is to make it harder for graffiti to stick to a masonry surface and, thus, easier to clean. But, like water-repellent coatings, in most cases the application of anti-graffiti coatings is generally not recommended for historic masonry buildings. These coatings are often quite shiny which can greatly alter the appearance of a historic masonry surface, and they are not always effective. Generally, other ways of discouraging graffiti, such as improved lighting, can be more effective than a coating. However, the application of anti-graffiti coatings may be appropriate in some instances on vulnerable areas of historic masonry buildings which are frequent targets of graffiti that are located in out-of-the-way places where constant surveillance is not possible.

Some water-repellent coatings are recommended by product manufacturers as a means of keeping dirt and pollutants or biological growth from collecting on the surface of masonry buildings and, thus, reducing the need for frequent cleaning. While this at times may be true, in some cases a coating may actually retain dirt more than uncoated
masonry. Generally, the application of a water-repellent coating is not recommended on a historic masonry building as a means of preventing biological growth. Some water-repellent coatings may actually encourage biological growth on a masonry wall. Biological growth on masonry buildings has traditionally been kept at bay through regularly-scheduled cleaning as part of a maintenance plan. Simple cleaning of the masonry with low-pressure water using a natural- or synthetic-bristled scrub brush can be very effective if done on a regular basis. Commercial products are also available which can be sprayed on masonry to remove biological growth.

In most instances, a water-repellent coating is not necessary if a building is watertight. The application of a water-repellent coating is not a recommended treatment for historic masonry buildings unless there is a specific problem which it may help solve. If the problem occurs on only part of the building, it is best to treat only that area rather than an entire building. Extreme exposures such as parapets, for example, or portions of the building subject to driving rain can be treated more effectively and less expensively than the entire building. Water-repellent coatings are not permanent and must be reapplied periodically although, if they are truly invisible, it can be difficult to know when they are no longer providing the intended protection.

Testing a water-repellent coating by applying it in one small area may not be helpful in determining its suitability for the building because a limited test area does not allow an adequate evaluation of a treatment. Since water may enter and leave through the surrounding untreated areas, there is no way to tell if the coated test area is "breathable." But trying a coating in a small area may help to determine whether the coating is visible on the surface or if it will otherwise change the appearance of the masonry.

Waterproof Coatings

In theory, waterproof coatings usually do not cause problems as long as they exclude all water from the masonry. If water does enter the wall from the ground or from the inside of a building, the coating can intensify the damage because the water will not be able to escape. During cold weather this water in the wall can freeze causing serious mechanical disruption, such as spalling.

In addition, the water eventually will get out by the path of least resistance. If this path is toward the interior, damage to interior finishes can result; if it is toward the exterior, it can lead to damage to the masonry caused by built-up water pressure.

In most instances, waterproof coatings should not be applied to historic masonry. The possible exception to this might be the application of a waterproof coating to below-grade exterior foundation walls as a last resort to stop water infiltration on interior basement walls. Generally, however, waterproof coatings, which include elastomeric paints, should almost never be applied above grade to historic masonry buildings.

Summary

A well-planned cleaning project is an essential step in preserving, rehabilitating or restoring a historic masonry building. Proper cleaning methods and coating treatments, when determined necessary for the preservation of the masonry, can enhance the
aesthetic character as well as the structural stability of a historic building. Removing years of accumulated dirt, pollutant crusts, stains, graffiti or paint, if done with appropriate caution, can extend the life and longevity of the historic resource. Cleaning that is carelessly or insensitively prescribed or carried out by inexperienced workers can have the opposite of the intended effect. It may scar the masonry permanently, and may actually result in hastening deterioration by introducing harmful residual chemicals and salts into the masonry or causing surface loss. Using the wrong cleaning method or using the right method incorrectly, applying the wrong kind of coating or applying a coating that is not needed can result in serious damage, both physically and aesthetically, to a historic masonry building. Cleaning a historic masonry building should always be done using the gentlest means possible that will clean, but not damage the building. It should always be taken into consideration before applying a water-repellent coating or a waterproof coating to a historic masonry building whether it is really necessary and whether it is in the best interest of preserving the building.

Selected Reading


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**Acknowledgements**

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Home page logo: Appropriate cleaning of historic masonry. Photo: NPS files.

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Repointing Mortar Joints in Historic Masonry Buildings

Robert C. Mack, FAIA, and John P. Speweik

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A NOTE TO OUR USERS: The web versions of the Preservation Briefs differ somewhat from the printed versions. Many illustrations are new, captions are simplified, illustrations are typically in color rather than black and white, and some complex charts have been omitted.

Masonry--brick, stone, terra-cotta, and concrete block--is found on nearly every historic building. Structures with all-masonry exteriors come to mind immediately, but most other buildings at least have masonry foundations or chimneys. Although generally considered "permanent," masonry is subject to deterioration, especially at the mortar joints. Repointing, also known simply as "pointing" or--somewhat inaccurately--"tuck pointing"*, is the process of removing deteriorated mortar from the joints of a masonry wall and replacing it with new mortar. Properly done, repointing restores the visual and physical integrity of the masonry. Improperly done, repointing not only detracts from the appearance of the building, but may also cause physical damage to the masonry units themselves.

The purpose of this Brief is to provide general guidance on appropriate materials and methods for repointing historic masonry buildings and it is intended to benefit building owners, architects, and contractors. The Brief should serve as a guide to prepare specifications for repointing historic masonry buildings. It should also help develop sensitivity to the particular needs of historic masonry, and to assist historic building owners in working cooperatively with architects, architectural conservators and historic preservation consultants, and contractors. Although specifically intended for historic buildings, the guidance is appropriate for other masonry buildings as well. This publication updates Preservation Briefs 2: Repointing Mortar Joints in Historic Brick
Buildings to include all types of historic unit masonry. The scope of the earlier Brief has also been expanded to acknowledge that the many buildings constructed in the first half of the 20th century are now historic and eligible for listing in the National Register of Historic Places, and that they may have been originally constructed with portland cement mortar.

*Tuckpointing technically describes a primarily decorative application of a raised mortar joint or lime putty joint on top of flush mortar joints.*

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**Historical Background**

Mortar consisting primarily of lime and sand has been used as an integral part of masonry structures for thousands of years. Up until about the mid-19th century, lime or quicklime (sometimes called lump lime) was delivered to construction sites, where it had to be slaked, or combined with water. Mixing with water caused it to boil and resulted in a wet lime putty that was left to mature in a pit or wooden box for several weeks, up to a year. Traditional mortar was made from lime putty, or slaked lime, combined with local sand, generally in a ratio of 1 part lime putty to 3 parts sand by volume. Often other ingredients, such as crushed marine shells (another source of lime), brick dust, clay, natural cements, pigments, and even animal hair were also added to mortar, but the basic formulation for lime putty and sand mortar remained unchanged for centuries until the advent of portland cement or its forerunner, Roman cement, a natural, hydraulic cement.

**Portland cement** was patented in Great Britain in 1824. It was named after the stone from Portland in Dorset which it resembled when hard. This is a fast-curing, hydraulic cement which hardens under water. Portland cement was first manufactured in the United States in 1872, although it was imported before this date. But it was not in common use throughout the country until the early 20th century. Up until the turn of the century portland cement was considered primarily an additive, or "minor ingredient" to help accelerate mortar set time. By the 1930s, however, most masons used a mix of equal parts portland cement and lime putty. Thus, the mortar found in masonry structures built between 1873 and 1930 can range from pure lime and sand mixes to a wide variety of lime, portland cement, and sand combinations.

In the 1930s more new mortar products intended to hasten and simplify masons' work were introduced in the U.S. These included **masonry cement**, a premixed, bagged mortar which is a combination of portland cement and ground limestone, and **hydrated lime**, machine-slaked lime that eliminated the necessity of slaking quicklime into putty at the site.

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**Identifying the Problem Before Repointing**

The decision to repoint is most often related to some obvious sign of deterioration, such as disintegrating mortar, cracks in mortar joints, loose bricks or stones, damp walls, or damaged plasterwork. It is, however, erroneous to assume that repointing alone will solve deficiencies that result from other problems. The root cause of the deterioration--leaking roofs or gutters, differential settlement of the building, capillary action causing rising damp, or extreme weather exposure--should always be dealt with prior to
beginning work. Without appropriate repairs to eliminate the source of the problem, mortar deterioration will continue and any repointing will have been a waste of time and money.

**Use of Consultants.** Because there are so many possible causes for deterioration in historic buildings, it may be desirable to retain a consultant, such as a historic architect or architectural conservator, to analyze the building. In addition to determining the most appropriate solutions to the problems, a consultant can prepare specifications which reflect the particular requirements of each job and can provide oversight of the work in progress. Referrals to preservation consultants frequently can be obtained from State Historic Preservation Offices, the American Institute for Conservation of Historic and Artistic Works (AIC), the Association for Preservation Technology (APT), and local chapters of the American Institute of Architects (AIA).

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**Finding an Appropriate Mortar Match**

Preliminary research is necessary to ensure that the proposed repointing work is both physically and visually appropriate to the building. Analysis of unweathered portions of the historic mortar to which the new mortar will be matched can suggest appropriate mixes for the repointing mortar so that it will not damage the building because it is excessively strong or vapor impermeable. Examination and analysis of the masonry units--brick, stone or terra cotta--and the techniques used in the original construction will assist in maintaining the building’s historic appearance. A simple, non-technical, evaluation of the masonry units and mortar can provide information concerning the relative strength and permeability of each--critical factors in selecting the repointing mortar--while a visual analysis of the historic mortar can provide the information necessary for developing the new mortar mix and application techniques.

Although not crucial to a successful repointing project, for projects involving properties of special historic significance, a mortar analysis by a qualified laboratory can be useful by providing information on the original ingredients. However, there are limitations with such an analysis, and replacement mortar specifications should not be based solely on laboratory analysis. Analysis requires interpretation, and there are important factors which affect the condition and performance of the mortar that cannot be established through laboratory analysis. These may include: the original water content, rate of curing, weather conditions during original construction, the method of mixing and placing the mortar, and the cleanliness and condition of the sand. *The most useful information that can come out of laboratory analysis is the identification of sand by gradation and color.* This allows the color and the texture of the mortar to be matched with some accuracy because sand is the largest ingredient by volume.
In creating a repointing mortar that is compatible with the masonry units, the objective is to achieve one that matches the historic mortar as closely as possible, so that the new material can coexist with the old in a sympathetic, supportive and, if necessary, sacrificial capacity. The exact physical and chemical properties of the historic mortar are not of major significance as long as the new mortar conforms to the following criteria:

- The new mortar must match the historic mortar in color, texture and tooling. (If a laboratory analysis is undertaken, it may be possible to match the binder components and their proportions with the historic mortar, if those materials are available.)

- The sand must match the sand in the historic mortar. (The color and texture of the new mortar will usually fall into place if the sand is matched successfully.)

- The new mortar must have greater vapor permeability and be softer (measured in compressive strength) than the masonry units.

- The new mortar must be as vapor permeable and as soft or softer (measured in compressive strength) than the historic mortar. (Softness or hardness is not necessarily an indication of permeability; old, hard lime mortars can still retain high permeability.)

**Mortar Analysis**

Methods for analyzing mortars can be divided into two broad categories: wet chemical and instrumental. Many laboratories that analyze historic mortars use a simple wet-chemical method called acid digestion, whereby a sample of the mortar is crushed and then mixed with a dilute acid. The acid dissolves all the carbonate-containing minerals not only in the binder, but also in the aggregate (such as oyster shells, coral sands, or other carbonate-based materials), as well as any other acid-soluble materials. The sand and fine-grained acid-insoluble material is left behind. There are several variations on the simple acid digestion test. One involves collecting the carbon dioxide gas given off as the carbonate is digested by the acid; based on the gas volume the carbonate content of the mortar can be accurately determined (Jedrzejewska, 1960). Simple acid digestion methods are rapid, inexpensive, and easy to perform, but the information they provide about the original composition of a mortar is limited to the color and texture of the sand. The gas collection method provides more information about the binder than a simple acid digestion test.

**Instrumental** analysis methods that have been used to evaluate mortars include polarized light or thin-section microscopy, scanning electron microscopy, atomic absorption spectroscopy, X-ray diffraction, and differential thermal analysis. All instrumental methods require not only expensive, specialized equipment, but also highly-trained experienced analysts. However, instrumental methods can provide much more information about a mortar. Thin-section microscopy is probably the most commonly used instrumental method. Examination of thin slices of a mortar in
transmitted light is often used to supplement acid digestion methods, particularly to look for carbonate-based aggregate. For example, the new ASTM test method, ASTM C 1324-96 "Test Method for Examination and Analysis of Hardened Mortars" which was designed specifically for the analysis of modern lime-cement and masonry cement mortars, combines a complex series of wet chemical analyses with thin-section microscopy.

The drawback of most mortar analysis methods is that mortar samples of known composition have not been analyzed in order to evaluate the method. Historic mortars were not prepared to narrowly defined specifications from materials of uniform quality; they contain a wide array of locally derived materials combined at the discretion of the mason. While a particular method might be able to accurately determine the original proportions of a lime-cement-sand mortar prepared from modern materials, the usefulness of that method for evaluating historic mortars is questionable unless it has been tested against mortars prepared from materials more commonly used in the past. Lorraine Schnabel.

**Properties of Mortar**

Mortars for repointing should be softer or more permeable than the masonry units and no harder or more impermeable than the historic mortar to prevent damage to the masonry units. It is a common error to assume that hardness or high strength is a measure of appropriateness, particularly for lime-based historic mortars. Stresses within a wall caused by expansion, contraction, moisture migration, or settlement must be accommodated in some manner; in a masonry wall, these stresses should be relieved by the mortar rather than by the masonry units. A mortar that is stronger in compressive strength than the masonry units will not "give," thus causing stresses to be relieved through the masonry units--resulting in permanent damage to the masonry, such as cracking and spalling, that cannot be repaired easily.

While stresses can also break the bond between the mortar and the masonry units, permitting water to penetrate the resulting hairline cracks, this is easier to correct in the joint through repointing than if the break occurs in the masonry units.

Permeability, or rate of vapor transmission, is also critical. High lime mortars are more permeable than denser cement mortars. Historically, mortar acted as a bedding material--not unlike an expansion joint--rather than a "glue" for the masonry units, and moisture was able to migrate through the mortar joints rather than the masonry units. When moisture evaporates from the masonry it deposits any soluble salts either on the surface as efflorescence or below the surface as subflorescence. While salts deposited on the surface of masonry units are usually relatively harmless, salt crystallization within a masonry unit creates pressure that can cause parts of the outer surface to spall off or delaminate. If the mortar does not permit moisture or moisture vapor to migrate out of the wall and evaporate, there the result will be damage to the masonry units.

This early 19th century building is being repointed with lime mortar. Photo: Travis McDonald.
**Components of Mortar**

**Sand.** Sand is the largest component of mortar and the material that gives mortar its distinctive color, texture and cohesiveness. Sand must be free of impurities, such as salts or clay. The three key characteristics of sand are: particle shape, gradation and void ratios.

When viewed under a magnifying glass or low-power microscope, particles of sand generally have either rounded edges, such as found in beach and river sand, or sharp, angular edges, found in crushed or manufactured sand. For repointing mortar, rounded or natural sand is preferred for two reasons. It is usually similar to the sand in the historic mortar and provides a better visual match. It also has better working qualities or plasticity and can thus be forced into the joint more easily, forming a good contact with the remaining historic mortar and the surface of the adjacent masonry units. Although manufactured sand is frequently more readily available, it is usually possible to locate a supply of rounded sand.

The gradation of the sand (particle size distribution) plays a very important role in the durability and cohesive properties of a mortar. Mortar must have a certain percentage of large to small particle sizes in order to deliver the optimum performance. Acceptable guidelines on particle size distribution may be found in ASTM C 144 (American Society for Testing and Materials). However, in actuality, since neither historic nor modern sands are always in compliance with ASTM C 144, matching the same particle appearance and gradation usually requires sieving the sand.

A scoop of sand contains many small voids between the individual grains. A mortar that performs well fills all these small voids with binder (cement/lime combination or mix) in a balanced manner. Well-graded sand generally has a 30 per cent void ratio by volume. Thus, 30 per cent binder by volume generally should be used, unless the historic mortar had a different binder: aggregate ratio. This represents the 1:3 binder to sand ratios often seen in mortar specifications.

For repointing, sand generally should conform to ASTM C 144 to assure proper gradation and freedom from impurities; some variation may be necessary to match the original size and gradation. Sand color and texture also should match the original as closely as possible to provide the proper color match without other additives.

**Lime.** Mortar formulations prior to the late-19th century used lime as the primary binding material. Lime is derived from heating limestone at high temperatures which burns off the carbon dioxide, and turns the limestone into quicklime. There are three types of limestone--calcium, magnesium, and dolomitic--differentiated by the different levels of magnesium carbonate they contain which impart specific qualities to mortar. Historically, calcium lime was used for mortar rather than the dolomitic lime (calcium magnesium carbonate) most often used today. But it is also important to keep in mind the fact that the historic limes, and other components of mortar, varied a great deal because they were natural, as opposed to modern lime which is manufactured and, therefore, standardized. Because some of the kinds of lime, as well as other components of mortar, that were used historically are no longer readily available, even when a conscious effort is made to replicate a "historic" mix, this may not be achievable due to the differences between modern and historic materials.

Lime, itself, when mixed with water into a paste is very plastic and creamy. It will remain workable and soft indefinitely, if stored in a
sealed container. Lime (calcium hydroxide) hardens by carbonation absorbing carbon dioxide primarily from the air, converting itself to calcium carbonate. Once a lime and sand mortar is mixed and placed in a wall, it begins the process of carbonation. If lime mortar is left to dry too rapidly, carbonation of the mortar will be reduced, resulting in poor adhesion and poor durability. In addition, lime mortar is slightly water soluble and thus is able to re-seal any hairline cracks that may develop during the life of the mortar. Lime mortar is soft, porous, and changes little in volume during temperature fluctuations thus making it a good choice for historic buildings. Because of these qualities, high calcium lime mortar may be considered for many repointing projects, not just those involving historic buildings.

For repointing, lime should conform to ASTM C 207, Type S, or Type SA, Hydrated Lime for Masonry Purposes. This machine-slaked lime is designed to assure high plasticity and water retention. The use of quicklime which must be slaked and soaked by hand may have advantages over hydrated lime in some restoration projects if time and money allow.

**Lime putty.** Lime putty is slaked lime that has a putty or paste-like consistency. It should conform to ASTM C 5. Mortar can be mixed using lime putty according to ASTM C 270 property or proportion specification.

**Portland cement.** More recent, 20th-century mortar has used portland cement as a primary binding material. A straight portland cement and sand mortar is extremely hard, resists the movement of water, shrinks upon setting, and undergoes relatively large thermal movements. When mixed with water, portland cement forms a harsh, stiff paste that is quite unworkable, becoming hard very quickly. (Unlike lime, portland cement will harden regardless of weather conditions and does not require wetting and drying cycles.) Some portland cement assists the workability and plasticity of the mortar without adversely affecting the finished project; it also provides early strength to the mortar and speeds setting. Thus, it may be appropriate to add some portland cement to an essentially lime-based mortar even when repointing relatively soft 18th or 19th century brick under some circumstances when a slightly harder mortar is required. The more portland cement that is added to a mortar formulation the harder it becomes—and the faster the initial set.

For repointing, portland cement should conform to ASTM C 150. White, non-staining portland cement may provide a better color match for some historic mortars than the more commonly available grey portland cement. But, it should not be assumed, however, that white portland cement is always appropriate for all historic buildings, since the original mortar may have been mixed with grey cement. The cement should not have more than 0.60 per cent alkali to help avoid efflorescence.

**Masonry cement.** Masonry cement is a preblended mortar mix commonly found at hardware and home repair stores. It is designed to produce mortars with a compressive strength of 750 psi or higher when mixed with sand and water at the job site. It may contain hydrated lime, but it always contains a large amount of portland cement, as well as ground limestone and other workability agents, including air-entraining agents.
Because masonry cements are not required to contain hydrated lime, and generally do not contain lime, they produce high strength mortars that can damage historic masonry. For this reason, they generally are not recommended for use on historic masonry buildings.

**Lime mortar (pre-blended).** Hydrated lime mortars, and pre-blended lime putty mortars with or without a matched sand are commercially available. Custom mortars are also available with color. In most instances, pre-blended lime mortars containing sand may not provide an exact match; however, if the project calls for total repointing, a pre-blended lime mortar may be worth considering as long as the mortar is compatible in strength with the masonry. If the project involves only selected, "spot" repointing, then it may be better to carry out a mortar analysis which can provide a custom pre-blended lime mortar with a matching sand. In either case, if a preblended lime mortar is to be used, it should contain Type S or SA hydrated lime conforming to ASTM C 207.

**Water.** Water should be potable--clean and free from acids, alkalis, or other dissolved organic materials.

**Other Components**

**Historic components.** In addition to the color of the sand, the texture of the mortar is of critical importance in duplicating historic mortar. Most mortars dating from the mid-19th century on--with some exceptions--have a fairly homogeneous texture and color. Some earlier mortars are not as uniformly textured and may contain lumps of partially burned lime or "dirty lime", shell (which often provided a source of lime, particularly in coastal areas), natural cements, pieces of clay, lampblack or other pigments, or even animal hair. The visual characteristics of these mortars can be duplicated through the use of similar materials in the repointing mortar.

Replicating such unique or individual mortars will require writing new specifications for each project. If possible, suggested sources for special materials should be included. For example, crushed oyster shells can be obtained in a variety of sizes from poultry supply dealers.

**Pigments.** Some historic mortars, particularly in the late 19th century, were tinted to match or contrast with the brick or stone. Red pigments, sometimes in the form of brick dust, as well as brown, and black pigments were commonly used. Modern pigments are available which can be added to the mortar at the job site, but they should not exceed 10 per cent by weight of the portland cement in the mix, and carbon black should be limited to 2 per cent. Only synthetic mineral oxides, which are alkali-proof and sun-fast, should be used to prevent bleaching and fading.

**Modern components.** Admixtures are used to create specific characteristics in mortar, and whether they should be used will depend upon the individual project. Air entraining agents, for example, help the mortar to resist freeze-thaw damage in northern climates. Accelerators are used to reduce mortar freezing prior to setting while retarders help to extend the mortar life in hot climates. Selection of admixtures should be made by the architect or architectural conservator as part of the specifications, not something routinely added by the masons.

Generally, modern chemical additives are unnecessary and may, in fact, have detrimental effects in historic masonry projects. The use of antifreeze compounds is not recommended. They are not very effective with high lime mortars and may introduce salts, which may cause efflorescence later. A better practice is to warm the sand and
water, and to protect the completed work from freezing. No definitive study has determined whether air-entraining additives should be used to resist frost action and enhance plasticity, but in areas of extreme exposure requiring high-strength mortars with lower permeability, air-entrainment of 10-16 percent may be desirable (see formula for "severe weather exposure" in Mortar Type and Mix). Bonding agents are not a substitute for proper joint preparation, and they should generally be avoided. If the joint is properly prepared, there will be a good bond between the new mortar and the adjacent surfaces. In addition, a bonding agent is difficult to remove if smeared on a masonry surface.

Mortar Type and Mix

Mortars for repointing projects, especially those involving historic buildings, typically are custom mixed in order to ensure the proper physical and visual qualities. These materials can be combined in varying proportions to create a mortar with the desired performance and durability. The actual specification of a particular mortar type should take into consideration all of the factors affecting the life of the building including: current site conditions, present condition of the masonry, function of the new mortar, degree of weather exposure, and skill of the mason. Thus, no two repointing projects are exactly the same. Modern materials specified for use in repointing mortar should conform to specifications of the American Society for Testing and Materials (ASTM) or comparable federal specifications, and the resulting mortar should conform to ASTM C 270, Mortar for Unit Masonry.

Specifying the proportions for the repointing mortar for a specific job is not as difficult as it might seem. Five mortar types, each with a corresponding recommended mix, have been established by ASTM to distinguish high strength mortar from soft flexible mortars. The ASTM designated them in decreasing order of approximate general strength as Type M (2,500 psi), Type S (1,800 psi), Type N (750 psi), Type O (350 psi) and Type K (75 psi). (The letters identifying the types are from the words MASON WORK using every other letter.) Type K has the highest lime content of the mixes that contain portland cement, although it is seldom used today, except for some historic preservation projects. The designation "L" in the accompanying chart identifies a straight lime and sand mix. Specifying the appropriate ASTM mortar by proportion of ingredients, will ensure the desired physical properties. Unless specified otherwise, measurements or proportions for mortar mixes are always given in the following order: cement-lime-sand. Thus, a Type K mix, for example, would be referred to as 1-3-10, or 1 part cement to 3 parts lime to 10 parts sand. Other requirements to create the desired visual qualities should be included in the specifications.

The strength of a mortar can vary. If mixed with higher amounts of portland cement, a harder mortar is obtained. The more lime that is added, the softer and more plastic the mortar becomes, increasing its workability. A mortar strong in compressive strength might be desirable for a hard stone (such as granite) pier holding up a bridge deck, whereas a softer, more permeable lime mortar would be preferable for a historic wall of soft brick. Masonry deterioration caused by salt deposition results when the mortar is less permeable than the masonry unit. A strong mortar is still more permeable than hard, dense stone. However, in a wall constructed of soft bricks where the masonry unit itself has a relatively high permeability or vapor transmission rate, a soft, high lime
mortar is necessary to retain sufficient permeability.

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**Budgeting and Scheduling**

Repointing is both expensive and time consuming due to the extent of handwork and special materials required. It is preferable to repoint only those areas that require work rather than an entire wall, as is often specified. But, if 25 to 50 per cent or more of a wall needs to be repointed, repointing the entire wall may be more cost effective than spot repointing. Total repointing may also be more sensible when access is difficult, requiring the erection of expensive scaffolding (unless the majority of the mortar is sound and unlikely to require replacement in the foreseeable future). Each project requires judgement based on a variety of factors. Recognizing this at the outset will help to prevent many jobs from becoming prohibitively expensive.

In scheduling, seasonal aspects need to be considered first. Generally speaking, wall temperatures between 40 and 95 degrees F (8 and 38 degrees C) will prevent freezing or excessive evaporation of the water in the mortar. Ideally, repointing should be done in shade, away from strong sunlight in order to slow the drying process, especially during hot weather. If necessary, shade can be provided for large-scale projects with appropriate modifications to scaffolding.

The relationship of repointing to other work proposed on the building must also be recognized. For example, if paint removal or cleaning is anticipated, and if the mortar joints are basically sound and need only selective repointing, it is generally better to postpone repointing until after completion of these activities. However, if the mortar has eroded badly, allowing moisture to penetrate deeply into the wall, repointing should be accomplished before cleaning. Related work, such as structural or roof repairs, should be scheduled so that they do not interfere with repointing and so that all work can take maximum advantage of erected scaffolding.

Building managers also must recognize the difficulties that a repointing project can create. The process is time consuming, and scaffolding may need to remain in place for an extended period of time. The joint preparation process can be quite noisy and can generate large quantities of dust which must be controlled, especially at air intakes to protect human health, and also where it might damage operating machinery. Entrances may be blocked from time to time making access difficult for both building tenants and visitors. Clearly, building managers will need to coordinate the repointing work with other events at the site.

**Contractor Selection**

The ideal way to select a contractor is to ask knowledgeable owners of recently repointed historic buildings for recommendations. Qualified contractors then can provide lists of
other repointing projects for inspection. More commonly, however, the contractor for a repointing project is selected through a competitive bidding process over which the client or consultant has only limited control. In this situation it is important to ensure that the specifications stipulate that masons must have a minimum of five years' experience with repointing historic masonry buildings to be eligible to bid on the project. Contracts are awarded to the lowest responsible bidder, and bidders who have performed poorly on other projects usually can be eliminated from consideration on this basis, even if they have the lowest prices.

The contract documents should call for unit prices as well as a base bid. Unit pricing forces the contractor to determine in advance what the cost addition or reduction will be for work which varies from the scope of the base bid. If, for example, the contractor has fifty linear feet less of stone repointing than indicated on the contract documents but thirty linear feet more of brick repointing, it will be easy to determine the final price for the work. Note that each type of work--brick repointing, stone repointing, or similar items--will have its own unit price. The unit price also should reflect quantities; one linear foot of pointing in five different spots will be more expensive than five contiguous linear feet.

**Execution of the Work**

**Test Panels.** These panels are prepared by the contractor using the same techniques that will be used on the remainder of the project. Several panel locations--preferably not on the front or other highly visible location of the building--may be necessary to include all types of masonry, joint styles, mortar colors, and other problems likely to be encountered on the job. If cleaning tests, for example, are also to be undertaken, they should be carried out in the same location. Usually a 3 foot by 3 foot area is sufficient for brickwork, while a somewhat larger area may be required for stonework. These panels establish an acceptable standard of work and serve as a benchmark for evaluating and accepting subsequent work on the building.

**Joint Preparation.** Old mortar should be removed to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "popouts." For most brick joints, this will require removal of the mortar to a depth of approximately ½ to 1 inch; for stone masonry with wide joints, mortar may need to be removed to a depth of several inches. Any loose or disintegrated mortar beyond this minimum depth also should be removed.

Although some damage may be inevitable, careful joint preparation can help limit damage to masonry units. The traditional manner of removing old mortar is through the use of hand chisels and mash hammers. Though labor-intensive, in most instances this method poses the least threat for damage to historic masonry units and produces the best final product.

The most common method of removing mortar, however, is through the use of power saws or grinders. The use of power tools by unskilled masons can be disastrous for historic masonry, particularly soft brick. Using power saws on walls with thin joints, such as most brick walls, almost always will result in damage to the masonry units by
breaking the edges and by overcutting on the head, or vertical joints.

However, small pneumatically-powered chisels generally can be used safely and effectively to remove mortar on historic buildings as long as the masons maintain appropriate control over the equipment. Under certain circumstances, thin diamond-bladed grinders may be used to cut out *horizontal* joints only on hard portland cement mortar common to most early-20th century masonry buildings. Usually, automatic tools most successfully remove old mortar without damaging the masonry units when they are used in combination with hand tools in preparation for repointing. Where horizontal joints are uniform and fairly wide, it may be possible to use a power masonry saw to assist the removal of mortar, such as by cutting along the middle of the joint; final mortar removal from the sides of the joints still should be done with a hand chisel and hammer. Caulking cutters with diamond blades can sometimes be used successfully to cut out joints without damaging the masonry. Caulking cutters are slow; they do not rotate, but vibrate at very high speeds, thus minimizing the possibility of damage to masonry units. Although mechanical tools may be safely used in limited circumstances to cut out horizontal joints in preparation for repointing, they should never be used on vertical joints because of the danger of slipping and cutting into the brick above or below the vertical joint. Using power tools to remove mortar without damaging the surrounding masonry units also necessitates highly skilled masons experienced in working on historic masonry buildings. Contractors should demonstrate proficiency with power tools before their use is approved.

Using any of these power tools may also be more acceptable on hard stone, such as quartzite or granite, than on terra cotta with its glass-like glaze, or on soft brick or stone. The test panel should determine the acceptability of power tools. If power tools are to be permitted, the contractor should establish a quality control program to account for worker fatigue and similar variables.

Mortar should be removed cleanly from the masonry units, leaving square corners at the back of the cut. Before filling, the joints should be rinsed with a jet of water to remove all loose particles and dust. At the time of filling, the joints should be damp, but with no standing water present. For masonry walls--limestone, sandstone and common brick--that are extremely absorbent, it is recommended that a continual mist of water be applied for a few hours before repointing begins.

**Mortar Preparation.** Mortar components should be measured and mixed carefully to assure the uniformity of visual and physical characteristics. Dry ingredients are measured by volume and thoroughly mixed before the addition of any water. Sand must be added in a damp, loose condition to avoid over sanding. Repointing mortar is typically pre-hydrated by adding water so it will just hold together, thus allowing it to stand for a period of time before the final water is added. Half the water should be added, followed by mixing for approximately 5 minutes. The remaining water should then be added in small portions until a mortar of the desired consistency is reached. The total volume of water necessary may vary from batch to batch, depending on weather conditions. It is important to keep the water to a minimum for two reasons: first, a drier mortar is cleaner to work with, and it can be compacted tightly into the joints; second, with no excess water to evaporate, the mortar cures without shrinkage cracks. Mortar should be used within approximately 30 minutes of final mixing, and "retempering," or adding more water, should not be permitted.

**Using Lime Putty to Make Mortar.** Mortar made with lime putty and sand, sometimes referred to as roughage or course stuff, should be measured by volume, and may require slightly different proportions from those used with hydrated lime. No additional water is usually needed to achieve a workable consistency because enough water is
already contained in the putty. Sand is proportioned first, followed by the lime putty, then mixed for five minutes or until all the sand is thoroughly coated with the lime putty. But mixing, in the familiar sense of turning over with a hoe, sometimes may not be sufficient if the best possible performance is to be obtained from a lime putty mortar. Although the old practice of chopping, beating and ramming the mortar has largely been forgotten, recent field work has confirmed that lime putty and sand rammed and beaten with a wooden mallet or ax handle, interspersed by chopping with a hoe, can significantly improve workability and performance. The intensity of this action increases the overall lime/sand contact and removes any surplus water by compacting the other ingredients. It may also be advantageous for larger projects to use a mortar pan mill for mixing. Mortar pan mills which have a long tradition in Europe produce a superior lime putty mortar not attainable with today's modern paddle and drum type mixers.

For larger repointing projects the lime putty and sand can be mixed together ahead of time and stored indefinitely, on or off site, which eliminates the need for piles of sand on the job site. This mixture, which resembles damp brown sugar, must be protected from the air in sealed containers with a wet piece of burlap over the top or sealed in a large plastic bag to prevent evaporation and premature carbonation. The lime putty and sand mixture can be recombined into a workable plastic state months later with no additional water.

If portland cement is specified in a lime putty and sand mortar--Type O (1:2:9) or Type K (1:3:11)--the portland cement should first be mixed into a slurry paste before adding it to the lime putty and sand. Not only will this ensure that the portland cement is evenly distributed throughout the mixture, but if dry portland cement is added to wet ingredients it tends to "ball up," jeopardizing dispersion. (Usually water must be added to the lime putty and sand anyway once the portland cement is introduced.) Any color pigments should be added at this stage and mixed for a full five minutes. The mortar should be used within 30 minutes to 1½ hours and it should not be retempered. Once portland cement has been added the mortar can no longer be stored.

**Filling the Joint.** Where existing mortar has been removed to a depth of greater than 1 inch, these deeper areas should be filled first, compacting the new mortar in several layers. The back of the entire joint should be filled successively by applying approximately 1/4 inch of mortar, packing it well into the back corners. This application may extend along the wall for several feet. As soon as the mortar has reached thumbprint hardness, another 1/4 inch layer of mortar--approximately the same thickness--may be applied. Several layers will be needed to fill the joint flush with the outer surface of the masonry. It is important to allow each layer time to harden before the next layer is applied; most of the mortar shrinkage occurs during the hardening process and layering thus minimizes overall shrinkage.

When the final layer of mortar is thumb-print hard, the joint should be tooled to match the historic joint. Proper timing of the tooing is important for uniform color and appearance. If tooled when too soft, the color will be lighter than expected, and hairline cracks may occur; if tooled when too hard, there may be dark streaks called "tool burning," and good closure of the mortar against the masonry units will not be achieved.

If the old bricks or stones have worn, rounded edges, it is best to recess the final mortar slightly from the face of the masonry. This treatment will help avoid a joint which is visually wider than the actual joint; it also will avoid creation of a large, thin featheredge which is easily damaged, thus admitting water. After tooing, excess mortar can be removed from the edge of the joint by brushing with a natural bristle or nylon brush. Metal bristle brushes should never be used on historic masonry.
Curing Conditions. The preliminary hardening of high-lime content mortars—those mortars that contain more lime by volume than portland cement, i.e., Type O (1:2:9), Type K (1:3:11), and straight lime/sand, Type "L" (0:1:3)—takes place fairly rapidly as water in the mix is lost to the porous surface of the masonry and through evaporation. A high lime mortar (especially Type "L") left to dry out too rapidly can result in chalking, poor adhesion, and poor durability. Periodic wetting of the repointed area after the mortar joints are thumb-print hard and have been finish tooled may significantly accelerate the carbonation process. When feasible, misting using a hand sprayer with a fine nozzle can be simple to do for a day or two after repointing. Local conditions will dictate the frequency of wetting, but initially it may be as often as every hour and gradually reduced to every three or four hours. Walls should be covered with burlap for the first three days after repointing. (Plastic may be used, but it should be tented out and not placed directly against the wall.) This helps keep the walls damp and protects them from direct sunlight. Once carbonation of the lime has begun, it will continue for many years and the lime will gain strength as it reverts back to calcium carbonate within the wall.

Aging the Mortar. Even with the best efforts at matching the existing mortar color, texture, and materials, there will usually be a visible difference between the old and new work, partly because the new mortar has been matched to the unweathered portions of the historic mortar. Another reason for a slight mismatch may be that the sand is more exposed in old mortar due to the slight erosion of the lime or cement. Although spot repointing is generally preferable and some color difference should be acceptable, if the difference between old and new mortar is too extreme, it may be advisable in some instances to repoint an entire area of a wall, or an entire feature such as a bay, to minimize the difference between the old and the new mortar. If the mortars have been properly matched, usually the best way to deal with surface color differences is to let the mortars age naturally. Other treatments to overcome these differences, including cleaning the non-repointed areas or staining the new mortar, should be carefully tested prior to implementation.

Staining the new mortar to achieve a better color match is generally not recommended, but it may be appropriate in some instances. Although staining may provide an initial match, the old and new mortars may weather at different rates, leading to visual differences after a few seasons. In addition, the mixtures used to stain the mortar may be harmful to the masonry; for example, they may introduce salts into the masonry which can lead to efflorescence.

Cleaning the Repointed Masonry. If repointing work is carefully executed, there will be little need for cleaning other than to remove the small amount of mortar from the edge of the joint following toothing. This can be done with a stiff natural bristle or nylon brush after the mortar has dried, but before it is initially set (1-2 hours). Mortar that has hardened can usually be removed with a wooden paddle or, if necessary, a chisel.

Further cleaning is best accomplished with plain water and natural bristle or nylon brushes. If chemicals must be used, they should be selected with extreme caution. Improper cleaning can lead to deterioration of the masonry units, deterioration of the mortar, mortar smear, and efflorescence. New mortar joints are especially susceptible to damage because they do not become fully cured for several months. Chemical cleaners,
particularly acids, should never be used on dry masonry. The masonry should always be completely soaked once with water before chemicals are applied. After cleaning, the walls should be flushed again with plain water to remove all traces of the chemicals.

Several precautions should be taken if a freshly repointed masonry wall is to be cleaned. First, the mortar should be fully hardened before cleaning. Thirty days is usually sufficient, depending on weather and exposure; as mentioned previously, the mortar will continue to cure even after it has hardened. Test panels should be prepared to evaluate the effects of different cleaning methods. Generally, on newly repointed masonry walls, only very low pressure (100 psi) water washing supplemented by stiff natural bristle or nylon brushes should be used, except on glazed or polished surfaces, where only soft cloths should be used.**

New construction "bloom" or efflorescence occasionally appears within the first few months of repointing and usually disappears through the normal process of weathering. If the efflorescence is not removed by natural processes, the safest way to remove it is by dry brushing with stiff natural or nylon bristle brushes followed by wet brushing. Hydrochloric (muriatic) acid, is generally ineffective, and it should not be used to remove efflorescence. It may liberate additional salts, which, in turn, can lead to more efflorescence.

**Surface Grouting** is sometimes suggested as an alternative to repointing brick buildings, in particular. This process involves the application of a thin coat of cement-based grout to the mortar joints and the mortar/brick interface. To be effective, the grout must extend slightly onto the face of the masonry units, thus widening the joint visually. The change in the joint appearance can alter the historic character of the structure to an unacceptable degree. In addition, although masking of the bricks is intended to keep the grout off the remainder of the face of the bricks, some level of residue, called "veiling," will inevitably remain. Surface grouting cannot substitute for the more extensive work of repointing, and it is not a recommended treatment for historic masonry.


**Visually Examining the Mortar and the Masonry Units**

A simple *in situ* comparison will help determine the hardness and condition of the mortar and the masonry units. Begin by scraping the mortar with a screwdriver, and gradually tapping harder with a cold chisel and mason's hammer. Masonry units can be tested in the same way beginning, even more gently, by scraping with a fingernail. This relative analysis which is derived from the 10-point hardness scale used to describe minerals, provides a good starting point for selection of an appropriate mortar. It is described more fully in "The Russack System for Brick & Mortar Description" referenced in Selected Reading at the end of this Brief.

Mortar samples should be chosen carefully, and picked from a variety of locations on the
building to find unweathered mortar, if possible. Portions of the building may have been repointed in the past while other areas may be subject to conditions causing unusual deterioration. There may be several colors of mortar dating from different construction periods or sand used from different sources during the initial construction. Any of these situations can give false readings to the visual or physical characteristics required for the new mortar. Variations should be noted which may require developing more than one mix.

1) Remove with a chisel and hammer three or four unweathered samples of the mortar to be matched from several locations on the building. (Set the largest sample aside--this will be used later for comparison with the repointing mortar). Removing a full representation of samples will allow selection of a "mean" or average mortar sample.

2) Mash the remaining samples with a wooden mallet, or hammer if necessary, until they are separated into their constituent parts. There should be a good handful of the material.

3) Examine the powdered portion--the lime and/or cement matrix of the mortar. Most particularly, note the color. There is a tendency to think of historic mortars as having white binders, but grey portland cement was available by the last quarter of the 19th century, and traditional limes were also sometimes grey. Thus, in some instances, the natural color of the historic binder may be grey, rather than white. The mortar may also have been tinted to create a colored mortar, and this color should be identified at this point.

4) Carefully blow away the powdery material (the lime and/or cement matrix which bound the mortar together).

5) With a low power (10 power) magnifying glass, examine the remaining sand and other materials such as lumps of lime or shell.

6) Note and record the wide range of color as well as the varying sizes of the individual grains of sand, impurities, or other materials.

Other Factors to Consider

**Color.** Regardless of the color of the binder or colored additives, the sand is the primary material that gives mortar its color. A surprising variety of colors of sand may be found in a single sample of historic mortar, and the different sizes of the grains of sand or other materials, such as incompletely ground lime or cement, play an important role in the texture of the repointing mortar. Therefore, when specifying sand for repointing mortar, it may be necessary to obtain sand from several sources and to combine or screen them in order to approximate the range of sand colors and grain sizes in the historic mortar sample.

**Pointing Style.** Close examination of the historic masonry wall and the techniques used in the original construction will assist in maintaining the visual qualities of the building. Pointing styles and the methods of producing them should be examined. It is important to look at both the horizontal and the vertical joints to determine the order in which they were tooled and whether they were the same style. Some late-19th and early-20th century buildings, for example, have horizontal joints that were raked back while the vertical joints were finished flush and stained to match the bricks, thus creating the illusion of horizontal bands. Pointing styles may also differ from one facade to another; front walls often received greater attention to mortar detailing than side and rear walls.
Tuckpointing is not true repointing but the application of a raised joint or lime putty joint on top of flush mortar joints. Penciling is a purely decorative, painted surface treatment over a mortar joint, often in a contrasting color.

Masonry Units. The masonry units should also be examined so that any replacement units will match the historic masonry. Within a wall there may be a wide range of colors, textures, and sizes, particularly with hand-made brick or rough-cut, locally-quarried stone. Replacement units should blend in with the full range of masonry units rather than a single brick or stone.

Matching Color and Texture of the Repointing Mortar

New mortar should match the unweathered interior portions of the historic mortar. The simplest way to check the match is to make a small sample of the proposed mix and allow it to cure at a temperature of approximately 70 degrees F for about a week, or it can be baked in an oven to speed up the curing; this sample is then broken open and the surface is compared with the surface of the largest "saved" sample of historic mortar.

If a proper color match cannot be achieved through the use of natural sand or colored aggregates like crushed marble or brick dust, it may be necessary to use a modern mortar pigment.

During the early stages of the project, it should be determined how closely the new mortar should match the historic mortar. Will "quite close" be sufficient, or is "exactly" expected? The specifications should state this clearly so that the contractor has a reasonable idea how much time and expense will be required to develop an acceptable match.

The same judgment will be necessary in matching replacement terra cotta, stone or brick. If there is a known source for replacements, this should be included in the specifications. If a source cannot be determined prior to the bidding process, the specifications should include an estimated price for the replacement materials with the final price based on the actual cost to the contractor.

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<tr>
<th>Mortar Types</th>
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<td>Designation</td>
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<th>Suggested Mortar Types for Different Exposures</th>
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<td>Exposure</td>
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<td>Masonry Material</td>
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<td>Very durable:</td>
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Summary

For the Owner/Administrator. The owner or administrator of a historic building should remember that repointing is likely to be a lengthy and expensive process. First, there must be adequate time for evaluation of the building and investigation into the cause of problems. Then, there will be time needed for preparation of the contract documents. The work itself is precise, time-consuming and noisy, and scaffolding may cover the face of the building for some time. Therefore, the owner must carefully plan the work to avoid problems. Schedules for both repointing and other activities will thus require careful coordination to avoid unanticipated conflicts. The owner must avoid the tendency to rush the work or cut corners if the historic building is to retain its visual integrity and the job is to be durable.

For the Architect/Consultant. Because the primary role of the consultant is to ensure the life of the building, a knowledge of historic construction techniques and the special problems found in older buildings is essential. The consultant must assist the owner in planning for logistical problems relating to research and construction. It is the consultant’s responsibility to determine the cause of the mortar deterioration and ensure that it is corrected before the masonry is repointed. The consultant must also be prepared to spend more time in project inspections than is customary in modern construction.

For the Masons. Successful repointing depends on the masons themselves. Experienced masons understand the special requirements for work on historic buildings and the added time and expense they require. The entire masonry crew must be willing and able to perform the work in conformance with the specifications, even when the specifications may not be in conformance with standard practice. At the same time, the masons should not hesitate to question the specifications if it appears that the work specified would damage the building.

Conclusion

A good repointing job is meant to last, at least 30 years, and preferably 50-100 years. Shortcuts and poor craftsmanship result not only in diminishing the historic character of a building, but also in a job that looks bad, and will require future repointing sooner than if the work had been done correctly. The mortar joint in a historic masonry building has often been called a wall’s "first line of defense." Good repointing practices guarantee the long life of the mortar joint, the wall, and the historic structure. Although careful maintenance will help preserve the freshly repointed mortar joints, it is important to remember that mortar joints are intended to be sacrificial and will probably require repointing some time in the future. Nevertheless, if the historic mortar joints proved durable for many years, then careful repointing should have an equally long life, ultimately contributing to the preservation of the entire building.
Selected Reading


Technical Notes on Brick Construction. Brick Institute of America, Reston, VA.


**Useful Addresses**

Brick Institute of America  
11490 Commerce Park Drive  
Reston, VA 22091

National Lime Association  
200 N. Glebe Road, Suite 800  
Arlington, VA 22203

Portland Cement Association  
5420 Old Orchard Road  
Skokie, IL 60077

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**Washington, D.C. October, 1998**

Home page logo: Soft mortar for repointing. Photo: John P. Speweik.
This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Technical Preservation Services (TPS), Heritage Preservation Services Division, National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.
Significance of the Roof

A weather-tight roof is basic in the preservation of a structure, regardless of its age, size, or design. In the system that allows a building to work as a shelter, the roof sheds the rain, shades from the sun, and buffers the weather.

During some periods in the history of architecture, the roof imparts much of the architectural character. It defines the style and contributes to the building's aesthetics. The hipped roofs of Georgian architecture, the turrets of Queen Anne, the Mansard roofs, and the graceful slopes of the Shingle Style and Bungalow designs are examples of the use of roofing as a major design feature.

But no matter how decorative the patterning or how compelling the form, the roof is a highly vulnerable element of a shelter that will inevitably fail. A poor roof will permit the accelerated deterioration of historic building materials--masonry, wood, plaster, paint--and will cause general disintegration of the basic structure. Furthermore, there is an urgency involved in repairing a leaky roof since such repair costs will quickly become prohibitive. Although such action is desirable as soon as a failure is discovered, temporary patching methods should be carefully chosen to prevent inadvertent damage to sound or historic roofing materials and related features. Before any repair work is performed, the historic value of the materials used on the roof should be understood. Then a complete internal and external inspection of the roof should be planned to determine all the causes of failure and to identify the alternatives for repair or replacement of the roofing.
Historic Roofing Materials in America

**Clay Tile:** European settlers used clay tile for roofing as early as the mid-17th century; many pantiles (S-curved tiles), as well as flat roofing tiles, were used in Jamestown, Virginia. In some cities such as New York and Boston, clay was popularly used as a precaution against such fires as those that engulfed London in 1666 and scorched Boston in 1679.

Tiles roofs found in the mid-18th century Moravian settlements in Pennsylvania closely resembled those found in Germany. Typically, the tiles were 1415" long, 67" wide with a curved butt. A lug on the back allowed the tiles to hang on the lathing without nails or pegs. The tile surface was usually scored with finger marks to promote drainage. In the Southwest, the tile roofs of the Spanish missionaries (mission tiles) were first manufactured (ca. 1780) at the Mission San Antonio de Padua in California. These semicircular tiles were made by molding clay over sections of logs, and they were generally 22" long and tapered in width.

The plain or flat rectangular tiles most commonly used from the 17th through the beginning of the 19th century measured about 10" by 6" by 1/2," and had two holes at one end for a nail or peg fastener. Sometimes mortar was applied between the courses to secure the tiles in a heavy wind.

In the mid-19th century, tile roofs were often replaced by sheet-metal roofs, which were lighter and easier to install and maintain. However, by the turn of the century, the Romanesque Revival and Mission style buildings created a new demand and popularity for this picturesque roofing material.

**Slate:** Another practice settlers brought to the New World was slate roofing. Evidence of roofing slates have been found also among the ruins of mid-17th century Jamestown. But because of the cost and the time required to obtain the material, which was mostly imported from Wales, the use of slate was initially limited. Even in Philadelphia (the second largest city in the English-speaking world at the time of the Revolution) slates were so rare that "The Slate Roof House" distinctly referred to William Penn’s home built late in the 1600s. Sources of native slate were known to exist along the eastern seaboard from Maine to Virginia, but difficulties in inland transportation limited its availability to the cities, and contributed to its expense. Welsh slate continued to be imported until the development of canals and railroads in the mid-19th century made American slate more accessible and economical.

Slate was popular for its durability, fireproof qualities, and aesthetic potential. Because slate was available in different colors (red, green, purple, and blue-gray), it was an effective material for decorative patterns on many 19th century roofs (Gothic and Mansard styles). Slate continued to be used well into the 20th century, notably on many Tudor revival style buildings of the 1920s.
**Shingles:** Wood shingles were popular throughout the country in all periods of building history. The size and shape of the shingles as well as the detailing of the shingle roof differed according to regional craft practices. People within particular regions developed preferences for the local species of wood that most suited their purposes. In New England and the Delaware Valley, white pine was frequently used: in the South, cypress and oak; in the far west, red cedar or redwood. Sometimes a protective coating was applied to increase the durability of the shingle such as a mixture of brick dust and fish oil, or a paint made of red iron oxide and linseed oil.

Commonly in urban areas, wooden roofs were replaced with more fire resistant materials, but in rural areas this was not a major concern. On many Victorian country houses, the practice of wood shingling survived the technological advances of metal roofing in the 19th century, and near the turn of the century enjoyed a full revival in its namesake, the Shingle Style. Colonial revival and the Bungalow styles in the 20th century assured wood shingles a place as one of the most fashionable, domestic roofing materials.

**Metal:** Metal roofing in America is principally a 19th-century phenomenon. Before then the only metals commonly used were lead and copper. For example, a lead roof covered "Rosewell," one of the grandest mansions in 18th century Virginia. But more often, lead was used for protective flashing. Lead, as well as copper, covered roof surfaces where wood, tile, or slate shingles were inappropriate because of the roof's pitch or shape.

Copper with standing seams covered some of the more notable early American roofs including that of Christ Church (1727-1744) in Philadelphia. Flat-seamed copper was used on many domes and cupolas. The copper sheets were imported from England until the end of the 18th century when facilities for rolling sheet metal were developed in America.

Sheet iron was first known to have been manufactured here by the Revolutionary War financier, Robert Morris, who had a rolling mill near Trenton, New Jersey. At his mill Morris produced the roof of his own Philadelphia mansion, which he started in 1794. The architect Benjamin H. Latrobe used sheet iron to replace the roof on Princeton's "Nassau Hall," which had been gutted by fire in 1802.

The method for corrugating iron was originally patented in England in 1829. Corrugating stiffened the sheets, and allowed greater span over a lighter framework, as well as reduced installation time and labor. In 1834 the American architect William Strickland proposed corrugated iron to cover his design for the market place in Philadelphia.
Galvanizing with zinc to protect the base metal from rust was developed in France in 1837. By the 1850s the material was used on post offices and customhouses, as well as on train sheds and factories. In 1857 one of the first metal roofs in the South was installed on the U.S. Mint in New Orleans. The Mint was thereby "fireproofed" with a 20-gauge galvanized, corrugated iron roof on iron trusses.

Tin-plate iron, commonly called "tin roofing," was used extensively in Canada in the 18th century, but it was not as common in the United States until later. Thomas Jefferson was an early advocate of tin roofing, and he installed a standing-seam tin roof on "Monticello" (ca. 1770-1802). The Arch Street Meetinghouse (1804) in Philadelphia had tin shingles laid in a herringbone pattern on a "piazza" roof.

However, once rolling mills were established in this country, the low cost, light weight, and low maintenance of tin plate made it the most common roofing material. Embossed tin shingles, whose surfaces created interesting patterns, were popular throughout the country in the late 19th century. Tin roofs were kept well-painted, usually red; or, as the architect A. J. Davis suggested, in a color to imitate the green patina of copper.

Terne plate differed from tin plate in that the iron was dipped in an alloy of lead and tin, giving it a duller finish. Historic, as well as modern, documentation often confuses the two, so much that it is difficult to determine how often actual "terne" was used.

Zinc came into use in the 1820s, at the same time tin plate was becoming popular. Although a less expensive substitute for lead, its advantages were controversial, and it was never widely used in this country.

Other Materials: Asphalt shingles and roll roofing were used in the 1890s. Many roofs of asbestos, aluminum, stainless steel, galvanized steel, and lead-coated copper may soon have historic values as well. Awareness of these and other traditions of roofing materials and their detailing will contribute to more sensitive preservation treatments.

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**Locating the Problem**

**Failures of Surface Materials**

When trouble occurs, it is important to contact a professional, either an architect, a reputable roofing contractor, or a craftsman familiar with the inherent characteristics of the particular historic roofing system involved. These professionals may be able to advise on immediate patching procedures and help plan more permanent repairs. A thorough examination of the roof should start with an appraisal of the existing condition and quality of the roofing material itself. Particular attention should be given to any southern slope because year-round exposure to direct sun may cause it to break down first.
**Wood:** Some historic roofing materials have limited life expectancies because of normal organic decay and "wear." For example, the flat surfaces of wood shingles erode from exposure to rain and ultraviolet rays. Some species are more hardy than others, and heartwood, for example, is stronger and more durable than sapwood.

Ideally, shingles are split with the grain perpendicular to the surface. This is because if shingles are sawn across the grain, moisture may enter the grain and cause the wood to deteriorate. Prolonged moisture on or in the wood allows moss or fungi to grow, which will further hold the moisture and cause rot.

**Metal:** Of the inorganic roofing materials used on historic buildings, the most common are perhaps the sheet metals: lead, copper, zinc, tin plate, terne plate, and galvanized iron. In varying degrees each of these sheet metals are likely to deteriorate from chemical action by pitting or streaking. This can be caused by airborne pollutants; acid rainwater; acids from lichen or moss; alkalis found in lime mortars or portland cement, which might be on adjoining features and washes down on the roof surface; or tannic acids from adjacent wood sheathings or shingles made of red cedar or oak.

Corrosion from "galvanic action" occurs when dissimilar metals, such as copper and iron, are used in direct contact. Corrosion may also occur even though the metals are physically separated; one of the metals will react chemically against the other in the presence of an electrolyte such as rainwater. In roofing, this situation might occur when either a copper roof is decorated with iron cresting, or when steel nails are used in copper sheets. In some instances the corrosion can be prevented by inserting a plastic insulator between the dissimilar materials. Ideally, the fasteners should be a metal sympathetic to those involved.

Iron rusts unless it is well-painted or plated. Historically this problem was avoided by use of tin plating or galvanizing. But this method is durable only as long as the coating remains intact. Once the plating is worn or damaged, the exposed iron will rust. Therefore, any iron-based roofing material needs to be undercoated, and its surface needs to be kept well-painted to prevent corrosion.

One cause of sheet metal deterioration is fatigue. Depending upon the size and the gauge of the metal sheets, wear and metal failure can occur at the joints or at any protrusions in the sheathing as a result from the metal's alternating movement to thermal changes. Lead will tear because of "creep," or the gravitational stress that causes the material to move down the roof slope.

**Slate:** Perhaps the most durable roofing materials are slate and tile. Seemingly indestructible, both vary in quality. Some slates are hard and tough without being brittle. Soft slates are more subject to erosion and to attack by airborne and rainwater chemicals, which cause the slates to wear at nail holes, to delaminate, or to break. In winter, slate is very susceptible to breakage by ice, or ice dams.

**Tile:** Tiles will weather well, but tend to crack or break if hit, as by tree branches, or if
they are walked on improperly. Like slates, tiles cannot support much weight. Low quality tiles that have been insufficiently fired during manufacture, will craze and spall under the effects of freeze and thaw cycles on their porous surfaces.

**Failures of Support Systems**

Once the condition of the roofing material has been determined, the related features and support systems should be examined on the exterior and on the interior of the roof. The gutters and downspouts need periodic cleaning and maintenance since a variety of debris fill them, causing water to back up and seep under roofing units. Water will eventually cause fasteners, sheathing, and roofing structure to deteriorate. During winter, the daily freeze-thaw cycles can cause ice floes to develop under the roof surface. The pressure from these ice floes will dislodge the roofing material, especially slates, shingles, or tiles. Moreover, the buildup of ice dams above the gutters can trap enough moisture to rot the sheathing or the structural members.

Many large public buildings have built-in gutters set within the perimeter of the roof. The downspouts for these gutters may run within the walls of the building, or drainage may be through the roof surface or through a parapet to exterior downspouts. These systems can be effective if properly maintained; however, if the roof slope is inadequate for good runoff, or if the traps are allowed to clog, rainwater will form pools on the roof surface. Interior downspouts can collect debris and thus back up, perhaps leaking water into the surrounding walls. Exterior downspouts may fill with water, which in cold weather may freeze and crack the pipes. Conduits from the built-in gutter to the exterior downspout may also leak water into the surrounding roof structure or walls.

Failure of the flashing system is usually a major cause of roof deterioration. Flashing should be carefully inspected for failure caused by either poor workmanship, thermal stress, or metal deterioration (both of flashing material itself and of the fasteners). With many roofing materials, the replacement of flashing on an existing roof is a major operation, which may require taking up large sections of the roof surface. Therefore, the installation of top quality flashing material on a new or replaced roof should be a primary consideration. **Remember, some roofing and flashing materials are not compatible.**

Roof fasteners and clips should also be made of a material compatible with all other materials used, or coated to prevent rust. For example, the tannic acid in oak will corrode iron nails. Some roofs such as slate and sheet metals may fail if nailed too rigidly.

If the roof structure appears sound and nothing indicates recent movement, the area to be examined most closely is the roof substrate—the sheathing or the battens. The danger spots would be near the roof plates, under any exterior patches, at the intersections of the roof planes, or at vertical surfaces such as dormers. Water penetration, indicating a breach in the roofing surface or flashing, should be readily apparent, usually as a damp spot or stain. Probing with a small pen knife may reveal any rot which may indicate previously undetected damage to the roofing membrane. Insect infestation evident by small exit holes and frass (a sawdustlike debris) should also be noted. Condensation on the underside of the roofing is undesirable and indicates improper ventilation. Moisture
will have an adverse effect on any roofing material; a good roof stays dry inside and out.

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**Repair or Replace**

Understanding potential weaknesses of roofing material also requires knowledge of repair difficulties. Individual slates can be replaced normally without major disruption to the rest of the roof, but replacing flashing on a slate roof can require substantial removal of surrounding slates. If it is the substrate or a support material that has deteriorated, many surface materials such as slate or tile can be reused if handled care fully during the repair. Such problems should be evaluated at the outset of any project to determine if the roof can be effectively patched, or if it should be completely replaced.

Will the repairs be effective? Maintenance costs tend to multiply once trouble starts. As the cost of labor escalates, repeated repairs could soon equal the cost of a new roof.

The more durable the surface is initially, the easier it will be to maintain. Some roofing materials such as slate are expensive to install, but if top quality slate and flashing are used, it will last 40-60 years with minimal maintenance. Although the installation cost of the roof will be high, low maintenance needs will make the lifetime cost of the roof less expensive.

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**Historical Research**

In a restoration project, research of documents and physical investigation of the building usually will establish the roof’s history. Documentary research should include any original plans or building specifications, early insurance surveys, newspaper descriptions, or the personal papers and files of people who owned or were involved in the history of the building. Old photographs of the building might provide evidence of missing details.

Along with a thorough understanding of any written history of the building, a physical investigation of the roofing and its structure may reveal information about the roof’s construction history. Starting with an overall impression of the structure, are there any changes in the roof slope, its configuration, or roofing materials? Perhaps there are obvious patches or changes in patterning of exterior brickwork where a gable roof was changed to a gambrel, or where a whole upper story was added. Perhaps there are obvious stylistic changes in the roof line, dormers, or ornamentation. These observations could help one understand any important alteration, and could help establish the direction of further investigation.

Because most roofs are physically out of the range of careful scrutiny, the "principle of least effort" has probably limited the extent and quality of previous patching or replacing, and usually considerable evidence of an earlier roof surface remains. Sometimes the older roof will be found as an underlayment of the current exposed roof. Original roofing may still be intact in awkward places under later features on a roof. Often if there is any unfinished attic space, remnants of roofing may have been dropped and left when the roof was being built or repaired. If the configuration of the roof has been changed, some of the original material might still be in place under the existing roof. Sometimes whole sections of the roof and roof framing will have been left intact under the higher roof. The profile and/or flashing of the earlier roof may be apparent on
the interior of the walls at the level of the alteration. If the sheathing or lathing appears to have survived changes in the roofing surface, they may contain evidence of the roofing systems. These may appear either as dirt marks, which provide "shadows" of a roofing material, or as nails broken or driven down into the wood, rather than pulled out during previous alterations or repairs. Wooden headers in the roof framing may indicate that earlier chimneys or skylights have been removed. Any metal ornamentation that might have existed may be indicated by anchors or unusual markings along the ridge or at other edges of the roof. This primary evidence is essential for a full understanding of the roof's history.

Caution should be taken in dating early "fabric" on the evidence of a single item, as recycling of materials is not a mid-20th century innovation. Carpenters have been reusing materials, sheathing, and framing members in the interest of economy for centuries. Therefore, any analysis of the materials found, such as nails or sawmarks on the wood, requires an accurate knowledge of the history of local building practices before any final conclusion can be accurately reached. It is helpful to establish a sequence of construction history for the roof and roofing materials; any historic fabric or pertinent evidence in the roof should be photographed, measured, and recorded for future reference.

During the repair work, useful evidence might unexpectedly appear. It is essential that records be kept of any type of work on a historic building, before, during, and after the project. Photographs are generally the easiest and fastest method, and should include overall views and details at the gutters, flashing, dormers, chimneys, valleys, ridges, and eaves. All photographs should be immediately labeled to insure accurate identification at a later date. Any patterning or design on the roofing deserves particular attention. For example, slate roofs are often decorative and have subtle changes in size, color, and texture, such as a gradually decreasing coursing length from the eave to the peak. If not carefully noted before a project begins, there may be problems in replacing the surface. The standard reference for this phase of the work is *Recording Historic Buildings*, compiled by Harley J. McKee for the Historic American Buildings Survey, National Park Service, Washington, D.C., 1970.

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**Replacing the Historic Roofing Material**

Professional advice will be needed to assess the various aspects of replacing a historic roof. With some exceptions, most historic roofing materials are available today. If not, an architect or preservation group who has previously worked with the same type material may be able to recommend suppliers. Special roofing materials, such as tile or embossed metal shingles, can be produced by manufacturers of related products that are commonly used elsewhere, either on the exterior or interior of a structure. With some creative thinking and research, the historic materials usually can be found.

**Craft Practices:** Determining the craft practices used in the installation of a historic roof is another major concern in roof restoration. Early builders took great pride in their work, and experience has shown
that the "rustic" or irregular designs commercially labeled "Early American" are a 20th-century invention. For example, historically, wood shingles underwent several distinct operations in their manufacture including splitting by hand, and smoothing the surface with a draw knife. In modern nomenclature, the same item would be a "tapersplit" shingle which has been dressed. Unfortunately, the rustic appearance of today's commercially available "handsplit" and re-sawn shingle bears no resemblance to the handmade roofing materials used on early American buildings.

Early craftsmen worked with a great deal of common sense; they understood their materials. For example they knew that wood shingles should be relatively narrow; shingles much wider than about 6" would split when walked on, or they may curl or crack from varying temperature and moisture. It is important to understand these aspects of craftsmanship, remembering that people wanted their roofs to be weather-tight and to last a long time. The recent use of "mother goose" shingles on historic structures is a gross underestimation of the early craftsman's skills.

Supervision: Finding a modern craftsman to reproduce historic details may take some effort. It may even involve some special instruction to raise his understanding of certain historic craft practices. At the same time, it may be pointless (and expensive) to follow historic craft practices in any construction that will not be visible on the finished product. But if the roofing details are readily visible, their appearance should be based on architectural evidence or on historic prototypes. For instance, the spacing of the seams on a standing-seam metal roof will affect the building's overall scale and should therefore match the original dimensions of the seams.

Many older roofing practices are no longer performed because of modern improvements. Research and review of specific detailing in the roof with the contractor before beginning the project is highly recommended. For example, one early craft practice was to finish the ridge of a wood shingle roof with a roof "comb"--that is, the top course of one slope of the roof was extended uniformly beyond the peak to shield the ridge, and to provide some weather protection for the raw horizontal edges of the shingles on the other slope. If the "comb" is known to have been the correct detail, it should be used. Though this method leaves the top course vulnerable to the weather, a disguised strip of flashing will strengthen this weak point.

Detail drawings or a sample mockup will help ensure that the contractor or craftsman understands the scope and special requirements of the project. It should never be assumed that the modern carpenter, slater, sheet metal worker, or roofer will know all the historic details. Supervision is as important as any other stage of the process.

Alternative Materials

The use of the historic roofing material on a structure may be restricted by building codes or by the availability of the materials, in which case an appropriate alternative will have to be found.

Some municipal building codes allow variances for roofing materials in historic districts. In other instances, individual variances may be obtained. Most modern heating and cooking is fueled by gas, electricity, or oil--none of which emit the hot embers that historically have been the cause of roof fires. Where wood burning fireplaces or stoves are used, spark arrester screens at the top of the chimneys help to prevent flaming...
material from escaping, thus reducing the number of fires that start at the roof. In most states, insurance rates have been equalized to reflect revised considerations for the risks involved with various roofing materials.

In a rehabilitation project, there may be valid reasons for replacing the roof with a material other than the original. The historic roofing may no longer be available, or the cost of obtaining specially fabricated materials may be prohibitive. But the decision to use an alternative material should be weighed carefully against the primary concern to keep the historic character of the building. If the roof is flat and is not visible from any elevation of the building, and if there are advantages to substituting a modern built-up composition roof for what might have been a flat metal roof, then it may make better economic and construction sense to use a modern roofing method. But if the roof is readily visible, the alternative material should match as closely as possible the scale, texture, and coloration of the historic roofing material.

Asphalt shingles or ceramic tiles are common substitute materials intended to duplicate the appearance of wood shingles, slates, or tiles. Fire-retardant, treated wood shingles are currently available. The treated wood tends, however, to be brittle, and may require extra care (and expense) to install. In some instances, shingles laid with an interlay of fire-retardant building paper may be an acceptable alternative.

Lead-coated copper, terne-coated steel, and aluminum/zinc-coated steel can successfully replace tin, terne plate, zinc, or lead. Copper-coated steel is a less expensive (and less durable) substitute for sheet copper.

The search for alternative roofing materials is not new. As early as the 18th century, fear of fire caused many wood shingle or board roofs to be replaced by sheet metal or clay tile. Some historic roofs were failures from the start, based on overambitious and naive use of materials as they were first developed. Research on a structure may reveal that an inadequately designed or a highly combustible roof was replaced early in its history, and therefore restoration of a later roof material would have a valid precedent. In some cities, the substitution of sheet metal on early row houses occurred as soon as the rolled material became available.

Cost and ease of maintenance may dictate the substitution of a material wholly different in appearance from the original. The practical problems (wind, weather, and roof pitch) should be weighed against the historical consideration of scale, texture, and color. Sometimes the effect of the alternative material will be minimal. But on roofs with a high degree of visibility and patterning or texture, the substitution may seriously alter the architectural character of the building.

**Temporary Stabilization**

It may be necessary to carry out an immediate and temporary stabilization to prevent further deterioration until research can determine how the roof should be restored or rehabilitated, or until funding can be provided to do a proper job. A simple covering of exterior plywood or roll roofing might provide adequate protection, but any temporary covering should be applied with caution. One should be careful not to overload the roof structure, or to damage or destroy historic evidence or fabric that might be incorporated into a new roof at a later date. In this sense, repairs with caulking or bituminous patching compounds should be recognized as potentially harmful, since they are difficult to remove, and at their best, are very temporary.
Precautions

The architect or contractor should warn the owner of any precautions to be taken against the specific hazards in installing the roofing material. Soldering of sheet metals, for instance, can be a fire hazard, either from the open flame or from overheating and undetected smoldering of the wooden substrate materials.

Thought should be given to the design and placement of any modern roof appurtenances such as plumbing stacks, air vents, or TV antennas. Consideration should begin with the placement of modern plumbing on the interior of the building, otherwise a series of vent stacks may pierce the roof membrane at various spots creating maintenance problems as well as aesthetic ones. Air handling units placed in the attic space will require vents which, in turn, require sensitive design. Incorporating these in unused chimneys has been very successful in the past.

Whenever gutters and downspouts are needed that were not on the building historically, the additions should be made as unobtrusively as possible, perhaps by painting them out with a color compatible with the nearby wall or trim.

Maintenance

Although a new roof can be an object of beauty, it will not be protective for long without proper maintenance. At least twice a year, the roof should be inspected against a checklist. All changes should be recorded and reported. Guidelines should be established for any foot traffic that may be required for the maintenance of the roof. Many roofing materials should not be walked on at all. For some--slate, asbestos, and clay tile--a self-supporting ladder might be hung over the ridge of the roof, or planks might be spanned across the roof surface. Such items should be specifically designed and kept in a storage space accessible to the roof. If exterior work ever requires hanging scaffolding, use caution to insure that the anchors do not penetrate, break, or wear the roofing surface, gutters, or flashing.

Any roofing system should be recognized as a membrane that is designed to be self-sustaining, but that can be easily damaged by intrusions such as pedestrian traffic or fallen tree branches. Certain items should be checked at specific times. For example, gutters tend to accumulate leaves and debris during the spring and fall and after heavy rain. Hidden gutter screening both at downspouts and over the full length of the gutter could help keep them clean. The surface material would require checking after a storm as well. Periodic checking of the underside of the roof from the attic after a storm or winter freezing may give early warning of any leaks. Generally, damage from water or ice is less likely on a roof that has good flashing on the outside and is well ventilated and insulated on the inside. Specific instructions for the maintenance of the different roof materials should be available from the architect or contractor.
Summary

The essential ingredients for replacing and maintaining a historic roof are:

- **Understanding the historic character** of the building and being sympathetic to it.

- **Careful examination and recording** of the existing roof and any evidence of earlier roofs.

- **Consideration of the historic craftsmanship** and detailing and implementing them in the renewal wherever visible.

- **Supervision of the roofers** or maintenance personnel to assure preservation of historic fabric and proper understanding of the scope and detailing of the project.

- **Consideration of alternative materials** where the original cannot be used.

- **Cyclical maintenance** program to assure that the staff understands how to take care of the roof and of the particular trouble spots to safeguard.

With these points in mind, it will be possible to preserve the architectural character and maintain the physical integrity of the roofing on a historic building.

Additional Readings


many designs and details of slate roofs)


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Washington, D.C. February, 1978

**Home page logo:** Decorative roofing feature. Photo: HABS Collection, NPS.

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The windows on many historic buildings are an important aspect of the architectural character of those buildings. Their design, craftsmanship, or other qualities may make them worthy of preservation. This is self-evident for ornamental windows, but it can be equally true for warehouses or factories where the windows may be the most dominant visual element of an otherwise plain building. Evaluating the significance of these windows and planning for their repair or replacement can be a complex process involving both objective and subjective considerations. The Secretary of the Interior's Standards for Rehabilitation and the accompanying guidelines, call for respecting the significance of original materials and features, repairing and retaining them wherever possible, and when necessary, replacing them in kind. This Brief is based on the issues of significance and repair which are implicit in the standards, but the primary emphasis is on the technical issues of planning for the repair of windows including evaluation of their physical condition, techniques of repair, and design considerations when replacement is necessary.

Much of the technical section presents repair techniques as an instructional guide for the do-it-yourselfer. The information will be useful, however, for the architect, contractor, or developer on large-scale projects. It presents a methodology for approaching the evaluation and repair of existing windows, and considerations for replacement, from which the professional can develop alternatives and specify appropriate materials and procedures.
Evaluating the architectural or historical significance of windows is the first step in planning for window treatments, and a general understanding of the function and history of windows is vital to making a proper evaluation. As a part of this evaluation, one must consider four basic window functions: admitting light to the interior spaces, providing fresh air and ventilation to the interior, providing a visual link to the outside world, and enhancing the appearance of a building. No single factor can be disregarded when planning window treatments; for example, attempting to conserve energy by closing up or reducing the size of window openings may result in the use of more energy by increasing electric lighting loads and decreasing passive solar heat gains.

Historically, the first windows in early American houses were casement windows; that is, they were hinged at the side and opened outward. In the beginning of the eighteenth century single- and double-hung windows were introduced. Subsequently many styles of these vertical sliding sash windows have come to be associated with specific building periods or architectural styles, and this is an important consideration in determining the significance of windows, especially on a local or regional basis. Site-specific, regionally oriented architectural comparisons should be made to determine the significance of windows in question. Although such comparisons may focus on specific window types and their details, the ultimate determination of significance should be made within the context of the whole building, wherein the windows are one architectural element.

After all of the factors have been evaluated, windows should be considered significant to a building if they: 1) are original, 2) reflect the original design intent for the building, 3) reflect period or regional styles or building practices, 4) reflect changes to the building resulting from major periods or events, or 5) are examples of exceptional craftsmanship or design. Once this evaluation of significance has been completed, it is possible to proceed with planning appropriate treatments, beginning with an investigation of the physical condition of the windows.

### Physical Evaluation

The key to successful planning for window treatments is a careful evaluation of existing physical conditions on a unit-by-unit basis. A graphic or photographic system may be devised to record existing conditions and illustrate the scope of any necessary repairs. Another effective tool is a window schedule which lists all of the parts of each window unit. Spaces by each part allow notes on existing conditions and repair instructions. When such a schedule is completed, it indicates the precise tasks to be performed in the repair of each unit and becomes a part of the specifications. In any evaluation, one should note at a minimum:

- 1) window location
- 2) condition of the paint
3) condition of the frame and sill
4) condition of the sash (rails, stiles and muntins)
5) glazing problems
6) hardware, and
7) the overall condition of the window (excellent, fair, poor, and so forth)

Many factors such as poor design, moisture, vandalism, insect attack, and lack of maintenance can contribute to window deterioration, but moisture is the primary contributing factor in wooden window decay. All window units should be inspected to see if water is entering around the edges of the frame and, if so, the joints or seams should be caulked to eliminate this danger. The glazing putty should be checked for cracked, loose, or missing sections which allow water to saturate the wood, especially at the joints. The back putty on the interior side of the pane should also be inspected, because it creates a seal which prevents condensation from running down into the joinery. The sill should be examined to insure that it slopes downward away from the building and allows water to drain off. In addition, it may be advisable to cut a dripline along the underside of the sill. This almost invisible treatment will insure proper water runoff, particularly if the bottom of the sill is flat. Any conditions, including poor original design, which permit water to come in contact with the wood or to puddle on the sill must be corrected as they contribute to deterioration of the window.

One clue to the location of areas of excessive moisture is the condition of the paint; therefore, each window should be examined for areas of paint failure. Since excessive moisture is detrimental to the paint bond, areas of paint blistering, cracking, flaking, and peeling usually identify points of water penetration, moisture saturation, and potential deterioration. Failure of the paint should not, however, be mistakenly interpreted as a sign that the wood is in poor condition and hence, irreparable. Wood is frequently in sound physical condition beneath unsightly paint. After noting areas of paint failure, the next step is to inspect the condition of the wood, particularly at the points identified during the paint examination.

Each window should be examined for operational soundness beginning with the lower portions of the frame and sash. Exterior rainwater and interior condensation can flow downward along the window, entering and collecting at points where the flow is blocked. The sill, joints between the sill and jamb, corners of the bottom rails and muntin joints are typical points where water collects and deterioration begins. The operation of the window (continuous opening and closing over the years and seasonal temperature changes) weakens the joints, causing movement and slight separation. This process makes the joints more vulnerable to water which is readily absorbed into the endgrain of the wood. If severe deterioration exists in these areas, it will usually be apparent on visual inspection, but other less severely deteriorated areas of the wood may be tested by two traditional methods using a small ice pick.

An ice pick or an awl may be used to test wood for soundness. The technique is simply to jab the pick into a wetted wood surface at an angle and pry up a small section of the wood. Sound wood will separate in long fibrous splinters, but decayed wood will lift up in short irregular pieces due to the breakdown of fiber strength.
Another method of testing for soundness consists of pushing a sharp object into the wood, perpendicular to the surface. If deterioration has begun from the hidden side of a member and the core is badly decayed, the visible surface may appear to be sound wood. Pressure on the probe can force it through an apparently sound skin to penetrate deeply into decayed wood. This technique is especially useful for checking sills where visual access to the underside is restricted.

Following the inspection and analysis of the results, the scope of the necessary repairs will be evident and a plan for the rehabilitation can be formulated. Generally the actions necessary to return a window to "like new" condition will fall into three broad categories: 1) routine maintenance procedures, 2) structural stabilization, and 3) parts replacement. These categories will be discussed in the following sections and will be referred to respectively as Repair Class I, Repair Class II, and Repair Class III. Each successive repair class represents an increasing level of difficulty, expense, and work time. Note that most of the points mentioned in Repair Class I are routine maintenance items and should be provided in a regular maintenance program for any building. The neglect of these routine items can contribute to many common window problems.

Before undertaking any of the repairs mentioned in the following sections all sources of moisture penetration should be identified and eliminated, and all existing decay fungi destroyed in order to arrest the deterioration process. Many commercially available fungicides and wood preservatives are toxic, so it is extremely important to follow the manufacturer's recommendations for application, and store all chemical materials away from children and animals. After fungicidal and preservative treatment the windows may be stabilized, retained, and restored with every expectation for a long service life.

**Repair Class I: Routine Maintenance**

Repairs to wooden windows are usually labor intensive and relatively uncomplicated. On small scale projects this allows the do-it-yourselfer to save money by repairing all or part of the windows. On larger projects it presents the opportunity for time and money which might otherwise be spent on the removal and replacement of existing windows, to be spent on repairs, subsequently saving all or part of the material cost of new window units. Regardless of the actual costs, or who performs the work, the evaluation process described earlier will provide the knowledge from which to specify an appropriate work program, establish the work element priorities, and identify the level of skill needed by the labor force.

The routine maintenance required to upgrade a window to "like new" condition normally includes the following steps: 1) some degree of interior and exterior paint removal, 2) removal and repair of sash (including reglazing where necessary), 3) repairs to the frame, 4) weatherstripping and reinstallation of the sash, and 5) repainting. These operations are illustrated for a typical historic double-hung window. This historic double-hung window has many layers of paint, some cracked and missing putty, slight separation at the joints, broken sash cords, and one cracked pane. Photo: NPS files.
double-hung wooden window, but they may be adapted to other window types and styles as applicable.

Historic windows have usually acquired many layers of paint over time. Removal of excess layers or peeling and flaking paint will facilitate operation of the window and restore the clarity of the original detailing. Some degree of paint removal is also necessary as a first step in the proper surface preparation for subsequent refinishing (if paint color analysis is desired, it should be conducted prior to the onset of the paint removal). There are several safe and effective techniques for removing paint from wood, depending on the amount of paint to be removed.

Paint removal should begin on the interior frames, being careful to remove the paint from the interior stop and the parting bead, particularly along the seam where these stops meet the jamb. This can be accomplished by running a utility knife along the length of the seam, breaking the paint bond. It will then be much easier to remove the stop, the parting bead and the sash. The interior stop may be initially loosened from the sash side to avoid visible scarring of the wood and then gradually pried loose using a pair of putty knives, working up and down the stop in small increments. With the stop removed, the lower or interior sash may be withdrawn. The sash cords should be detached from the sides of the sash and their ends may be pinned with a nail or tied in a knot to prevent them from falling into the weight pocket.

Removal of the upper sash on double-hung units is similar but the parting bead which holds it in place is set into a groove in the center of the stile and is thinner and more delicate than the interior stop. After removing any paint along the seam, the parting bead should be carefully pried out and worked free in the same manner as the interior stop. The upper sash can be removed in the same manner as the lower one and both sash taken to a convenient work area (in order to remove the sash the interior stop and parting bead need only be removed from one side of the window). Window openings can be covered with polyethylene sheets or plywood sheathing while the sash are out for repair.

The sash can be stripped of paint using appropriate techniques, but if any heat treatment is used, the glass should be removed or protected from the sudden temperature change which can cause breakage. An overlay of aluminum foil on gypsum board or asbestos can protect the glass from such rapid temperature change. It is important to protect the glass because it may be historic and often adds character to the window. Deteriorated putty should be removed manually, taking care not to damage the wood along the rabbet. If the glass is to be removed, the glazing points which hold the glass in place can be extracted and the panes numbered and removed for cleaning and reuse in the same openings. With the glass panes out, the remaining putty can be removed and the sash can be sanded, patched, and primed with a preservative primer. Hardened putty in the rabbets may be softened by heating with a soldering iron at the
point of removal. Putty remaining on the glass may be softened by soaking the panes in linseed oil, and then removed with less risk of breaking the glass. Before reinstalling the glass, a bead of glazing compound or linseed oil putty should be laid around the rabbet to cushion and seal the glass. Glazing compound should only be used on wood which has been brushed with linseed oil and primed with an oil based primer or paint. The pane is then pressed into place and the glazing points are pushed into the wood around the perimeter of the pane.

The final glazing compound or putty is applied and beveled to complete the seal. The sash can be refinished as desired on the inside and painted on the outside as soon as a "skin" has formed on the putty, usually in 2 or 3 days. Exterior paint should cover the beveled glazing compound or putty and lap over onto the glass slightly to complete a weather-tight seal. After the proper curing times have elapsed for paint and putty, the sash will be ready for reinstallation.

While the sash are out of the frame, the condition of the wood in the jamb and sill can be evaluated. Repair and refinishing of the frame may proceed concurrently with repairs to the sash, taking advantage of the curing times for the paints and putty used on the sash. One of the most common work items is the replacement of the sash cords with new rope cords or with chains. The weight pocket is frequently accessible through a door on the face of the frame near the sill, but if no door exists, the trim on the interior face may be removed for access. Sash weights may be increased for easier window operation by elderly or handicapped persons. Additional repairs to the frame and sash may include consolidation or replacement of deteriorated wood. Techniques for these repairs are discussed in the following sections.

The operations just discussed summarize the efforts necessary to restore a window with minor deterioration to "like new" condition. The techniques can be applied by an unskilled person with minimal training and experience. To demonstrate the practicality of this approach, and photograph it, a Technical Preservation Services staff member repaired a wooden double-hung, two over two window which had been in service over ninety years. The wood was structurally sound but the window had one broken pane, many layers of paint, broken sash cords and inadequate, worn-out weatherstripping. The staff member found that the frame could be stripped of paint and the sash removed quite easily. Paint, putty and glass removal required about one hour for each sash, and the reglazing of both sash was accomplished in about one hour. Weatherstripping of the sash and frame, replacement of the sash cords and reinstallation of the sash, parting bead, and stop required an hour and a half. These times refer only to individual operations; the entire process took several days due to the drying and curing times for putty, primer, and paint, however, work on other window units could have been in progress during these lag times.

**Repair Class II: Stabilization**

The preceding description of a window repair job focused on a unit which was operationally sound. Many windows will show some additional degree of physical deterioration, especially in the vulnerable areas mentioned earlier, but even badly
damaged windows can be repaired using simple processes. Partially decayed wood can be waterproofed, patched, built-up, or consolidated and then painted to achieve a sound condition, good appearance, and greatly extended life. Three techniques for repairing partially decayed or weathered wood are discussed in this section, and all three can be accomplished using products available at most hardware stores.

One established technique for repairing wood which is split, checked or shows signs of rot, is to:

1) dry the wood,
2) treat decayed areas with a fungicide,
3) waterproof with two or three applications of boiled linseed oil (applications every 24 hours),
4) fill cracks and holes with putty, and
5) after a "skin" forms on the putty, paint the surface. Care should be taken with the use of fungicide which is toxic. Follow the manufacturers' directions and use only on areas which will be painted. When using any technique of building up or patching a flat surface, the finished surface should be sloped slightly to carry water away from the window and not allow it to puddle. Caulking of the joints between the sill and the jamb will help reduce further water penetration.

When sills or other members exhibit surface weathering they may also be built-up using wood putties or homemade mixtures such as sawdust and resorcinol glue, or whiting and varnish. These mixtures can be built up in successive layers, then sanded, primed, and painted. The same caution about proper slope for flat surfaces applies to this technique.

Wood may also be strengthened and stabilized by consolidation, using semirigid epoxies which saturate the porous decayed wood and then harden. The surface of the consolidated wood can then be filled with a semirigid epoxy patching compound, sanded and painted. Epoxy patching compounds can be used to build up missing sections or decayed ends of members. Profiles can be duplicated using hand molds, which are created by pressing a ball of patching compound over a sound section of the profile which has been rubbed with butcher's wax. This can be a very efficient technique where there are many typical repairs to be done. The process has been widely used and proven in marine applications; and proprietary products are available at hardware and marine supply stores. Although epoxy materials may be comparatively expensive, they hold the promise of being among the most durable and long lasting materials available for wood repair. More information on epoxies can be found in the publication "Epoxies for Wood Repairs in Historic Buildings," cited in the bibliography.

Any of the three techniques discussed can stabilize and restore the appearance of the window unit. There are times, however, when the degree of deterioration is so advanced that stabilization is impractical, and the only way to retain some of the original fabric is to replace damaged parts.

**Repair Class III: Splices and Parts Replacement**

When parts of the frame or sash are so badly deteriorated that they cannot be stabilized there are methods which permit the retention of some of the existing or original fabric.
These methods involve replacing the deteriorated parts with new matching pieces, or splicing new wood into existing members. The techniques require more skill and are more expensive than any of the previously discussed alternatives. It is necessary to remove the sash and/or the affected parts of the frame and have a carpenter or woodworking mill reproduce the damaged or missing parts. Most millwork firms can duplicate parts, such as muntins, bottom rails, or sills, which can then be incorporated into the existing window, but it may be necessary to shop around because there are several factors controlling the practicality of this approach. Some woodworking mills do not like to repair old sash because nails or other foreign objects in the sash can damage expensive knives (which cost far more than their profits on small repair jobs); others do not have cutting knives to duplicate muntin profiles. Some firms prefer to concentrate on larger jobs with more profit potential, and some may not have a craftsman who can duplicate the parts. A little searching should locate a firm which will do the job, and at a reasonable price. If such a firm does not exist locally, there are firms which undertake this kind of repair and ship nationwide. It is possible, however, for the advanced do-it-yourselfer or craftsman with a table saw to duplicate moulding profiles using techniques discussed by Gordie Whittington in "Simplified Methods for Reproducing Wood Mouldings," Bulletin of the Association for Preservation Technology, Vol. III, No. 4, 1971, or illustrated more recently in The Old House, Time-Life Books, Alexandria, Virginia, 1979.

The repairs discussed in this section involve window frames which may be in very deteriorated condition, possibly requiring removal; therefore, caution is in order. The actual construction of wooden window frames and sash is not complicated. Pegged mortise and tenon units can be disassembled easily, if the units are out of the building. The installation or connection of some frames to the surrounding structure, especially masonry walls, can complicate the work immeasurably, and may even require dismantling of the wall. It may be useful, therefore, to take the following approach to frame repair: 1) conduct regular maintenance of sound frames to achieve the longest life possible, 2) make necessary repairs in place, wherever possible, using stabilization and splicing techniques, and 3) if removal is necessary, thoroughly investigate the structural detailing and seek appropriate professional consultation.

Another alternative may be considered if parts replacement is required, and that is sash replacement. If extensive replacement of parts is necessary and the job becomes prohibitively expensive it may be more practical to purchase new sash which can be installed into the existing frames. Such sash are available as exact custom reproductions, reasonable facsimiles (custom windows with similar profiles), and contemporary wooden sash which are similar in appearance. There are companies which still manufacture high quality wooden sash which would duplicate most historic sash. A few calls to local building suppliers may provide a source of appropriate replacement sash, but if not, check with local historical associations, the state historic preservation office, or preservation related magazines and supply catalogs for information.

If a rehabilitation project has a large number of windows such as a commercial building or an industrial complex, there may be less of a problem arriving at a solution. Once the evaluation of the windows is completed and the scope of the work is known, there may be a potential economy of scale. Woodworking mills may be interested in the work from a large project; new sash in volume may be considerably less expensive per unit; crews can be assembled and trained on site to perform all of the window repairs; and a few extensive repairs can be absorbed (without undue burden) into the total budget for a large number of sound windows. While it may be expensive for the average historic home owner to pay seventy dollars or more for a mill to grind a custom knife to duplicate four or five bad muntins, that cost becomes negligible on large commercial projects which may have several hundred windows.
Most windows should not require the extensive repairs discussed in this section. The ones which do are usually in buildings which have been abandoned for long periods or have totally lacked maintenance for years. It is necessary to thoroughly investigate the alternatives for windows which do require extensive repairs to arrive at a solution which retains historic significance and is also economically feasible. Even for projects requiring repairs identified in this section, if the percentage of parts replacement per window is low, or the number of windows requiring repair is small, repair can still be a cost effective solution.

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**Weatherization**

A window which is repaired should be made as energy efficient as possible by the use of appropriate weatherstripping to reduce air infiltration. A wide variety of products are available to assist in this task. Felt may be fastened to the top, bottom, and meeting rails, but may have the disadvantage of absorbing and holding moisture, particularly at the bottom rail. Rolled vinyl strips may also be tacked into place in appropriate locations to reduce infiltration. Metal strips or new plastic spring strips may be used on the rails and, if space permits, in the channels between the sash and jamb. Weatherstripping is a historic treatment, but old weatherstripping (felt) is not likely to perform very satisfactorily. Appropriate contemporary weatherstripping should be considered an integral part of the repair process for windows. The use of sash locks installed on the meeting rail will insure that the sash are kept tightly closed so that the weatherstripping will function more effectively to reduce infiltration. Although such locks will not always be historically accurate, they will usually be viewed as an acceptable contemporary modification in the interest of improved thermal performance.

Many styles of storm windows are available to improve the thermal performance of existing windows. The use of exterior storm windows should be investigated whenever feasible because they are thermally efficient, cost-effective, reversible, and allow the retention of original windows (see "Preservation Briefs: 3"). Storm window frames may be made of wood, aluminum, vinyl, or plastic; however, the use of unfinished aluminum storms should be avoided. The visual impact of storms may be minimized by selecting colors which match existing trim color. Arched top storms are available for windows with special shapes. Although interior storm windows appear to offer an attractive option for achieving double glazing with minimal visual impact, the potential for damaging condensation problems must be addressed. Moisture which becomes trapped between the layers of glazing can condense on the colder, outer prime window, potentially leading to deterioration. The correct approach to using interior storms is to create a seal on the interior storm while allowing some ventilation around the prime window. In actual practice, the creation of such a durable, airtight seal is difficult.

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**Window Replacement**

Although the retention of original or existing windows is always desirable and this Brief is intended to encourage that goal, there is a point when the condition of a window may clearly indicate replacement. The decision process for selecting replacement windows should not begin with a survey of contemporary window products which are available as replacements, but should begin with a look at the windows which are being replaced. Attempt to understand the contribution of the window(s) to the appearance of the facade including: **1)** the pattern of the openings and their size; **2)** proportions of the
frame and sash; 3) configuration of window panes; 4) muntin profiles; 5) type of wood; 6) paint color; 7) characteristics of the glass; and 8) associated details such as arched tops, hoods, or other decorative elements. Develop an understanding of how the window reflects the period, style, or regional characteristics of the building, or represents technological development.

Armed with an awareness of the significance of the existing window, begin to search for a replacement which retains as much of the character of the historic window as possible. There are many sources of suitable new windows. Continue looking until an acceptable replacement can be found. Check building supply firms, local woodworking mills, carpenters, preservation oriented magazines, or catalogs or suppliers of old building materials, for product information. Local historical associations and state historic preservation offices may be good sources of information on products which have been used successfully in preservation projects.

Consider energy efficiency as one of the factors for replacements, but do not let it dominate the issue. Energy conservation is no excuse for the wholesale destruction of historic windows which can be made thermally efficient by historically and aesthetically acceptable means. In fact, a historic wooden window with a high quality storm window added should thermally outperform a new double-glazed metal window which does not have thermal breaks (insulation between the inner and outer frames intended to break the path of heat flow). This occurs because the wood has far better insulating value than the metal, and in addition many historic windows have high ratios of wood to glass, thus reducing the area of highest heat transfer. One measure of heat transfer is the U-value, the number of Btu's per hour transferred through a square foot of material. When comparing thermal performance, the lower the U-value the better the performance. According to ASHRAE 1977 Fundamentals, the U-values for single glazed wooden windows range from 0.88 to 0.99. The addition of a storm window should reduce these figures to a range of 0.44 to 0.49. A non-thermal break, double-glazed metal window has a U-value of about 0.6.

**Conclusion**

Technical Preservation Services recommends the retention and repair of original windows whenever possible. We believe that the repair and weatherization of existing wooden windows is more practical than most people realize, and that many windows are unfortunately replaced because of a lack of awareness of techniques for evaluation, repair, and weatherization. Wooden windows which are repaired and properly maintained will have greatly extended service lives while contributing to the historic character of the building. Thus, an important element of a building's significance will have been preserved for the future.

**Additional Reading**


*Rehab Right*. Oakland, California: City of Oakland Planning Department, 1978 (pp. 7883).


**Washington, D.C. 1981**

*Home page logo: Historic six-over-six windows--preserved. Photo: NPS files.*

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*This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Technical Preservation Services (TPS), Heritage Preservation Services Division, National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.*

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"Concrete" is a name applied to any of a number of compositions consisting of sand, gravel, crushed stone, or other coarse material, bound together with various kinds of cementitious materials, such as lime or cements. When water is added, the mix undergoes a chemical reaction and hardens. An extraordinarily versatile building material, concrete is used for the utilitarian, the ornamental, and the monumental. While early proponents of modern concrete considered it to be permanent, it is, like all materials, subject to deterioration. This Brief surveys the principal problems posed by concrete deterioration, their likely causes, and approaches to their remedies. In almost every instance, remedial work should only be undertaken by qualified professionals. Faulty concrete repair can worsen structural problems and lead to further damage or safety hazards. Concrete repairs are not the province of do-it-yourselfers. Consequently, the corrective measures discussed here are included for general information purposes only; they do not provide "how to" advice.

**Historical Overview**

The Romans found that the mixture of lime putty with pozzolana, a fine volcanic ash, would harden under water. The result was possibly the first hydraulic cement. It became a major feature of Roman building practice, and was used in many buildings and engineering projects such as bridges and aqueducts. Concrete technology was kept alive during the Middle Ages in Spain and Africa, with the Spanish introducing a form of concrete to the New World in the first decades of the 16th century. It was used by both the Spanish and English in coastal areas stretching from Florida to South Carolina.
Called "tapia," or "tabby," the substance was a creamy white, monolithic masonry material composed of lime, sand, and an aggregate of shells, gravel, or stone mixed with water. This mass of material was placed between wooden forms, tamped, and allowed to dry, the building arising in layers, about one foot at a time. Despite its early use, concrete was slow in achieving widespread acceptance as a building material in the United States. In 1853, the second edition of Orson S. Fowler's *A Home for All* publicized the advantages of "gravel wall" construction to a wide audience, and poured gravel wall buildings appeared across the United States. Seguin, Texas, 35 miles east of San Antonio, came to be called "The Mother of Concrete Cities" for some 90 concrete buildings made from local "lime water" and gravel. Impressed by the economic advantages of poured gravel wall or "limegrout" construction, the Quartermaster General's Office of the War Department embarked on a campaign to improve the quality of building for frontier military posts. As a result, lime-grout structures were built at several western posts, such as the buildings that were constructed with 12 or 18-inch-thick walls at Fort Laramie, Wyoming between 1872 and 1885. By the 1880s sufficient experience had been gained with unreinforced concrete to permit construction of much larger buildings. The Ponce de Leon Hotel in St. Augustine, Florida, is a notable example from this period.

Reinforced concrete in the United States dates from 1860, when S.T. Fowler obtained a patent for a reinforced concrete wall. In the early 1870s William E. Ward built his own house in Port Chester, New York, using concrete reinforced with iron rods for all structural elements.

Despite these developments, such construction remained a novelty until after 1880, when innovations introduced by Ernest L. Ransome made reinforced concrete more practicable. The invention of the horizontal rotary kiln allowed production of a cheaper, more uniform and reliable cement, and led to the greatly increased acceptance of concrete after 1900.

During the early 20th century Ransome in Beverly, Massachusetts, Albert Kahn in Detroit, and Richard E. Schmidt in Chicago promoted concrete for utilitarian buildings with their "factory style," featuring an exposed concrete skeleton filled with expanses of glass. Thomas Edison's cast-in-place reinforced concrete homes in Union Township, New Jersey, proclaimed a similarly functional emphasis in residential construction. From the 1920s onward, concrete began to be used with spectacular design results: in James J. Earley and Louis Bourgeois' exuberant, graceful Baha'i Temple in Wilmette, Illinois; and in Frank Lloyd Wright's masterpiece "Fallingwater" near Mill Run, Pennsylvania. Eero Saarinen's soaring Terminal Building at Dulles International Airport outside Washington, D.C., exemplifies the masterful use of concrete achieved in the Modern era.
Types of Concrete

**Unreinforced concrete** is a composite material containing aggregates (sand, gravel, crushed shell, or rock) held together by a cement combined with water to form a paste, and gets its name from the fact that it does not have any iron or steel reinforcing bars. It was the earliest form of concrete. The ingredients become a plastic mass that hardens as the concrete hydrates, or "cures." Unreinforced concrete, however, is relatively weak, and since the turn of the century has largely been replaced by reinforced concrete.

**Reinforced concrete** is concrete strengthened by the inclusion of metal bars which increase the tensile strength of concrete. Both unreinforced and reinforced concrete can be either cast in place or precast.

**Cast-in-place concrete** is poured onsite into a previously erected formwork that is removed after the concrete has set. Precast concrete is molded offsite into building components. More recent developments in concrete technology include post-tensioned concrete and prestressed concrete, which feature greater strength and reduced cracking in reinforced structural elements.

Causes of Concrete Deterioration

Deterioration in concrete can be caused by environmental factors, inferior materials, poor workmanship, inherent structural design defects, and inadequate maintenance.

**Environmental factors** are a principal source of concrete deterioration. Concrete absorbs moisture readily, and this is particularly troublesome in regions of recurrent freeze-thaw cycles. Freezing water produces expansive pressure in the cement paste or in nondurable aggregates. Carbon dioxide, another atmospheric component, can cause the concrete to deteriorate by reacting with the cement paste at the surface.

**Materials and workmanship** in the construction of early concrete buildings are potential sources of problems. For example, aggregates used in early concrete, such as cinders from burned coal and certain crushed brick, absorb water and produce a weak and porous concrete. Alkali-aggregate reactions within the concrete can result in cracking and white surface staining. Aggregates were not always properly graded by size to ensure an even distribution of elements from small to large. The use of aggregates with similarly sized particles normally produced a poorly consolidated and therefore weaker concrete.

Early builders sometimes inadvertently compromised concrete by using seawater or beach sand in the mix or by using calcium chloride or a similar salt as an additive to make the concrete more "fireproof." A common practice, until recently, was to add salt to strengthen concrete or to lower the freezing point during cold-weather construction. These practices cause problems over the long term.

In addition, early concrete was not vibrated when poured into forms as it is today. More often it was tamped or rodded to consolidate it, and on floor slabs it was often rolled with increasingly heavier rollers filled with water. These practices tended to leave voids (areas of no concrete) at congested
Structural Design Defects in historic concrete structures can be an important cause of deterioration. For example, the amount of protective concrete cover around reinforcing bars was often insufficient. Another design problem in early concrete buildings is related to the absence of standards for expansion-contraction joints to prevent stresses caused by thermal movements, which may result in cracking.

**Improper Maintenance** of historic buildings can cause long-term deterioration of concrete. Water is a principal source of damage to historic concrete (as to almost every other material) and prolonged exposure to it can cause serious problems. Unrepaired roof and plumbing leaks, leaks through exterior cladding, and unchecked absorption of water from damp earth are potential sources of building problems. Deferred repair of cracks allowing water penetration and freeze-thaw attacks can even cause a structure to collapse. In some cases the application of waterproof surface coatings can aggravate moisture-related problems by trapping water vapor within the underlying material.

**Major Signs of Concrete Deterioration**

**Cracking** occurs over time in virtually all concrete. Cracks vary in depth, width, direction, pattern, location, and cause. Cracks can be either active or dormant (inactive). Active cracks widen, deepen, or migrate through the concrete. Dormant cracks remain unchanged. Some dormant cracks, such as those caused by shrinkage during the curing process, pose no danger, but if left unrepaired, they can provide convenient channels for moisture penetration, which normally causes further damage.

**Structural cracks** can result from temporary or continued overloads, uneven foundation settling, or original design inadequacies. Structural cracks are active if the overload is continued or if settlement is ongoing; they are dormant if the temporary overloads have been removed, or if differential settlement has stabilized. Thermally-induced cracks result from stresses produced by temperature changes. They frequently occur at the ends or corners of older concrete structures built without expansion joints capable of relieving such stresses. Random surface cracks (also called "map" cracks due to their resemblance to the lines on a road map) that deepen over time and exude a white gel that hardens on the surface are caused by an adverse reaction between the alkalis in a cement and some aggregates.

Since superficial repairs that do not eliminate
underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.

**Spalling** is the loss of surface material in patches of varying size. It occurs when reinforcing bars corrode, thus creating high stresses within the concrete. As a result, chunks of concrete pop off from the surface. Similar damage can occur when water absorbed by porous aggregates freezes. Vapor-proof paints or sealants, which trap moisture beneath the surface of the impermeable barrier, also can cause spalling. Spalling may also result from the improper consolidation of concrete during construction. In this case, water-rich cement paste rises to the surface (a condition known as laitance). The surface weakness encourages scaling, which is spalling in thin layers.

**Deflection** is the bending or sagging of concrete beams, columns, joists, or slabs, and can seriously affect both the strength and structural soundness of concrete. It can be produced by overloading, by corrosion, by inadequate construction techniques (use of low-strength concrete or undersized reinforcing bars, for example), or by concrete creep (long-term shrinkage). Corrosion may cause deflection by weakening and ultimately destroying the bond between the rebar and the concrete, and finally by destroying the reinforcing bars themselves. Deflection of this type is preceded by significant cracking at the bottom of the beams or at column supports. Deflection in a structure without widespread cracking, spalling, or corrosion is frequently due to concrete creep.

**Stains** can be produced by alkali-aggregate reaction, which forms a white gel exuding through cracks and hardening as a white stain on the surface. Efflorescence is a white, powdery stain produced by the leaching of lime from Portland cement, or by the pre-World War II practice of adding lime to whiten the concrete. Discoloration can also result from metals inserted into the concrete, or from corrosion products dripping onto the surface.

**Erosion** is the weathering of the concrete surface by wind, rain, snow, and salt air or spray. Erosion can also be caused by the mechanical action of water channeled over concrete, by the lack of drip grooves in beltcourses and sills, and by inadequate drainage.

**Corrosion**, the rusting of reinforcing bars in concrete, can be a most serious problem. Normally, embedded reinforcing bars are protected against corrosion by being buried within the mass of the concrete and by the high alkalinity of the concrete itself. This protection, however, can be destroyed in two ways. First, by carbonation, which occurs when carbon dioxide in the air reacts chemically with cement paste at the surface and reduces the alkalinity of the concrete. Second, chloride ions from salts combine with moisture to produce an electrolyte that effectively corrodes the reinforcing bars. Chlorides may come from seawater additives.
in the original mix, or from prolonged contact with salt spray or deicing salts. Regardless of the cause, corrosion of reinforcing bars produces rust, which occupies significantly more space than the original metal, and causes expansive forces within the concrete. Cracking and spalling are frequent results. In addition, the load-carrying capacity of the structure can be diminished by the loss of concrete, by the loss of bond between reinforcing bars and concrete, and by the decrease in thickness of the reinforcing bars themselves. Rust stains on the surface of the concrete are an indication that internal corrosion is taking place.

Planning for Concrete Preservation

Whatever the causes of deterioration, careful analysis, supplemented by testing, is vital to the success of any historic concrete repair project. Undertaken by experienced engineers or architects, the basic steps in a program of testing and analysis are document review, field survey, testing, and analysis.

Document Review. While plans and specifications for older concrete buildings are rarely extant, they can be an invaluable aid, and every attempt should be made to find them. They may provide information on the intended composition of the concrete mix, or on the type and location of reinforcing bars. Old photographs, records of previous repairs, documents for buildings of the same basic construction or age, and news reports may also document original construction or changes over time.

Field Survey. A thorough visual examination can assist in locating and recording the type, extent, and severity of stress, deterioration, and damage.

Testing. Two types of testing, onsite and laboratory, can supplement the field condition survey as necessary. Onsite, nondestructive testing may include use of a calibrated metal detector or sonic tests to locate the position, depth, and direction of reinforcing bars. Voids can frequently be detected by "sounding" with a metal hammer. Chains about 30 inches long attached to a 2-foot-long crossbar, dragged over the slabs while listening for hollow reverberations, can locate areas of slabs that have delaminated. In order to find areas of walls that allow moisture to penetrate to the building interior, areas may be tested from the outside by spraying water at the walls and then inspecting the interior for water. If leaks are not readily apparent, sophisticated equipment is available to measure the water permeability of concrete walls.

If more detailed examinations are required, nondestructive instruments are available that can assist in determining the presence of voids or internal cracks, the location and size of rebars, and the strength of the concrete. Laboratory testing can be invaluable in
determining the composition and characteristics of historic concrete and in formulating a compatible design mix for repair materials. These tests, however, are expensive. A well-equipped concrete laboratory can analyze concrete samples for strength, alkalinity, carbonation, porosity, alkali-aggregate reaction, presence of chlorides, and past composition.

**Analysis.** Analysis is probably the most important step in the process of evaluation. As survey and test results are revised in conjunction with available documentation, the analysis should focus on determining the nature and causes of the concrete problems, on assessing both the short-term and long-term effects of the deterioration, and on formulating proper remedial measures.

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**Concrete Repair**

Repairs should be undertaken only after the planning measures outlined above have been followed. Repair of historic concrete may consist of either patching the historic material or filling in with new material worked to match the historic material. If replacement is necessary, duplication of historic materials and detailing should be as exact as possible to assure a repair that is functionally and aesthetically acceptable.

The correction and elimination of concrete problems can be difficult, time-consuming, and costly. Yet the temptation to resort to temporary solutions should be avoided, since their failure can expose a building to further and more serious deterioration, and in some cases can mask underlying structural problems that could lead to serious safety hazards.

Principal concrete repair treatments are discussed below. While they are presented separately here, in practice, preservation projects typically incorporate multiple treatments.

**Repair of Cracking.** Hairline, nonstructural cracks that show no sign of worsening normally need not be repaired. Cracks larger than hairline cracks, but less than approximately one-sixteenth of an inch, can be repaired with a mix of cement and water. If the crack is wider than one-sixteenth of an inch, fine sand should be added to the mix to allow for greater compactibility, and to reduce shrinkage during drying. Field trials will determine whether the crack should be routed (widened and deepened) minimally before patching to allow sufficient penetration of the patching material. To ensure a long-term repair, the patching materials should be carefully selected to be compatible with the existing concrete as well as with subsequent surface treatments such as paint or stucco.

When it is desirable to reestablish the structural integrity of a concrete structure involving dormant cracks, epoxy injection repair should be considered. An epoxy injection repair is made by sealing the crack on both sides of a wall or a structural member with an epoxy mortar, leaving small holes, or "ports" to receive the epoxy resin. After the surface mortar has hardened, epoxy is pumped into the ports. Once the epoxy in the crack has hardened, the surface mortar can be ground off, but the repair
may be visually noticeable. (It is possible to inject epoxy without leaving noticeable patches, but the procedure is much more complex.)

Other cracks are active, changing their width and length. Active structural cracks will move as loads are added or removed. Thermal cracks will move as temperatures fluctuate. Thus, expansion-contraction joints may have to be introduced before repair is undertaken. Active cracks should be filled with sealants that will adhere to the sides of the cracks and will compress or expand during crack movement. The design, detailing, and execution of sealant-filled cracks require considerable attention, or else they will detract from the appearance of the historic building.

Random (map) cracks throughout a structure are difficult to correct, and may be unrepairable. Repair, if undertaken, requires removing the cracked concrete. A compatible concrete patch to replace the removed concrete is then installed. For some buildings without significant historic finishes, an effective and economical repair material is probably a sprayed concrete coating, troweled or brushed smooth. Because the original concrete will ultimately contaminate new concrete, buildings with map cracks will present continuing maintenance problems.

**Repair of Spalling.** Repair of spalling entails removing the loose, deteriorated concrete and installing a compatible patch that dovetails into the existing sound concrete. In order to prevent future crack development after the spall has been patched and to ensure that the patch matches the historic concrete, great attention must be paid to the treatment of rebars, the preparation of the existing concrete substrate, the selection of compatible patch material, the development of good contact between patch and substrate, and the curing of the patch.

Once the deteriorated concrete in a spalled area has been removed, rust on the exposed rebars must be removed by wire brush or sandblasting. An epoxy coating applied immediately over the cleaned rebars will diminish the possibility of further corrosion. As a general rule, if the rebars are so corroded that a structural engineer determines they should be replaced, new supplemental reinforcing bars will normally be required, assuming that the rebar is important to the strength of the concrete. If not, it is possible to cut away the rebar.

Proper preparation of the substrate will ensure a good bond between the patch and the existing concrete. If a large, clean break or other smooth surface is to be patched, the contact area should be roughened with a hammer and chisel. In all cases, the substrate should be kept moist with wet rags, sponges, or running water for at least an hour before placement of the patch. Bonding between the patch and substrate can be encouraged by scrubbing the substrate with cement paste, or by applying a liquid bonding agent to the surface of the substrate. Admixtures such as epoxy resins, latexes, and acrylics in the patch may also be used to increase bonding, but this may cause problems with color matching if the surfaces are to be left unpainted.
Compatible matching of patch material to the existing concrete is critical for both appearance and durability. In general, repair material should match the composition of the original material (as revealed by laboratory analysis) as closely as possible so that the properties of the two materials, such as coefficient of thermal expansion and strength, are compatible. Matching the color and texture of the existing concrete requires special care. Several test batches of patching material should be mixed by adding carefully selected mineral pigments that vary slightly in color. After the samples have cured, they can be compared to the historic concrete and the closest match selected.

Contact between the patch and the existing concrete can be enhanced through the use of anchors, preferably stainless steel hooked pins, placed in holes drilled into the structure and secured in place with epoxy. Good compaction of the patch material will encourage the contact. Compaction is difficult when the patch is "laid-up" with a trowel without the use of forms; however, by building up thin layers of concrete, each layer can be worked with a trowel to achieve compaction. Board forms will be necessary for large patches. In cases where the existing concrete has a significant finish, care must be taken to pin the form to the existing concrete without marring the surface. The patch in the form can be consolidated by rodding or vibration.

Because formed concrete surfaces normally develop a sheen that does not match the surface texture of most historic concrete, the forms must be removed before the patch has fully set. The surface of the patch must then be finished to match the historic concrete. A brush or wet sponge is particularly useful in achieving matching textures. It may be difficult to match historic concrete surfaces that were textured, as a result of exposed aggregate for example, but it is important that these visual qualities be matched. Once the forms are removed, holes from the bolts must also be patched and finished to match adjacent surfaces.

Regardless of size, a patch containing cement binder (especially Portland cement) will tend to shrink during drying. Adequate curing of the patch may be achieved by keeping it wet for several days with damp burlap bags. It should be noted that although greater amounts of sand will reduce overall shrinkage, patches with a high sand content normally will not bond well to the substrate.

**Repair of Deflection.** Deflection can indicate significant structural problems and often requires the strengthening or replacement of structural members. Because deflection can lead to structural failure and serious safety hazards, its repair should be left to engineering professionals.

**Repair of Erosion.** Repair of eroded concrete will normally require replacing lost surface material with a compatible patching material (as outlined above) and then applying an appropriate finish to match the historic appearance. The elimination of

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*Unity Temple, Oak Park, Illinois (1906). Once all repair work was complete, the entire building was sprayed with a concrete mixture consisting of pea-gravel and sand, which was then hand-trowled. Finally, the building was grit-blasted to remove the cement paste and reproduce the exposed aggregate finish. Photo: NPS files.*

*The new concrete spindles have been*
water coursing over concrete surfaces should be accomplished to prevent further erosion. If necessary, drip grooves at the underside of overhanging edges of sills, beltcourses, cornices, and projecting slabs should be installed.

Summary

Many early concrete buildings in the United States are threatened by deterioration. Effective protection and maintenance are the keys to the durability of concrete. Even when historic concrete structures are deteriorated, however, many can be saved through preservation projects involving sensitive repair (see figs. 14a-c). or replacement of deteriorated concrete with carefully selected matching material. Successful restoration of many historic concrete structures in America demonstrates that techniques and materials now available can extend the life of such structures for an indefinite period, thus preserving significant cultural resources.

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Rehabilitating Interiors in Historic Buildings
Identifying and Preserving Character-Defining Elements

H. Ward Jandl

» Identifying and Evaluating...
» Recommended Approaches...
» Meeting Building, Life Safety and Fire Codes
» Sources of Assistance
» Protecting Interior Elements...
» Summary
» Selected Reading List

A NOTE TO OUR USERS: The web versions of the Preservation Briefs differ somewhat from the printed versions. Many illustrations are new, captions are simplified, illustrations are typically in color rather than black and white, and some complex charts have been omitted.

A floor plan, the arrangement of spaces, and features and applied finishes may be individually or collectively important in defining the historic character of the building and the purpose for which it was constructed. Thus, their identification, retention, protection, and repair should be given prime consideration in every preservation project. Caution should be exercised in developing plans that would radically change character-defining spaces or that would obscure, damage or destroy interior features or finishes.

While the exterior of a building may be its most prominent visible aspect, or its "public face," its interior can be even more important in conveying the building's history and development over time. Rehabilitation within the context of the Secretary of the Interior's Standards for Rehabilitation calls for the preservation of exterior and interior portions or features of the building that are significant to its historic, architectural and cultural values.

Interior components worthy of preservation may include the building's plan (sequence of spaces and circulation patterns), the building's spaces (rooms and volumes), individual architectural features, and the various finishes and materials that make up the walls, floors, and ceilings. A theater auditorium or sequences of rooms such as double parlors or a lobby leading to a stairway that ascends to a
mezzanine may comprise a building's most important spaces. Individual rooms may contain notable features such as plaster cornices, millwork, parquet wood floors, and hardware. Paints, wall coverings, and finishing techniques such as graining, may provide color, texture, and patterns which add to a building's unique character.

Virtually all rehabilitations of historic buildings involve some degree of interior alteration, even if the buildings are to be used for their original purpose. Interior rehabilitation proposals may range from preservation of existing features and spaces to total reconfigurations. In some cases, depending on the building, restoration may be warranted to preserve historic character adequately; in other cases, extensive alterations may be perfectly acceptable.

This Preservation Brief has been developed to assist building owners and architects in identifying and evaluating those elements of a building's interior that contribute to its historic character and in planning for the preservation of those elements in the process of rehabilitation. The guidance applies to all building types and styles, from 18th century churches to 20th century office buildings. The Brief does not attempt to provide specific advice on preservation techniques and treatments, given the vast range of buildings, but rather suggests general preservation approaches to guide construction work.

Identifying and Evaluating the Importance of Interior Elements Prior to Rehabilitation

Before determining what uses might be appropriate and before drawing up plans, a thorough professional assessment should be undertaken to identify those tangible architectural components that, prior to rehabilitation, convey the building's sense of time and place--that is, its "historic character." Such an assessment, accomplished by walking through and taking account of each element that makes up the interior, can help ensure that a truly compatible use for the building, one that requires minimal alteration to the building, is selected.

Researching The Building's History

A review of the building's history will reveal why and when the building achieved significance or how it contributes to the significance of the district. This information helps to evaluate whether a particular rehabilitation treatment will be appropriate to the building and whether it will preserve those tangible components of the building that convey its significance for association with specific events or persons along with its architectural importance. In this regard, National Register files may prove useful in explaining why and for what period of time the building is significant. In some cases research may show that later alterations are significant to the building; in other cases, the alterations may be without historical or architectural merit, and may be removed in
Identifying Interior Elements

Interiors of buildings can be seen as a series of primary and secondary spaces. The goal of the assessment is to identify which elements contribute to the building's character and which do not. Sometimes it will be the sequence and flow of spaces, and not just the individual rooms themselves, that contribute to the building's character. This is particularly evident in buildings that have strong central axes or those that are consciously asymmetrical in design. In other cases, it may be the size or shape of the space that is distinctive.

The importance of some interiors may not be readily apparent based on a visual inspection; sometimes rooms that do not appear to be architecturally distinguished are associated with important persons and events that occurred within the building.

Primary spaces, are found in all buildings, both monumental and modest. Examples may include foyers, corridors, elevator lobbies, assembly rooms, stairhalls, and parlors. Often they are the places in the building that the public uses and sees; sometimes they are the most architecturally detailed spaces in the building, carefully proportioned and finished with costly materials. They may be functionally and architecturally related to the building's external appearance. In a simpler building, a primary space may be distinguishable only by its location, size, proportions, or use. Primary spaces are always important to the character of the building and should be preserved.

Secondary spaces are generally more utilitarian in appearance and size than primary spaces. They may include areas and rooms that service the building, such as bathrooms, and kitchens. Examples of secondary spaces in a commercial or office structure may include storerooms, service corridors, and in some cases, the offices themselves. Secondary spaces tend to be of less importance to the building and may accept greater change in the course of work without compromising the building's historic character.

Spaces are often designed to interrelate both visually and functionally. The sequence of spaces, such as vestibule-hall-parlor or foyer-lobby-stair-auditorium or stairhall-corridor-classroom, can define and express the building's historic function and unique character. Important sequences of spaces should be identified and retained in the rehabilitation project.

Floor plans may also be distinctive and characteristic of a style of architecture or a
region. Examples include Greek Revival and shotgun houses. Floor plans may also reflect social, educational, and medical theories of the period. Many 19th century psychiatric institutions, for example, had plans based on the ideas of Thomas Kirkbride, a Philadelphia doctor who authored a book on asylum design.

In addition to evaluating the relative importance of the various spaces, the assessment should identify architectural features and finishes that are part of the interior's history and character. Marble or wood wainscoting in corridors, elevator cabs, crown molding, baseboards, mantels, ceiling medallions, window and door trim, tile and parquet floors, and staircases are among those features that can be found in historic buildings. Architectural finishes of note may include grained woodwork, marbleized columns, and plastered walls. Those features that are characteristic of the building's style and period of construction should, again, be retained in the rehabilitation.

Features and finishes, even if machine-made and not exhibiting particularly fine craftsmanship, may be character defining; these would include pressed metal ceilings and millwork around windows and doors. The interior of a plain, simple detailed worker's house of the 19th century may be as important historically as a richly ornamented, high-style townhouse of the same period. Both resources, if equally intact, convey important information about the early inhabitants and deserve the same careful attention to detail in the preservation process.

The location and condition of the building's existing heating, plumbing, and electrical systems also need to be noted in the assessment. The visible features of historic systems—radiator, grilles, light fixtures, switchplate, bathtub, etc.—can contribute to the overall character of the building, even if the systems themselves need upgrading.

**Assessing Alterations and Deterioration**

In assessing a building's interior, it is important to ascertain the extent of alteration and deterioration that may have taken place over the years; these factors help determine what degree of change is appropriate in the project. Close examination of existing fabric and original floorplans, where available, can reveal which alterations have been additive, such as new partitions inserted for functional or structural reasons and historic features covered up rather than destroyed. It can also reveal which have been subtractive, such as key walls removed and architectural features destroyed. If an interior has been modified by additive changes and if these changes have not acquired significance, it may be relatively easy to remove the alterations and return the interior to its historic appearance. If an interior has been greatly altered through subtractive changes, there may be more latitude in making further alterations in the process of rehabilitation because the integrity of the interior has been compromised. At the same time, if the interior had been exceptionally significant, and solid documentation on its historic condition is available, reconstruction of the missing features may be the preferred option.

It is always a recommended practice to photograph interior spaces and features thoroughly prior to rehabilitation. Measured floor plans showing the existing conditions are extremely useful. This documentation is invaluable in drawing up rehabilitation plans and specifications and in assessing the impact of changes to the property for historic preservation certification purposes.
Drawing Up Plans and Executing Work

If the historic building is to be rehabilitated, it is critical that the new use not require substantial alteration of distinctive spaces or removal of character-defining architectural features or finishes. If an interior loses the physical vestiges of its past as well as its historic function, the sense of time and place associated both with the building and the district in which it is located is lost.

The recommended approaches that follow address common problems associated with the rehabilitation of historic interiors and have been adapted from the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. Adherence to these suggestions can help ensure that character-defining interior elements are preserved in the process of rehabilitation. The checklist covers a range of situations and is not intended to be all-inclusive. Readers are strongly encouraged to review the full set of guidelines before undertaking any rehabilitation project.

Recommended Approaches for Rehabilitating Historic Interiors

1. Retain and preserve floor plans and interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves such as lobbies, reception halls, entrance halls, double parlors, theaters, auditoriums, and important industrial or commercial use spaces. Put service functions required by the building’s new use, such as bathrooms, mechanical equipment, and office machines, in secondary spaces.

2. Avoid subdividing spaces that are characteristic of a building type or style or that are directly associated with specific persons or patterns of events. Space may be subdivided both vertically through the insertion of new partitions or horizontally through insertion of new floors or mezzanines. The insertion of new additional floors should be considered only when they will not damage or destroy the structural system or obscure, damage, or destroy character-defining spaces, features, or finishes. If rooms have already been subdivided through an earlier insensitive renovation, consider removing the partitions and restoring the room to its original proportions and size.

3. Avoid making new cuts in floors and ceilings where such cuts would change character-defining spaces and the historic configuration of such spaces. Inserting of a new atrium or a lightwell is appropriate only in very limited situations where the existing interiors are not historically or architecturally distinguished.

4. Avoid installing dropped ceilings below ornamental ceilings or in rooms where high ceilings are part of the building’s character. In addition to obscuring or destroying significant...
5. Retain and preserve interior features and finishes that are important in defining the overall historic character of the building. This might include columns, doors, cornices, baseboards, fireplaces and mantels, paneling, light fixtures, elevator cabs, hardware, and flooring; and wallpaper, plaster, paint, and finishes such as stenciling, marbleizing, and graining; and other decorative materials that accent interior features and provide color, texture, and patterning to walls, floors, and ceilings.

6. Retain stairs in their historic configuration and to location. If a second means of egress is required, consider constructing new stairs in secondary spaces. The application of fire-retardant coatings, such as intumescent paints; the installation of fire suppression systems, such as sprinklers; and the construction of glass enclosures can in many cases permit retention of stairs and other character-defining features.

7. Retain and preserve visible features of early mechanical systems that are important in defining the overall historic character of the building, such as radiators, vents, fans, grilles, plumbing fixtures, switchplates, and lights. If new heating, air conditioning, lighting and plumbing systems are installed, they should be done in a way that does not destroy character-defining spaces, features and finishes. Ducts, pipes, and wiring should be installed as inconspicuously as possible: in secondary spaces, in the attic or basement if possible, or in closets.

8. Avoid "furring out" perimeter walls for insulation purposes. This requires unnecessary removal of window trim and can change a room's proportions. Consider alternative means of improving thermal performance, such as installing insulation in attics and basements and adding storm windows.

9. Avoid removing paint and plaster from traditionally finished surfaces, to expose masonry and wood. Conversely, avoid painting previously unpainted millwork. Repairing deteriorated plasterwork is encouraged. If the plaster is too deteriorated to save, and the walls and ceilings are not highly ornamented, gypsum board may be an acceptable replacement material. The use of paint colors appropriate to the period of the building's construction is encouraged.

10. Avoid using destructive methods--propane and butane torches or sandblasting--to remove paint or other coatings from historic features. Avoid harsh cleaning agents that can change the appearance of wood.
Meeting Building, Life Safety and Fire Codes

Buildings undergoing rehabilitation must comply with existing building, life safety and fire codes. The application of codes to specific projects varies from building to building, and town to town. Code requirements may make some reuse proposals impractical; in other cases, only minor changes may be needed to bring the project into compliance. In some situations, it may be possible to obtain a code variance to preserve distinctive interior features. (It should be noted that the Secretary’s Standards for Rehabilitation take precedence over other regulations and codes in determining whether a rehabilitation project qualifies for Federal tax benefits.) A thorough understanding of the applicable regulations and close coordination with code officials, building inspectors, and fire marshals can prevent the alteration of significant historic interiors.

Sources of Assistance

Rehabilitation and restoration work should be undertaken by professionals who have an established reputation in the field.

Given the wide range of interior work items, from ornamental plaster repair to marble cleaning and the application of graining, it is possible that a number of specialists and subcontractors will need to be brought in to bring the project to completion. State Historic Preservation Officers and local preservation organizations may be a useful source of information in this regard. Good sources of information on appropriate preservation techniques for specific interior features and finishes include the Bulletin of the Association for Preservation Technology and The Old-House Journal; other useful publications are listed in the bibliography.

Protecting Interior Elements During Rehabilitation

Architectural features and finishes to be preserved in the process of rehabilitation should be clearly marked on plans and at the site. This step, along with careful supervision of the interior demolition work and protection against arson and vandalism, can prevent the unintended destruction of architectural elements that contribute to the building’s historic character.

Protective coverings should be installed around architectural features and finishes to avoid damage in the course of construction work and to protect workers. Staircases and floors, in particular, are subjected to dirt and heavy wear, and the risk exists of incurring costly or irreparable damage. In most cases, the best, and least costly, preservation approach is to design and construct a protective system that enables stairs and floors to be used yet protects them from damage. Other architectural features such as mantels, doors, wainscoting, and decorative finishes may be protected by using heavy canvas or plastic sheets.
Summary

In many cases, the interior of a historic building is as important as its exterior. The careful identification and evaluation of interior architectural elements, after undertaking research on the building’s history and use, is critically important before changes to the building are contemplated. Only after this evaluation should new uses be decided and plans be drawn up. The best rehabilitation is one that preserves and protects those rooms, sequences of spaces, features and finishes that define and shape the overall historic character of the building.

Selected Reading List

There are few books written exclusively on preserving historic interiors, and most of these tend to focus on residential interiors. Articles on the subject appear regularly in The Old-House Journal, the Bulletin of the Association for Preservation Technology, and Historic Preservation Magazine.


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This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Technical Preservation Services (TPS), Heritage Preservation Services Division, National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.