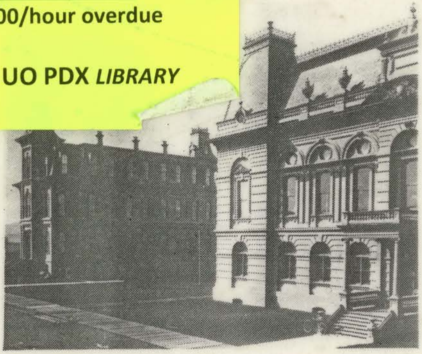
A RESTORATION AND PRESERVATION PLAN WITH DRAWINGS FOR THE WOODEN BALUSTRADE AND URNS THAT EMBELLISHED THE ROOF STRUCTURE OF VILLARD HALL



by

ANDREW RICHARD CURTIS

December 1988

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A TERMINAL PROJECT

Presented to the Interdisciplinary Studies Program:
Historic Preservation,
the School of Architecture and Allied Arts,
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Science

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APPROVED: ______________________
PHILIP H. DOLE, PROFESSOR EMERITUS

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I also wish to express my gratitude to the Director of the Physical Plant, Harold C. Babcock, for facilitating the task of measuring the building. Grateful thanks are due to James V. Bernhard of Wegroup PC Architects and Planners for employing my drafting services and utilizing my drawings for this project in conjunction with Professor Peting's <u>Historic Structures Report</u>.

Finally, I wish to thank my parents, Dr. Richard Curtis and Laurinda Curtis, for their unfailing encouragement and support throughout my entire academic career.

DEDICATION

To Richard and Laurinda

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SECTION I

INTRODUCTION: THE PROBLEM AND ITS SETTING

Introduction

Villard Hall, located on the University of Oregon campus (along Kincaid Street between East Eleventh and East Twelfth Avenues) in Eugene, survives as a distinguished example of Second Empire architecture in Oregon. The building was designated as a National Historic Landmark in 1977, despite several periods of extensive interior remodeling and the addition of a theatre to the west elevation in 1948. Completed in 1886, the building is significant (a) for its architectural features designed by Warren Heywood Williams, a leading architect in Portland, Oregon (during the 1870-80s); and (b) for its association with Henry Villard, a highly successful railroad builder who generously donated to the University during its financially troubled early years. The building currently houses the Department of Speech (which includes the academic majors of Rhetoric and Communication, Telecommunication and Film, and Theatre). Many years of deferred maintenance has left the building in a severely deteriorated condition that is in need of immediate preservation and restoration action.

The aim of this Master's "Terminal Project" was to produce a restoration and preservation plan that would supply drawings for the missing balustrade and urns which previously embellished the roof structure of Villard Hall. The project was selected in order (a) to fill the need for active independent research (on Villard Hall) to be conducted by students in the Historic Preservation Program and (b) to provide a view of the methodology necessary to produce a complete restoration and preservation plan for individual architectural details. Particular attention is given to the section dealing with the choice of an appropriate material for restoration of the urns. The final conclusions were reached through a synthesis of the findings produced during the research methodology. The research included the documentation and assessment methodology, interviews, research of existing literature, research of technical information related to the proposed restoration, collection of historic photographs, and search for existing urns on other buildings designed by W. H. Williams. The initial research enabled (a) the compilation of a chronology of exterior alterations, (b) the execution of existing-condition drawings, and (c) the use of a reverse perspective and a scale system for the deduction of the urn/balustrade form and overall dimensions.

The research methodology for the restoration of the urn/balustrade system was carried out in several simultaneous phases. The field documentation included existing-condition inspection, field measurements, photographic documentation, and videotapes; this was begun in conjunction with the interviews, the collection of historic photographs, the research of existing literature and archives, and the search for existing urns on other W. H. Williams buildings. The early research activity resulted in the compilation of a chronology of events related to exterior alterations of Villard Hall, a complete set of existing-condition drawings, and an extensive bibliography. The proposed restoration design was derived from the field-documentation evidence, the research into the typical design characteristics of W. H. Williams' work, and the use of reverse perspective and a scale system for the deduction of the urn/balustrade form and dimensions. The recommendations and conclusions were derived from the findings of the research methodology and consultations with Professor Philip H. Dole, Professor Donald L. Peting, and architect William J. Hawkins III.

The field-measurement booklet (which exists under separate cover),[1] and many of the existing-condition drawings and photographs, were produced between January 1987 and June 1988 for two primary purposes. The first was for the Historic Preservation Program East Porch Restoration Workshop and a special-project course on Villard Hall offered by Professor Peting during Winter Term 1988. The second was for the Historic Structures Report being written by

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[1] Andrew R. Curtis, Field Measurements for the Existing Condition Drawings of Villard Hall (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

Professor Peting in 1988 for Wegroup PC Architects and Planners of Eugene, Oregon, for the University of Oregon Physical Plant. All recommendations and conclusions were based on research done during this time period. Any new information (such as the discovery of original plans and/or additional historic photographs pertaining to the urn/balustrade system) could lead to further clarification of the urns' original material and to a reevaluation of the restoration and preservation recommendations and conclusions.

Many of the following sections contain small portions of identical information which has been included in order that each section may stand on its own.

The Statement of the Problem

An examination of the historic photographs of Villard Hall reveals the loss of the urn/balustrade system which had been located above the main cornice (between the roof of the corner pavilion and the centrally located semicircular pediment) and below the decorative tablet on the blind-dormer parapet wall: Previously "there was balustrading which erupted into pillars [or pedestals] two times on each side of a central, semi-circular pediment on the [east and] west faces, and two times only on the north and south sides."[2] The

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[2] Joseph A. Baird, Jr., Historic American Buildings Survey Photograph-Data Book Report (University of California, 1964), quoted by Carolyn Pitts, National Register of Historic Places Inventory: Nomination Form (Washington, DC: Historic Sites Survey Division, National Park Service, 1977), 3.

pedestals supported urns which were removed circa 1903 during the building's second decade of existence. Subsequently, most of the balustrading (except for a section renovated circa 1948 on the north elevation) was also removed.

Very little active independent research, documentation, and assessment of the exterior conditions had been undertaken by Historic Preservation Program Workshop students or faculty before the advent of Professor Peting's Winter Term 1988 "Special Project: Villard Hall Historic Study." Considering the current need for immediate preservative action, and acknowledging that no original drawings are known to exist for the building, the aim of this Master's "Terminal Project" was to devise a documentation and assessment methodology to produce a restoration and preservation plan which would supply drawings for the missing balustrade and urns that embellished the roof structure of Villard Hall on the campus of the University of Oregon in Eugene, Oregon.

The Statement of the Subproblems

The first subproblem was to devise a method for resolving the form of the urns and the construction details of the urn/balustrade system. Several parts of the methodology were utilized:

1. Undertaking an intensive documentation of existing conditions through extensive field measurements, photography, and videotape.

2. Researching other buildings and available plans for such buildings by the architect in question, in order to formulate a basic vocabulary for his design work.
3. Researching early photographic documentation, archival information, builder's guides (contemporary to the period in question), and craftsperson publications; and conducting extensive interviews with knowledgeable people concerning the many aspects of this subject.
4. Developing a system of reverse perspective to deduce the dimensions of the original urns in the historic photographs.

The <u>second subproblem</u> was to consider the most probable causes for the removal of the urns; for example:

1. They may have been removed as the result of changing architectural tastes.
2. They may have been removed as the result of newly imposed earthquake codes after the San Francisco disaster.
3. They may have been removed as the result of severe deterioration at their surface point of attachment to the pedestal.

The <u>third subproblem</u> was to ascertain the original material of the urns and explore possible substitute materials or alternative design solutions. This was accomplished through constructing (a) a list of possible original materials, (b) a list of possible substitute materials, and (c) diagrams of alternative design solutions.

The fourth subproblem was to analyze the findings to propose (a) the form and construction of the original urn/balustrade system, and (b) the scope of the final restoration and preservation plans.

The fifth subproblem was to test the design of the proposed urn/balustrade system in terms of its compliance with necessary preservation guidelines, codes, and standards for rehabilitation. That is, the following questions were asked:

1. Does the design pose any maintenance problems?
2. Does the design meet code requirements?
3. In terms of meeting the technical needs in Questions 1 and 2, does the design meet the Secretary of the Interior's Standards for Rehabilitation[3]?

The Delimitations

The study included areas directly attached to the balustrade and areas that provided assistance in the attainment of the correct proportions for the details in question.

The study was not intended to take the place of Professor Peting's proposed Historic Structures Report. The present research will, of course, be referenced in the actual final documents which constitute Professor Peting's work.

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[3] Sharon C. Park, Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors (Washington, DC: U.S. Government Printing Office, U.S. Department of Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, 1988), 1.

The study did not attempt to consider other deteriorated areas, except in its suggestion of areas which should be repaired before the urn/balustrade system is restored. For example, the cornice is directly related to the urn balustrade, but it does not have details that are completely missing on the building. Thus, one can suggest restoration of individual details from existing details.

The Assumptions

The first assumption was that the future restoration and preservation plan for the entire building would call for the restoration of the urn/balustrade system.

The second assumption was that the University of Oregon building-maintenance budget would always be minimal. So the new design for the urn/balustrade system would need to employ the best material offered today for use in this particular construction detail.

The third assumption was that none of the urns would be found, and that designs would need to be developed from researching W. H. Williams' buildings in Portland and from early photographs of the urns in place on the building. It was also assumed that the existing-condition drawings would assist the design process.

The fourth assumption was that the point of attachment between the urn and pedestal would need to be designed in a manner that not only would comply with present code requirements, but also would maintain historic integrity.

The Importance of the Project

This Master's "Terminal Project" was selected in order to fill the need for Villard Hall's inclusion in the active independent research conducted by Historic Preservation Program Workshop students. Although the scope is quite narrow, the final product provides a view of the methodology necessary to produce a complete restoration and preservation plan for the architectural details.

SECTION II

THE BACKGROUND INFORMATION: VILLARD HALL

Introduction

The following exterior description of Villard Hall and brief biography of architect Warren Heywood Williams (1844-88) serve as vital background information for the review of the research methodology presented in the Section III. Far more than merely being an interesting background or a documentation of the historical importance of the structure and its architect, the description and biography provide important clues for the analysis of present conditions. The exterior description is confined to a discussion involving the forms and materials of the individual architectural details as related to the proposed restoration design for the urn/balustrade system. The biography of W. H. Williams is slanted toward gaining a better understanding for the context of the urns in his building designs. By examining a group of W. H. Williams-designed buildings within the Pacific Northwest that are approximately the same age, many similiar construction techniques and moulding profiles are identifiable.

Most importantly, the background information gives the urn/balustrade system a certain amount of integrity and originality, thus warranting its significance and the need for a restoration plan. The urns in the urn/balustrade system are particularly important because they gave the building a unique spirit that expressed the character of W. H. Williams' work in Oregon. W. H. Williams combined a number of local materials, catalog details, and many unique forms to produce a distinct architectural style.

The Exterior Description

The principal elevation of Villard Hall is now oriented to the east and perpendicular to Deady Hall (which is located directly south). The east elevation measures 125 feet in length, and 74 feet in height from the ground to the top of the corner towers' iron crestings. The corner towers (or pavilions) and the center section project from the plane of the main elevation. They are topped by a mansard roof above each tower and a brick parapet wall; moulded into the face of the wall is a decorative tablet which is above the centrally located semicircular pediment of the center section (refer to cover photograph, Figure 1). The main roof has a slightly flatter pitch than the 75° angle of the tower roofs; the main roof rises only two-thirds as high as the tower roofs. Second Empire details found on this elevation are mirrored on the other elevations--excluding the center section, which has a tablet above a semicircular pediment at the cornice height and a wood entry porch at the ground level. The west elevation is not referred to in this description, but it once exhibited identical detailing to that of the east elevation.

The exterior walls of Villard Hall are built of brick and mortar. In his original specifications for the building, architect W. H. Williams called for

> the balance of the mortar to be composed of Port Langdon lime and clear sharp sand, mixed in the proportions of one (1) barrel of lime to sixteen (16) cubic feet sand. . . . Strong arches turned over all openings. The two (2) tablets of front parapets will be built of brick, the balance of the parapets will be of wood.[1]

The brickwork of the four elevations, from the ground level to the undersides of the woodwork of the main cornices (including the architrave mould of the main cornice, all around, and the friezes of main cornices, except for towers and center projections), and the two tablets of the parapets were cemented onto the brickwork with a coat of Portland cement and finely sifted Lewis or Sandy River sand mortar a full one-half inch thick, mixed in the proportions of one part cement to each of two parts sand.[2] This cement mortar or architectural rendering was screeded to form the bold horizontal rustication (including belt-courses and voussoirs of the arched window openings) in an imitation of the stonework found in the original buildings of the French Second Empire style in France.

The windows are the principal articulating feature of the wall elevation. The window on both the first and second stories typically have 1-3/4" wide stile double-run sashes with 26-ounce Chancis Crystal

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[1] Warren Heywood Williams, <u>Specifications for Villard Hall</u> (Eugene: University of Oregon Archives, 22 June 1985), 4.

[2] Ibid., 16.

or Belgian sheet glass. A 1-3/4" semicircular stationary transom sash stile is located at the head of each first-story window. The bull's-eye windows above the second story's main block windows have 1-3/4" circular sashes and the same glass. All windows are set in cedar frames.

> On the main block of the structure, on all faces (although with seven windows east and west to three on the north and south, and a central window of the east and west group in a salient section of the building over the main door and porches, manifesting a 1-3-1 rhythm), the windows proper are flanked by tall, slender pilasters with [composition metal] Corinthianesque capitals which "support" a strip molding running between each side of the wall recess. The pilasters (unfluted) are on square bases with panelled recesses of the same square shape. Framing each window recess, in series of three on each facade, are Corinthian pilasters supporting [a galvanized iron] entablature [with imposts which are ornamented with a composition metal garland motif ornamenting the frieze] extending between the end pavilions and central entrance salient, above which spring arches enclosing round [bull's-eye] windows. The windows on the second floor of the [corner towers'] pavilions are more Mannerist. The window proper is framed with an "eared" architrave which runs down into scrolls at either side of the window's bottom. The whole window seems to sit on small vertical strips or "feet" (actually, part of a panelled section below the window). [The window sits on a 3/8" thick cast-iron window sill 6'-3" long and 11" wide with a moulded front edge.] Above, over the "eared" frame, is a [cedar] pediment with a keystone connecting it to the frame. The pediment is filled with [carved wood] crisp, foliate ornament around a convex boss.[3]

The exterior doors at the center of the north and east elevations are 2-1/4" thick; they have heavy raised mouldings, raised panels, and

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[3] Joseph A. Baird, Jr., Historic American Buildings Survey Photograph-Data Book Report (University of California, 1964), quoted by Carolyn Pitts, National Register of Historic Places Inventory: Nomination Form (Washington, DC: Historic Sites Survey Division, National Park Service, 1977), 3.

26-ounce Chancis Crystal or Belgian sheet glass in the upper portion (see Figures 2 and 3).

At the roof level, the original material primarily used shifts to cedar (see Appendix F, pages 206-09). Wooden modillions support the cornice on each elevation of the main block of the building, whereas modillions with bracket extensions supported the cornice of the corner towers (the pavilions) and the center salient section. The corner towers' engaged-base pedestals have a paneled section between a base-strip moulding and a cyma recta or ogee moulding below, and an ovolo above which supports the sloped tin-covered top shelf. A circular louver-board window with keystone and flanking wooden scrollwork is centered along the top edge of this base-pedestal detail. A turned wooden finial once embellished the top of the keystone (see Figure 4). The base section and cyma recta moulding, on the right, are not original.

The urn/balustrade system, under consideration in this project, was located directly above the main cornice--between the corner towers' (or pavilions') engaged-base pedestals and the engaged pedestals of the centrally located brick parapet wall with its decorative tablet and wooden side scrolls (see Figure 5). An identical urn/balustrade system was located between the corner towers' roofs on the north and south elevations. The balustrade portion of each complete urn/balustrade system was interrupted twice by a wooden pedestal that served as the base for a 6-foot high wooden urn.

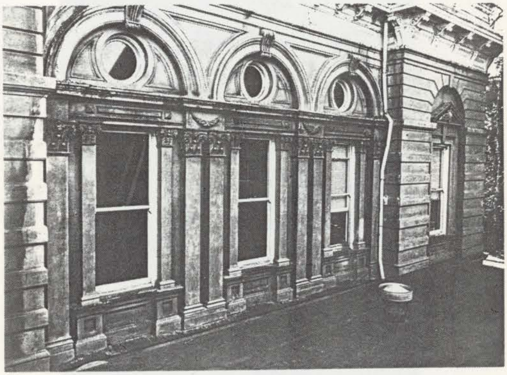
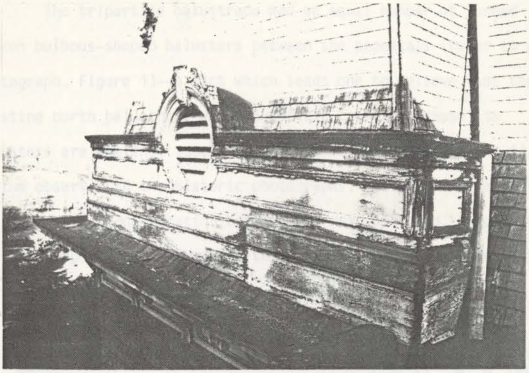


FIGURE 2. West Elevation at Second Level: 1988 View

FIGURE 3. West Elevation of Southeast Corner-Tower Window at Second Level: 1988 View



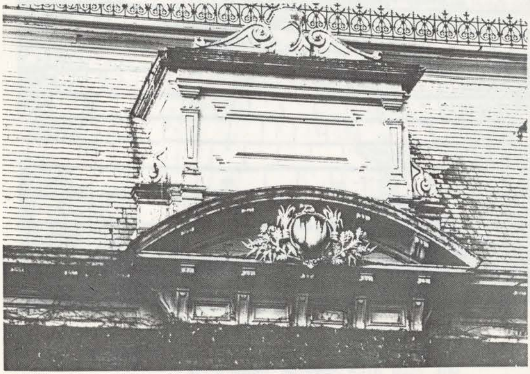


FIGURE 4. Northwest Corner Tower Above Cornice: 1988 View

FIGURE 5. Center Salient Section--East Elevation of Semicircular Pediment and Tablet Above: 1988 View

The tripartite balustrade had an equal number of turned wooden bulbous-shaped balusters between the pedestals (refer to cover photograph, Figure 1)--a fact which leads one to believe that the existing north balustrade was extensively rebuilt because its balusters are unevenly spaced in a 11-10-11 rhythm versus the 11-11-11 rhythm observed in the historic photographs. Evidence for a different point of attachment location between the main roof and the pedestals further supports the assumption that the existing balustrade on the north elevation was rebuilt (see Figure 6).

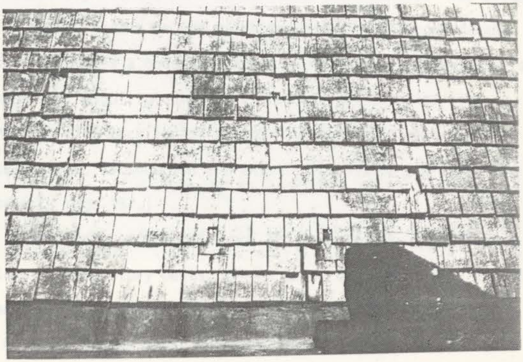


FIGURE 6. Evidence of the Original Point of Attachment Between Main Roof and the Wooden Balustrade: 1988 View

As illustrated by Figures 7 and 8, the existing-condition photographs and drawings for this balustrade show the historically inaccurate moulding profiles and extensive use of 1" plywood for the structure of the pedestals and rail sections of the balustrade. The moulding profiles observed during the field investigation were identical in profile to the mouldings dated circa 1949 which were presented during the Spring Term 1988 East Porch Restoration Workshop (see Appendix A, pages 89-104; and Appendix C, page 188). The original balustrade pedestals had deep-panel mouldings similar to those currently found on the corner-tower base panels. The evidence left by paint shadows on the existing corner-tower engaged-base pedestals provides a good indication of the original balustrade's location and height in comparison with the existing one (see Figure 9). (The location of the cornice gutter, directly under the balustrade, is shown on the existing-condition roof plan in Appendix C, page 181.)

The decks of the main roof and tower roofs, tops of main cornices, second-story belts, window caps, and porch roofs are all tinned over; whereas the mansard-roof slopes are shingled over with 6" sawed Oregon cedar shingles, laid 5" to the weather (see Appendix F, pages 206-09). The wood shingles currently in place on the building appear to be original, whereas the original tin-roof surface is covered with roofing tar and fiberglass matting along the cornice gutter.

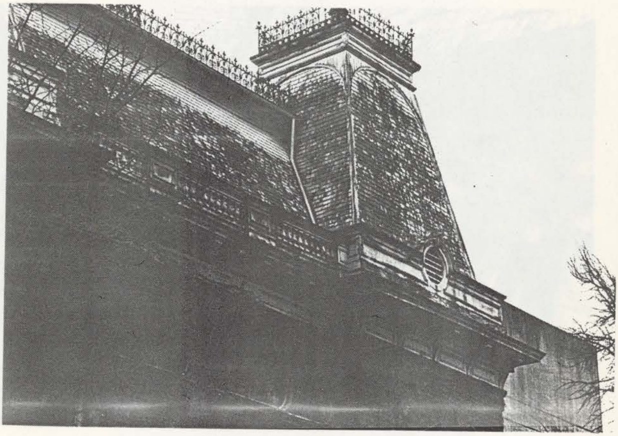


FIGURE 7. North-Elevation Balustrade--
Existing Condition: 1988 View 1

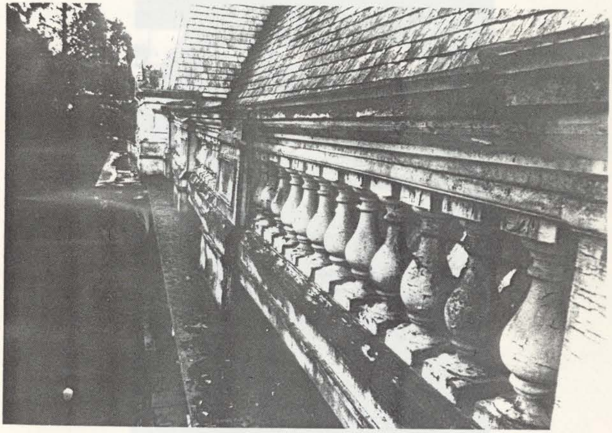


FIGURE 8. North-Elevation Balustrade--
Existing Condition: 1988 View 2

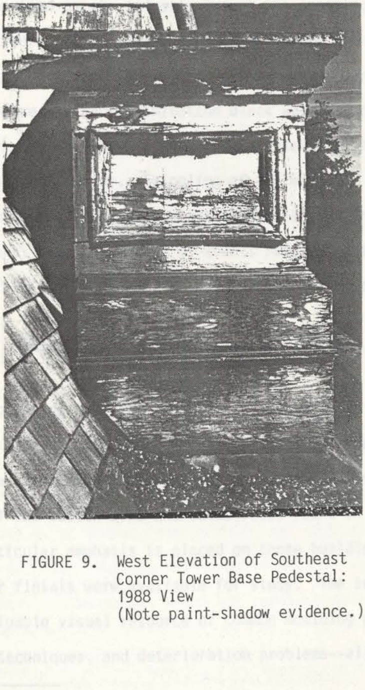


FIGURE 9. West Elevation of Southeast Corner Tower Base Pedestal: 1988 View (Note paint-shadow evidence.)

W. H. Williams' specifications for the building called for all exterior wood, as well as the cast- and galvanized-ironwork for the four fronts, to have three good heavy coats of linseed oil and "Pioneer" white lead paint; and all, except the crestings, sashes, doors, porch floors and steps were to be sanded (on the two last coats) with first-grade Monterey, California, white quartz sand. The outside doors were grained in imitation Black Walnut and wax finished. All the tinwork (except the leaders) were painted with two heavy coats of metallic red paint. Shingling of the main and tower roofs were painted with two good heavy coats of linseed oil and "Pioneer" white lead paint.[4] (A chronology of events related to the exterior alterations of Villard Hall is included as Appendix E, pages 199-205.)

The Architect Warren Heywood Williams and His Use of Urns

The following short biography of Warren Heywood Williams and the review of relevant contemporaneous buildings designed by him, is presented here in order to attain a more in-depth understanding for the context of the wooden urns and balustrades found in his building designs. Particular emphasis is placed on those buildings for which wooden urns or finials were available for study. The investigation provided a valuable visual resource of common moulding profiles, construction techniques, and deterioration problems--all of which

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[4] Warren Heywood Williams, Specifications for Villard Hall (Eugene: University of Oregon Archives, 22 June 1985), 4.

serve an important role in the proposed restoration design for the urn/balustrade system on Villard Hall.

During the 1870s and 1880s, the architectural designs of Warren Heywood Williams (1844-88) furnished the Pacific Northwest--particularly in Portland, Oregon--with an air of architectural sophistication and refinement which rivaled that in any other major city of the mid- to late-nineteenth century. He designed several large commercial palaces, many handsomely proportioned and detailed mansions, churches, and important public buildings.[5]

Born in New York, W. H. Williams was 5 years old when his father (architect Stephen Hedders Williams) moved the family to San Francisco. W. H. Williams apprenticed in his father's architectural office, and was influenced by one of his father's noted associates, Henry W. Cleaveland.[6] In 1869, W. H. Williams came to Portland, Oregon, for the first time; as a representative for the firm (which was now named Stephen H. Williams and Son) he was to oversee the construction of the new Odd Fellows Temple. W. H. Williams moved to Portland following the of 1872 and 1873. He first entered into a partnership with E. M. Burton from 1873-75, and then with Justus Krumbein from 1875-78. Notable buildings of this period include the Henry W. Corbett Residence, which was constructed in 1874; and

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[5] William J. Hawins III, "Warren H. Williams, Architect," Portland Friends of Cast-Iron Architecture Newsletter 17 (December 1980): 1.

[6] Ibid.

The Bank of British Columbia, which was constructed in 1873 (see Figure 10).

FIGURE 10. The Bank of British Columbia Built in 1873
(Note the urns on the roof-line balustrade.)

In 1878, Williams and Krumbein designed the large Cosmopolitan Block, and the Alisky and Hegele Building. W. H. Williams produced several large commercial buildings from 1879 to 1888, including the Portland, Oregon, Union Block in 1879 (see Figure 11); and the Victoria, British Columbia, First Bank of British Columbia in 1886 (see Figure 12).

W. H. Williams died at the age of 44 on 7 January 1888, having contracted pneumonia while on a trip East. Many of his outstanding building designs have been left out of this short review of his work, but it is hoped that the reader has gained an appreciation for the

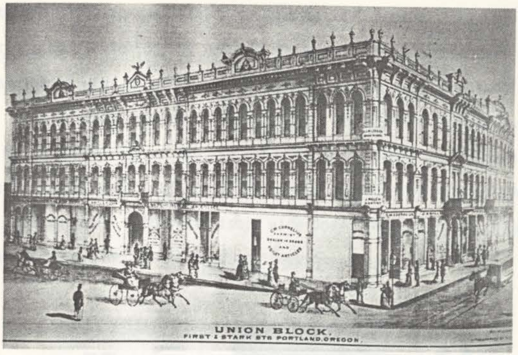


FIGURE 11. Historic Photograph of the Union Block Built in 1879 (Note the extensive use of urns above the cornice.)

FIGURE 12. Historic Photograph of The First Bank of British Columbia Built in 1886 (Note the presence of finials above the cornice.)

extraordinary architectural treasures he left behind. The following discussion focuses on the results of research into particularly good examples of urns on other buildings designed by W. H. Williams.

The Jacobs-Dolph House (1880) is an excellent example of W. H. Williams' use of urns in his building designs (see Figure 13). The urns pictured in Figure 13 are proportioned similarly to the urns on Villard--with a characteristic wide body, separately attached handles, and elongated turned top section.

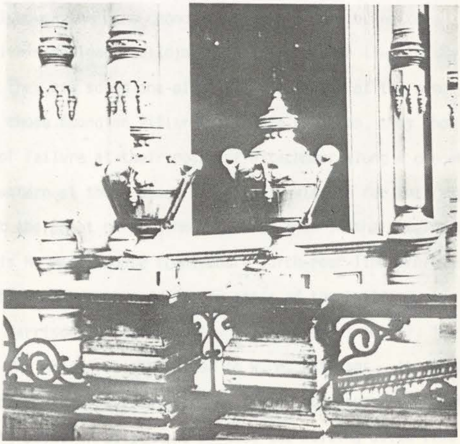


FIGURE 13. Jacobs-Dolph House Built in 1880: Circa 1950 View (Note urns above the entry-porch roof-line balustrade pedestals; photograph from Oregon Historical Society.)

The photographs from Minor White Studios (located at the Oregon Historical Society) show several urns above the paired pedestals of the entry-porch roof balustrade (see Figure 14).

The solid-wood finials presented in Figure 15 are similar in size and material to many of the urns pictured in historic photographs of buildings designed by W. H. Williams. The finials' origins are unknown, but stylistic characteristics attribute them to the 1870-80s. These photographs are available in William J. Hawkins III's architectural-detail collection.

Although the urns cannot be directly attributed to a W. H. Williams-designed building, their importance lies in the fact that they are solid one-piece cedar turnings of the same period as those found on Villard Hall. In addition, they show evidence of failure at their point of attachment along a concentric-nailing pattern at their base. Identical evidence for this type of failure at the point of attachment can be seen in the remains of the 1882 Morris M. Marks House front-entry porch-roof-line urn/balustrade system, which was discovered in the attic of the building at Southwest Harrison Street in Portland (see Figures 16, 17, 18, 19, and 20). The design is attributed to W. H. Williams. It appears that the concentric-nailing pattern at the base caused the urns to fail at the point of attachment because the nailing acted like a splitting wedge along a weak point in the natural graining of the cedar.

FIGURE 14. Jacobs-Dolph House Built in 1880: Circa 1960 View (Note that the photographic detail from Minor White Studios shows the urns in place on the building; photograph from Oregon Historical Society.)

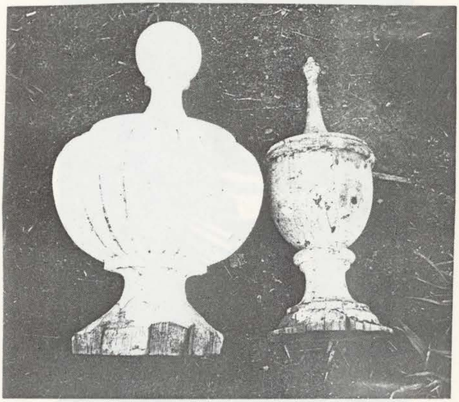


FIGURE 15. Solid Cedar Finials: 1988 View
(Photograph courtesy of
William J. Hawkins III.)

FIGURE 16. Remains of the Morris M. Marks House Front-Porch Roof-Line Urn/Balustrade Stored in the Attic: 1988 View (Note the broken base of the urn.)

FIGURE 17. Pedestal and Urn From Morris M. Marks House Built in 1882: 1988 View

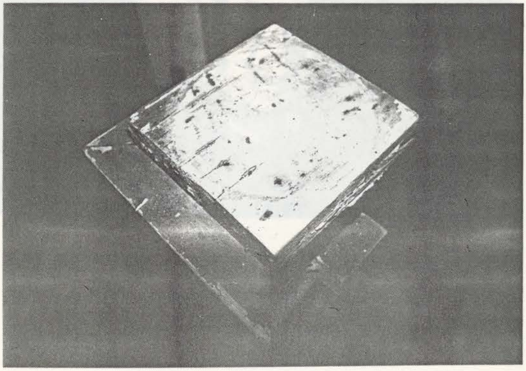


FIGURE 18. Pedestal From the Morris M. Marks House Built in 1882: 1988 View

FIGURE 19. Base for Urn Atop Pedestal From the Morris M. Marks House Built in 1882--The Front-Entry Porch-Roof-Line Balustrade: 1988 View (Note tightly spaced concentric-nailing pattern in base.)

FIGURE 20. Balustrade Remains From the Morris M. Marks House Built in 1882--The Front-Entry Porch: 1988 View (Photograph retrieved from attic of house.)

Thus, the research of urns on other buildings designed by W. H. Williams has led to a few conclusive answers to the second and third subproblems posed in Section I of this text and has also provided the necessary background information for the resolution of the fourth subproblem. The answers are further expanded upon in Section III of this text.

SECTION III

THE METHODOLOGY

Introduction

The following descriptions of field-documentation techniques and related research activities are presented in order to provide a complete overview of the research methodology necessary for a restoration and preservation plan with drawings for the wooden balustrade and urns that previously embellished the roof structure of Villard Hall. The methodology consisted of a number of related, and usually sequential, activities which built upon one another.

The documentation and research activities were carried out over a period of 9 months, at first for the East Porch Restoration Workshop (conducted during Winter and Spring Terms of 1987) and then for Professor Donald L. Peting's Special Project course (during Winter Term 1988). Additional research was carried out on an independent basis during the spring and summer of 1988. The existing-condition drawings and resulting proposed-restoration drawings were completed after several months of drawing and consultation with Professors Philip H. Dole and Donald L. Peting.

Additional critique sessions occurred with architect and Warren Heywood Williams authority, William J. Hawkins III; architectural conservator, Alfred N. Staehli; restoration craftsman, Greg Olson; and substitute-materials specialist David Talbot. The set of existing-condition drawings (a) for all four elevations; (b) for the roof plan; and (c) for the section views through the corner pavilion, main roof, and blind dormer were executed for Professor Peting's Historic Structures Report for the building. (The Report is being written by Professor Peting in his capacity as Preservation Consultant, under contract to Wegroup PC Architects and Planners of Eugene, Oregon.)

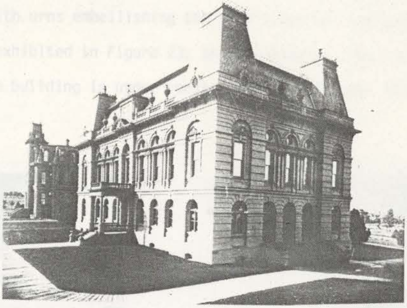
The Existing-Condition Inspection

The existing-condition inspection was carried out in conjunction with Professor Peting's Special Project course on Villard Hall during Winter Term 1988. The following subsections discuss the activities included in the inspection (for example, the collection of historic photographs, field documentation, existing-condition drawings, interviews, and research of existing literature and archives, and search for existing urns on other W. H. Williams buildings in the Pacific Northwest). The inspection was all-inclusive from the start, but narrowed to a detailed investigation of those areas directly associated with the urn/balustrade system.

The Collection and Analysis of Historic Photographs

An abundance of historic photographs proved to be available for the compilation of a structural history (or chronology of the exterior alterations), tracing each elevation of the building (see Appendix E, pages 199-205). Thus, the photographic record yielded a massive amount of physical data which was recorded, identified, dated, analyzed, measured, compared, and evaluated during the process of redesigning the urn/balustrade system.

The photographs were collected from numerous sources during the entire duration of the project. The University of Oregon Archives (located in Fenton Hall) has the most extensive collection of historic photographs of Villard Hall. The University Publications Office (located in Condon Hall) and the Oregon Historical Society (located in Portland) have several important early views. The Lane County Museum and early editions of the University of Oregon yearbook (entitled the Webfoot) contain a number of dated early views of the building. Several historic photographs of the entire east elevation and one particularly vivid view of one-half the east elevation with Deady Hall in the background were especially helpful in the process of resolving the original form of the urns (see Figures 21 and 22). Although several of the early photographs are not dated, one is able to piece together the series of events and corresponding dates that led to the removal of the urns circa 1903 and removal of the balustrade in 1949.



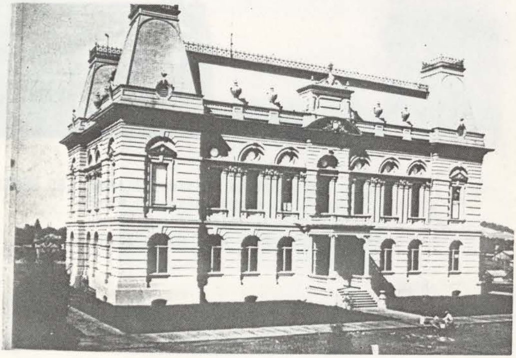


FIGURE 21. Northeast Elevation With Urn/Balustrade: Circa 1896 View

FIGURE 22. East Elevation With Entire Urn/Balustrade and Deady Hall in the Background: Circa 1886 View (Photograph from University of Oregon Archives.)

The first important photograph to show both Villard Hall and Deady Hall with urns embellishing the roof lines of each respective building is exhibited in Figure 23; in the distance, the roof of the new gymnasium building is under construction in the year 1889 (see Figure 23).

FIGURE 23. West Elevations of Deady and Villard Halls With Both Urn/Balustrades in Place and Gymnasium Under Construction in the Background: 1889 View (Photograph from University of Oregon Archives.)

Although Figure 21 previously provided a view of Deady Hall in the background with its ball-shaped urns removed (in its photograph dated circa 1896), the photograph in Figure 24 shows Deady Hall without urns as early as November 1891. However, it is the photograph included as Figure 25 which proved to be the most valuable for the purpose of determining why the urns were removed from Villard Hall.

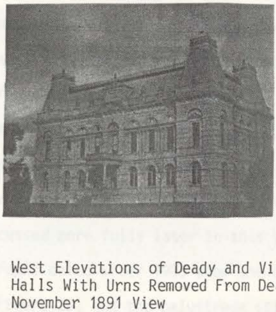
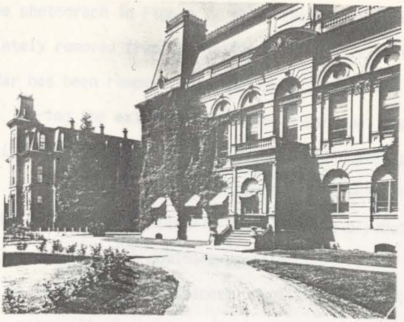


FIGURE 24. West Elevations of Deady and Villard Halls With Urns Removed From Deady Hall: November 1891 View (Photograph from University of Oregon Archives.)

FIGURE 25. Villard Hall With Far-Right Urn on Western Elevation Leaning Back Against the Main Roof Surface: Circa 1903 View (Photograph from University of Oregon Archives.)

The photograph in Figure 25 was found in the 1903 edition of the student yearbook, the Webfoot. A close examination of the photograph reveals that the far-right urn on the west elevation had broken off somewhere near its base or point of attachment and it is seen leaning back against the main roof surface. Thus, one is led to the assumption that the urns were removed from the building for safety reasons after it was determined that (a) the point of attachment was improperly designed or (b) the point of attachment had badly deteriorated as a result of poor design. The photograph is also important because it leads one to believe that the urns were removed because of a failure at the point of attachment and not because the material (most probably wood) had badly deteriorated. This conclusion outweighs the assumptions that they were removed because of changing architectural styles or that they were removed as the result of the newly imposed earthquake codes which followed the San Francisco disaster. The research of other urns on W. H. Williams buildings in Portland revealed similiar evidence of failure at the point of attachment to their pedestal or base. This part of the research methodology is discussed more fully later in this section.

All photographs dated after 1903 show the urns removed from the building (see Figure 26) and the balustrade still in place on all the elevations. This condition exists until the 1949 construction photographs taken during the addition of Robinson Theatre to the west elevation (see Figure 27).



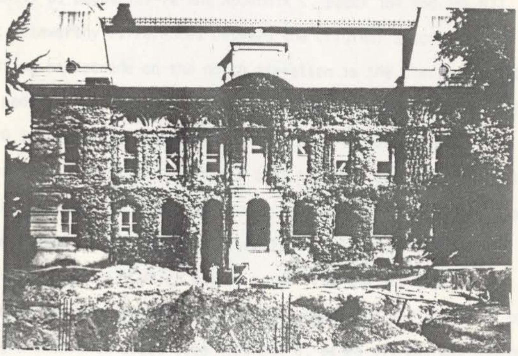


FIGURE 26. View From the Northeast With Only the Balustrade Still in Place on the Building: Circa 1935 View (Photograph from Oregon Historical Society.)

FIGURE 27. West Elevation During Construction of Robinson Theatre: 1949 View (Note entire balustrade has been removed.)

The photograph in Figure 27 shows that the balustrade has been completely removed from the building and that a section of finish cedar has been removed from the right side of the pavilion's roof base. During the existing-condition inspection, the removed cedar section was discovered to have been replaced with plywood.

It was also during the Robinson Theatre construction that the north balustrade was completely rebuilt using plywood and was unfaithfully restored with moulding profiles similiar to those found during the existing-condition inspection of the East Porch (see Appendix B, pages 159-72 and Appendix C, pages 184 and 186-87). The most noteworthy differences between the original balustrade and the existing balustrade on the north elevation is the shallow profile of the pedestal-panel moulding and the reduction from 11 turned balusters to 10 in the center section of the tripartite balustrade. The investigation further determined that the only original material found on the existing north balustrade is that of the individual bulbous-shaped turned cedar balusters (see Figures 28 and 29). Another important discovery which may be noted from the drawings is the evidence of the original point of attachment for each pedestal by a wrought-iron knee brace (see Appendix B, pages 119-20; and Appendix C, page 185). The location of the original balustrade along the base of the corner pavilion was easily determined by the existence of a distinct paint-shadow line on the wooden base of each corner pavilion (see Appendix B, pages 129-35; and refer to Figure 9).

FIGURE 28. Turned Baluster of the North-Elevation Balustrade: 1988 View (Note nail holes show evidence of having been reused.)

FIGURE 29. Existing Condition of North-Elevation Balustrade: 1988 View

The Field Documentation

Field documentation included the recording of field measurements and notes (see Appendix B, pages 105-79). The reader is also referred to the complete set of field measurements for the entire exterior of the building which appears under separate cover,[1] to the black-and-white photographs (see Appendix A, pages 89-104), to the

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[1] Andrew R. Curtis, Field Measurements for the Existing Condition Drawings of Villard Hall (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

color slides of all existing conditions,[2] and to the videotape which summarizes the complete field-documentation process.[3] The field documentation (in particular the field-measurement and videotape activities) were conducted with the assistance of field partners and certain standard documentation tools (see Figure 30; and Appendix I, pages 227-28).

FIGURE 30. A Partial Collection of Field-Documentation Tools

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[2] For information regarding the availability of the color slides contact Andrew R. Curtis (in care of Dr. Richard Curtis, 42 A Central Street, Hudson, Massachusetts 01749).

[3] Andrew R. Curtis, <u>1988 Existing Conditions of Villard Hall: A Videotape</u> (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

In the case of the field measurements for the area directly related to the urn/balustrade, rock-climbing gear and the advice of an experienced mountain climber allowed an up-close investigation of the area above the main cornice. The existing balustrade on the north elevation was documented in its entirety during two separate trips over the main roof edge down to the cornice level. Color slides and black-and-white photographs were taken to comprehensively document specific detailed areas. The initial photographs proved very helpful in the production of the preliminary graph-paper sketches; these sketches were then used as the implement for recording the measurements taken during the second trip over the edge. Extreme care was exercised at all times to establish a clear communication system between the person "on belay" and the person letting out slack from the friction knot. The knot was secured to two carabiners that were locked to a strap looped around the sturdily attached radio tower at the center of the main roof. The most important safety consideration was that slack created by movement along the cornice, by the person on belay, toward the friction knot or toward a perpendicular position below the knot had to be constantly pulled in ("up slack") in order to prevent a free-fall over the distance of slack in the rope. The resulting pendulum-swinging action was potentially dangerous considering the amount of glass in the wall plane below. A major problem with this measurement technique is that the person documenting the conditions is time-constrained by the person waiting above (who oftentimes has volunteered a precious hour or two of his or her time). So it is important that the person conducting the documentation have a list of important measurements composed beforehand. This can be accomplished by laying out varicolored dimension lines on detailed sketches before any field-measurement session, so that each detail may be methodically measured line by line. The person measuring often feels confident that he or she has covered every dimension needed to complete the finished existing-condition drawings in his or her studio without any further measuring; unfortunately, this often proves not to be the case, and further field measurements are inevitably required to accurately complete the drawings. In the event that the latter situation occurs, it is most helpful to keep a running list of measurements to be taken during what is to be the final-measuring session.

Several photographs and portions of the videotape were also taken while "on belay"; whereas others were taken with the aid of telephoto, zoom, and wide-angle camera lenses. Black-and-white Kodak Plus-X pan 125 ASA and Kodak Tmax 100 ASA films proved to be the best for exterior photography with a 35 mm Canon AE-1 Camera. Kodak Ektachrome (Tungsten) 160 ASA proved to be the best film for the reproduction of the historic photographs into slides using a light stand at the Allied Arts and Architecture Student Services Office. Long segments of videotape were taken of all existing conditions and historic photographs; they were later edited and narrated within the Instructional Media Center (IMC) studio--a section of the University of Oregon Library.

After all of the documentation and existing-condition inspection activities were completed, it was finally possible to enter the studio and draft the existing-condition drawings with only a few return trips to the building for measurement checks that were listed on a sheet of paper and checked off in the field.

The Existing-Condition Drawings

Selected existing-condition drawings appear in reduced form within Appendix C (pages 180-89); the full set may be viewed in the Historic Preservation Drawing Collection located in the Allied Arts and Architecture Library. The notes for the existing-condition drawings are included in Appendix B (pages 105-79). The goal of the drawings was to present the findings from the existing-condition inspection in as clear and accurate a manner as possible, while providing the first available set of measured drawings for the building.

The Interviews

Throughout the course of this project a number of very informative and direction-producing personal interviews were conducted. The process quickly became the most enjoyable and exciting part of the project--particularly as new leads were opened up and discussion on the development of the urn/balustrade-section drawings grew more and more detailed. The following annotated list of interviewees is only a small portion of those actually interviewed.

Murray Adams, Masonic Temple, 12 January 1988:

Provided the location of the original full-scale detailed drawings for the Masonic Temple building designed by W. H. Williams (circa 1887); these proved helpful in determining the moulding profiles. The drawings are located in the Oregon Collection section of the Library at the University of Oregon.

Harold Babcock, Director, Physical Plant, University of Oregon, 12 January 1988:

Arranged all the necessary equipment for, and access to, the building.

Philip H. Dole, Professor Emeritus, Department of Architecture, University of Oregon:

Professor Dole provided many hours of expert and thought-provoking advice on the entire scope of the project, from start to finish, as Committee Chairperson for my project.

Eileen G. Fitzsimons, Oregon Trail Advisory Council, 7 March 1988:

Has extensively researched the life and works of W. H. Williams. She owns the original copy of the specifications for a Dwelling House in Albany, Oregon, which was designed by W. H. Williams. (As an aside, she was married to David Lockhead Williams, the great-grandson of Warren Heywood.)

William J. Hawkins III, Architect and Author, 5 February 1988:

The authority on W. H. Williams and cast-iron architecture in Oregon. Provided many leads which were of assistance in locating urns on W. H. Williams buildings in Portland; he also served as a member of my Committee.

Greg Olson, Restoration Craftsman, Salem, Oregon, 2 November 1988:

Critiqued the final proposed restoration-section drawing, and offered suggestions for constructing the urns in wood.

Donald L. Peting, Professor, Department of Architecture, University of Oregon:

Provided hours of very constructive criticism and support during the entire project, while serving as a Committee member.

Alfred N. Staehli, Architectural Conservator, Portland, Oregon:

Offered technical advice on past building practices by wood craftsmen in Oregon. His grandfather executed many of the sculptural details found on W. H. Williams buildings (as evidenced by the grandfather's signature on the back of many of the details).

David Talbot, Architectural Reproductions, Boring, Oregon:

Reviewed the substitute-materials options for the restoration of the urns. His work had a good "track record" in the investigation of urns made of glass-reinforced polyester resins.

The Research of Existing Literature and Archives, and the Search for Existing Urns on Other Warren Heywood Williams Buildings

The results of this part of the research methodology are elaborated in several of the following sections in the text. Suffice it to say here that the search for literature and archival information produced little substantive information, but the search for existing urns on other buildings by W. H. Williams was successfully rewarded by the discovery of several smaller solid-wood urns. The condition of these unearthed urns proved instrumental in my final decision to restore the urns in cedar.

The Chronology of Exterior Alterations

The chronology of exterior changes was compiled throughout the entire project, as bits and pieces of the puzzle presented themselves for consideration, in the effort to reconstruct the events that led to the removal of the original 12 urns circa 1903 and the 6 tripartite balustrades before 1949. (Refer to the discussion on the removal of the urns in the historic-photographs section of the methodology and Appendix E, pages 199-205, for the complete chronology.)

The Use of Reverse Perspective and a Scale System for Deducing the Overall Form and Dimensions of the Urn/Balustrades

After a substantial number of clear historic photographs showing the urn/balustrade were located and the field measurements were completed, a system was devised for deducing the original form and construction details. This system involved the use of reverse perspective in combination with a scale system developed from the field measurements. Basically, the dimensions of the urn/balustrade system were proposed by using a strong magnifying glass and a divider to compare the known distances with the unknown distances between points along the urn/balustrade system. The process was double-checked by carrying lines, in perspective to a vanishing point on the horizon line, across the object in question to a known vertical height on the centrally located blind-dormer parapet wall. By using this system, as well as the evidence found on the corner-pavilion engaged-base pedestals (refer to Figure 9), the dimensions of the restoration design were proposed.

The Research of Technical Information

The Journal of the Association for Preservation Technology was by far the most helpful resource during the search for technical information concerning the details of the proposed restoration. Articles covering many aspects of this project were invaluable learning tools--especially during the formulation of the research methodology and discussions regarding possible choices of materials to be used in the urn restoration. The Architectural Graphic Standards book was also useful in guiding the delineation of certain details. An early edition of The Builder's Guide by Asher Benjamin was beneficial in reaffirming my thoughts on the correct proportion of the urn in relation to the pedestal and on the proper method for describing the mouldings. Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors arrived "hot off the press" from Washington; it reconfirmed the choice of wood as the main restoration material for the urn/balustrade system.

Accumulated Bibliography

The accumulated bibliography at the end of this text includes all the sources used during the project. Although many are not directly referred to in this manuscript, all were listed in order that future researchers investigating Villard Hall would be able to locate potentially valuable references.

SECTION IV

THE PROPOSED RESTORATION DESIGN

The Drawings

The research methodology culminated in the proposed-restoration drawings. Produced at 1" = 1'-0" scale, the series of drawings which show a section cut through the north-elevation balustrade are presented in order to enable the viewer to gain an understanding of the chronology of changes that have occurred between the years 1885-1988 (see Appendix D, pages 192-93). A similiar set of drawings shows a series of section views through the balustrade pedestal between the years 1885-1988 (see Appendix D, pages 194-95). In 3" = 1'-0" scale, the final section view shows the proposed-restoration construction details for the urn/balustrade system (see Appendix D, page 197). An isometric diagrammatic sketch located at the bottom right-hand corner of the details sheet (see Appendix D, page 198) shows the form of the proposed galvanized-steel structure behind the finish material of the pedestal below the urn. An elevation drawing of the proposed urn/balustrade (at 3" = 1'-0" scale) provides the most accurate picture of the restoration moulding-profile proposals (see Appendix D, page 196). An elevation (at 1" = 1'-0" scale) of the entire proposed urn/balustrade above the cornice on the north elevation yields the most complete view of the proposed-restoration changes, as compared with the existing-condition drawing of the remodeled balustrade currently in place above the main cornice on the north elevation (see Appendix D, page 191). A final view of the restored urn/balustrade system on a full-elevation drawing of the east elevation requires further time than that which was allowed for this project, but would most certainly revive the unique spirit and special imagery that were once associated with the work of the great Warren Heywood Williams.

The Review of Material Choice

The choice of seasoned Oregon cedar as the main material for the restoration of the urn/balustrade system was arrived at after considerable deliberation over the most appropriate material for use on this National Historic Landmark. Several substitute materials were explored as possible replacements--including metal, fiberglass (fiber-reinforced polymers), and glass fiber-reinforced concretes (GFRCs). All were found to have several advantages in comparison to the choice of cedar; but, in the final analysis, the choice of cedar, in combination with a galvanized-metal and marine plywood internal framework, best balances the criteria for selection of materials as established by the Secretary of the Interior's Standards for Rehabilitation (see Appendix D, pages 197-98; and Appendix H, pages 212-26):

> "The Secretary of the Interior's Standards for Rehabilitation require that "deteriorated architectural features be repaired rather than replaced, wherever possible. In the event that replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual properties." Substitute materials should be used only on a limited basis and only when they will match the appearance and general properties of the historic material and will not damage the historic resource.[1]

The following brief description of the proposed-restoration section drawing is offered here in order to facilitate the review of material choice.

The final proposed-restoration drawings for the urn/balustrade system call for the use of original materials--except for areas related to the internal framework of the pedestal and solid-cedar urn above. Thus, the balustrade is proposed to be constructed of the finest-quality seasoned Oregon cedar as called for by W. H. Williams in his original specifications for Villard Hall, and as found in several other buildings designed by him in Portland, Oregon (see Appendices F and G, pages 206-11). The drawings also call for the use of marine-quality plywood, as used in the structure of the first-level pedestals of the east porch (see the proposed-structural "Column Pedestal" drawing which was designed for the Historic Preservation Program Workshop, Winter Term 1987, in Appendix C, page 189). Plywood is suggested for use in this situation due to its extra strength

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[1] Sharon C. Park, Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors (Washington, DC: U.S. Government Printing Office, U.S. Department of Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, 1988), 1.

against the lateral wind forces created by the large sail-like urns above. A galvanized 3/4"-thick metal framework is recommended to support the weight of the proposed solid-cedar urn and a vertical piece of 2-1/2" galvanized-metal pipe would serve to tie the individually turned sections of the urn together with the framework of the pedestal. The metal pole takes the place of the pole used to turn the large central body of the urn on a specially designed wood lathe. This lathe would be similiar to the one used for the solid-cedar columns of the east porch. It is assumed that both the urns and the columns were turned locally by the same wood craftsman on an oversized lathe. Cedar of the grade necessary for this kind of turning was probably readily available in Eugene at that time.

All wood structural members and blocking behind the 7/8" finish-cedar face boards and mouldings are recommended to be pressure treated. All nailing for the above structural work should be done with top-quality galvanized nails. All surfaces are recommended to be painted with three heavy coats of linseed oil and "Pioneer" white lead paint with the last two coats sanded with first-grade Monterey, California, white-quartz sand.

The choice of wood for the restoration of the urns was arrived at after investigation into several other material choices. As an economical alternative to the high cost of replicating the urns in metal and as an alternative to the weighty proposal for solid wood, the other choices investigated included cast aluminum, metal, fiberglass (fiber-reinforced polymers), and glass fiber-reinforced concretes (GFRCs).

Arguments in Favor of Wood:

1. It is known that many of the finials on W. H. Williams buildings were turned from solid blocks of top-quality cedar and later carved (refer to Figure 15).
2. It has also been documented that several large wooden sculptures during the time period in question were constructed of built-up (glued-up) cedar blocks that were covered with a white lead paste or gesso which was the customary way of filling joints in exterior woodwork.[2]
3. A photograph of the west elevation of the building found in the 1903 edition of the Webfoot (the University of Oregon yearbook) shows the far-right urn leaning back against the sloping main roof; this fact suggests that it broke off somewhere at its base, along the point of attachment to the pedestal. Research into existing urns on W. H. Williams buildings in Portland, Oregon, uncovered several wooden urns that appeared to have broken off at the point of attachment. In most cases a series of long nails were driven in a concentric pattern through the first rounded section at the base of the urn, and it is along this ring that several of

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[2] Alfred N. Staehli, interview of architectural conservator by author, in Portland, Oregon, 22 January 1988.

the urns had split which caused a failure similar to that found in the 1903 photograph of Villard Hall. A legitimate solution for this problem would be to turn the main body of the urn in one piece--just as the east porch columns were found to have been turned on a large wood lathe with the help of a 2-1/2" pole running through the middle to support its weight. Considering that the same craftsman probably also built the urns, it is a possibility that they were turned in similiar fashion. Thus, one could insert a 2-1/2" galvanized-metal pole into the cavity left by the lathe process and use it to tie the main elements of the urn and pedestal together--with the addition of a metal structural framework behind the finish material of the pedestal (see Appendix D, pages 197-98).

4. Considering the National-Historic-Landmark status of the building, it is important to follow the criteria for selection of materials as established by the Secretary of the Interior's Standards for Rehabilitation.[3] The section of the Standards relating to this project emphasizes that it is sound preservation philosophy to replace damaged or deteriorated materials with new or salvaged material similar to the original material--in other words, replacement in-kind is

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[3] Sharon C. Park, Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors (Washington, DC: U.S. Government Printing Office, U.S. Department of Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, 1988).

fundamental to a sound restoration. Thus, if it is available, the original material should be used; other materials should be used only after all options for restoration in cedar have been ruled out.

5. The choice of cedar would result in an excellent training opportunity for both the students in the Historic Preservation Program and the University of Oregon Physical Plant workers to join forces with a craftsperson (such as Greg Olson) in order to produce the urns.

The Arguments Against Wood:

1. Weight. A weight of 150-300 pounds is the projection for each urn which is completed in wood. An internal metal framework would result in a stronger structural unit.
2. Cost of production in wood. Production would initially involve a large set-up cost for the redesign of a lathe to handle the large urns. A possible solution to this initial high cost would be to devise a makeshift lathe that combined a large power router and a hand-powered turning mechanism (as suggested by Sculptor/Professor Paul Buckner of the University of Oregon Fine Arts Department).
3. Material availability. It would be extremely difficult to find a perfectly dry, tightly compacted ring structure, large diameter (3'-0") piece of cedar; however, the Olympic Peninsula in Washington State is known to have trees of this type.

4. The urns are located in an area that is not likely to receive a great deal of repeat maintenance.

The Arguments in Favor of Cast Aluminum:

1. The durability of cast aluminum could be expected to be greater than wood or fiberglass.
2. Cast aluminum is lightweight.
3. Cast aluminum is not only corrosion-resistant, but also noncombustible.
4. Cast aluminum is easily assembled.

The Arguments Against Cast Aluminum:

1. It is difficult to prevent galvanic corrosion between cast aluminum and the other metals at the urns' points of attachment.
2. Cast aluminum has a greater expansion-and-contraction rate than wood, and requires gaskets or caulked joints.
3. It is difficult to keep paint on cast-aluminum exterior surfaces.

The Arguments in Favor of Metal:

1. The durability of metal may be expected to be greater than wood or fiberglass.
2. Several large metal finials are known to have existed on W. H. Williams buildings in Portland, Oregon.

The Arguments Against Metal:

1. Metal is probably the most expensive option.
2. No evidence exists that the urns were metal; for example, no staining on the woodwork below the urns from oxidation of the metal is visible in the historic photographs.
3. There is also the question of whether there is a skilled craftsperson available to hammer such a complex form.
4. It is difficult to keep paint on exterior-metal surfaces.

The Argument in Favor of Fiberglass (Fiber-Reinforced Polymers):

1. Fiberglass is lightweight and has a high ratio of strength to weight.
2. Fiberglass would be a relatively inexpensive way to reproduce the urns--especially if several were to be reproduced (and, in this case, "several" would mean 8 urns).
3. The moulding process would allow an easier means of accurately reproducing the urns. Instead of fabricating 8 individual urns, only one model or pattern would need to be fabricated; thus, moulds taken from the model would provide an accurate means of reproduction.
4. Fiberglass maintains its color integrity with exposed high-quality pigmented gel-coat.
5. Fiberglass is noncorrosive and rot-resistant.

The Arguments Against Fiberglass (Fiber-Reinforced Polymers):

1. Fiberglass has a high coefficient of expansion and contraction--about twice that of metal; therefore, oftentimes, the piece has to be designed with historically inaccurate expansion joints.
2. There are problems with the surface finish of fiberglass. Ultraviolet radiation from sunlight initiates the degeneration of the molecular carbon bonds in the fiberglass.[4] Gel-coats to protect the fiberglass matting underneath have not been adequately tested for durability over a long time period. Another important consideration is that the substitute material often weathers differently than the surrounding original materials. Over time, the substitute material invariably retains its original newness or brightness and this feature stands out in contrast to the cycle of weathering for surrounding materials. Moreover, attempts to match the weathered-look of surrounding materials can lead to problems with the surface gel-coating of the fiberglass piece when these untested materials are added for colored effects. A final surface consideration is that the completed group of moulded urns would have exactly identical features; thus, some of the original spirit of the handmade craftsmanship would be

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[4] John A. Fidler, "Glass-Reinforced Plastic Facsimiles in Building Restoration," Association for Preservation Technology Bulletin 14, no. 3 (1982): 24.

lost in their reproduction. A good example of this spirited, handmade craftsmanship appears in the detailing of the east porch where the individually turned balusters have varied profiles.

3. Considering that this building is designated as a National Historic Landmark, it is important to follow *The Secretary of the Interior's Standards for Historic Preservation Projects*[5] and other criteria regarding the selection of materials (as established by the U.S. Department of Interior); this publication emphasizes the use of original materials wherever and whenever possible. Thus, the plan calls for cedar because it is still available in the Pacific Northwest.
4. The vapor impermeability of fiberglass may require a ventilation detail.
5. Each urn would require a separate anchorage system and an interior stainless-steel armature.
6. Fiberglass is combustible, if fire retardants are not added.

The Arguments in Favor of Glass Fiber-Reinforced Concretes (GFRCs):

1. GFRCs are lightweight.
2. GFRCs have a good moulding ability.

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[5] U.S. Department of the Interior, *The Secretary of the Interior's Standards for Historic Preservation Projects* (prepared by W. Brown Morton III and Gary L. Hume) (Washington, DC: U.S. Department of the Interior, Technical Preservation Services, Historic Conservation and Recreation Services, 1978).

3. GFRCs are weather resistant.
4. Cements are, in general, breathable.
5. Cement material is fire-rated.

The Arguments Against Glass Fiber-Reinforced Concretes (GFRCs):

1. GFRCs would require a separate anchorage system.
2. Color additives may fade with sunlight.
3. With GFRCs, it is necessary to have properly detailed joints; such joints are not always historically accurate and are often visibly evident from long distances.
4. GFRCs may have a different absorption rate than the adjacent historic materials.

SECTION V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The proposed-restoration drawings for the wooden balustrade and urns that previously embellished the roof structure of Villard Hall resulted from extensive research carried out over a period from February to November 1988. The exterior description of Villard Hall and the biography of architect Warren Heywood Williams were presented as vital background information for the review of the research methodology. The description and review of results for each research activity were presented in the early pages of this manuscript, in order to provide a complete overview of the research steps necessary to execute a restoration and preservation plan. The final discussion regarding the conclusions and recommendations for the proposed restoration and preservation plan are facilitated by the following brief summary of (a) the exterior description of Villard Hall, (b) the biography of the architect, (c) the research activities, and (d) the research results.

The exterior description of Villard Hall provided an important overview for both the form and material of the individual architectural details, in relationship to the proposed urn/balustrade-system restoration design. In particular, the description of existing conditions found on the north elevation showed that the presently existing balustrade had been remodeled circa 1949 using historically inaccurate mouldings similiar to those found during the restoration of the east porch during the Spring Term 1987 Historic Preservation Program Workshop. (See Appendix C, page 188, for porch-remodeling plans calling for similarly inappropriate mouldings.) Other important information included a description regarding the original point-of-attachment location between the main roof and the balustrade pedestals (refer to Figure 6). Evidence for the location and height of the original balustrade has been previously examined (as may be noted by referring to the discussion of Figure 9, which displays a distinct vertical paint shadow). Excerpts from W. H. Williams' original specifications for the building assisted in the description of original materials. Especially valuable information gleaned from this source included (a) the description of the sand-paint mixture specified for all exterior surfaces, (b) the description of the roofing materials, and (c) the section which called for all of the parapet woodwork to be secured with wrought-iron knees (see Appendix F, pages 206-09).

The biography of W. H. Williams and focused review of contemporaneous buildings designed by him allowed for a more complete understanding of the context of the wooden urns and balustrades found in his building designs (refer to Figures 10-12). Particular emphasis was directed toward the Morris M. Marks House (1882) and its front-entry-porch urns, which are currently stored in the attic of the large Italianate house on Southwest Harrison Street in Portland, Oregon. Evidence discovered during research in the Portland area revealed failure at the point of attachment along a concentric-nailing pattern at the base of the solid-cedar urns; this was found to be the most common area of failure for urns of this type (refer to Figures 16-20). Thus, the research regarding architect W. H. Williams' use of urns on other buildings, and the investigation of failure patterns found in those urns, led to several conclusive answers to the questions concerning the probable cause for the removal of the urns themselves and their original material. The findings of this research were used in the final analysis of the proposed urn/balustrade system and preservation plan.

The scope and direction of the research methodology were established during the formulation of the research proposal for this project. Basically, the goal of the research proposal was the development of a method to resolve the form of the urns and the construction details of the urn/balustrade system, while also attempting to determine the most probable cause for the removal of the urns and to ascertain the original materials. Possible substitute-material choices were evaluated for compliance with necessary preservation guidelines, as well with as codes and standards for rehabilitation, before the final proposed restoration drawings and preservation plans were completed.

The methodology consisted of a number of related, and often sequential, activities that built upon each other as the project progressed. The initial existing-condition inspection was carried out during Professor Peting's Special Project course on Villard Hall during Winter Term 1988. It was during this time that a number of important research activities were conducted simultaneously. A complete photographic documentation of the entire building--including black-and-white photographs, color slides, and videotape were produced. (For samples of the photographic documentation, see Appendix A, pages 89-104.) The photographs proved to be a valuable record of existing conditions during the time the drawings were being produced in the studio.

The existing-condition drawings were produced after the complete set of field measurements and notes had been compiled for the entire exterior of the building (see Appendices B and I, pages 105-79 and pages 227-28).[1] A number of field assistants were needed to safely conduct the field-measurement sessions on the building. The goal of the drawings was to present the findings from the existing-condition inspection in as clear and accurate a manner as possible,

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[1] The reader is also referred to Andrew R. Curtis, Field Measurements for the Existing Condition Drawings of Villard Hall (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

while providing the first set of available measured drawings for the building.

An extensive search through the University of Oregon Archives, the Lane County Museum, the Oregon Historical Society, and the Provincial Archives of British Columbia provided an abundance of historic photographs. Several early views of Villard and Deady Halls proved to be extremely valuable in the compilation of a chronology of exterior alterations to each elevation of the building. Especially noteworthy was the revelation that one of the urns on the west elevation had broken off near its base or point of attachment (as may be seen by referring to Figure 25, which was found in the 1903 edition of the University student yearbook). The final, resulting assumption was that the urns were removed circa 1903 from the building for safety reasons after it was determined that the point of attachment was improperly designed or had badly deteriorated as the result of their poor design. The remainder of the dated, post-1903 historic photographs of Villard Hall provide further evidence that the urns were completely removed from the building after that date (see Appendix E, pages 199-205; and refer to Figures 21-27). A number of historic photographs of W. H. Williams buildings in both Portland, Oregon, and Victoria, British Columbia, illustrate his prolific use of urns and finials in his building designs. Although usually smaller in scale, the urns on his other buildings generally exhibited several similar design characteristics turned from solid-cedar blocks.

The interview portion of the research methodology was the most rewarding--especially as new leads opened up, and as critiques of the existing-condition and proposed-restoration drawings progressed. An interview with Murray Adams provided the location of the original full-scale detailed drawings for the Masonic Temple (constructed in 1887); these drawings proved of great assistance in determining the moulding profiles of the urn/balustrade system. Harold C. Babcock, Director of the University of Oregon Physical Plant, arranged for the necessary equipment and access to the building. Professors Philip H. Dole and Donald L. Peting provided many hours of expert advice concerning all aspects of the project, from start to finish; and both were members of my Committee. William J. Hawkins III provided many leads toward locating urns on W. H. Williams buildings in the Pacific Northwest, and arranged several meetings with other experts concerning portions of my project. In fact, he was instrumental behind the interesting meeting with Eileen G. Fitzsimons, who had extensively researched the life of W. H. Williams up through the year 1880. Greg Olson and Alfred N. Staehli critiqued the technical aspects of the proposed-restoration drawings and offered suggestions for constructing the urns in wood. David Talbot provided a complete review of the substitute-material options for the restoration of the urns; he also advised that they be moulded using glass fiber-reinforced polymers.

The research of existing literature produced numerous secondary sources and a few primary sources. The most valuable of the primary sources was the complete set of W. H. Williams' original specifications for Villard Hall. A few descriptive articles, pertaining to the exterior of the building, were helpful; but no specific literature on urns in the Pacific Northwest was located.

A chronology of major events and exterior-building alterations was compiled from information gathered during the research activities. The chronology assisted in the separation of the events that led to the removal of the original 12 urns circa 1903 and the 6 tripartite balustrades before 1949 (see Appendix E, pages 199-205).

The form and overall dimensions of the urn/balustrade system were derived from the most vivid historic photographs possible, by using the technique of reverse perspective and a scale system developed from the known, existing field measurements. Basically, a magnifying glass and divider were used to compare the known distances with the unknown distances, between points along the urn/balustrade system, in the historic photographs. The reverse-perspective technique was used to double-check the scale system.

The accumulated bibliography contains all the sources referred to during this project. Although many were not directly referenced to in this manuscript, all were studied and utilized throughout the duration of the project.

The research methodology culminated in the proposed-restoration drawings. A series of drawings (at 1' = 1'-0" scale) illustrated the section views through the north-elevation balustrade and pedestals in order to enable the reader to gain an understanding of the chronological changes which occurred between the years 1885-1988 (see Appendix D, pages 192-95). A final section view (at 3" = 1'-0" scale) demonstrated the proposed-construction details for the urn/balustrade system; and an isometric diagrammatic sketch located at the bottom right-hand corner of the details sheet shows the form of the proposed galvanized-steel structure behind the pedestal finish material (see Appendix D, pages 197-98). Two elevation drawings (one at 3" = 1'-0" and one at 1' = 1'-0" scale) provided the most accurate and complete views of the proposed restoration changes, in relation to the existing-condition drawing of the remodeled balustrade currently in place above the main cornice on the north elevation (see Appendix C, page 184; and Appendix D, pages 191 and 197).

The review of material choice for the proposed-restoration design explored several substitute materials before arriving at the final decision of cedar; the final decision was reached only after considerable deliberation concerning the most appropriate material for this National Historic Landmark. This extensive analysis of substitute materials required evaluating the issues which are in question whenever such a restoration is contemplated. Substitute materials which were considered included metal, glass fiber-reinforced polymers, and glass fiber-reinforced concretes: All were found to have several advantages; but, in the final analysis, the choice of cedar--in combination with a galvanized-metal and marine plywood internal framework--was deemed to provide the best balance among all the choices and between the criteria established by the Secretary of the Interior's Standards for Rehabilitation.[2]

The summary of results garnered from the research methodology has been presented here as a "quick reference" and "lead-in" to the final subsections on conclusions and recommendations regarding the restoration and preservation plan.

Conclusions

The final conclusions were derived from the review of the research-methodology results. The research included the existing-condition inspection, the historic-photograph collection, the field documentation, the interviews, the existing-literature research, the technical-information research related to the proposed-restoration, and the search for existing urns on other buildings designed by W. H. Williams. This initial research enabled the compilation of the exterior alterations, the existing-condition drawings, and the use of

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[2] Sharon C. Park, Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors (Washington, DC: U.S. Government Printing Office, U.S. Department of Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, 1988), 1.

a reverse perspective and scale system for deducing the urn/balustrade form and overall dimensions. Consultations with Committee members also played a major role in the derivation of conclusions from the research methodology.

The initial research proposal had as its intention the development of a method to resolve the form of the urns and the construction details of the urn/balustrade system, while also attempting to determine the cause for the removal of the urns and to ascertain the original materials. Possible substitute-material choices were evaluated for compliance with necessary preservation guidelines, as well as the codes and standards for rehabilitation.

The first important conclusions which were reached during the course of this project answered many of the questions posed under "The Statement of the Subproblems" subsection (in Section I) of this manuscript. The form of the urns and the construction details of the urn/balustrade system were concluded to have appeared as shown in the series of section views through the north-elevation balustrade and pedestals (as presented in Appendix D, pages 192-95). The details shown in each section drawing resulted from the method especially devised for resolving the form of this particular urn/balustrade system. For example, the paint shadow provided a significant indication of the original balustrade in comparison with the existing one (refer to Figure 9). Indicative evidence regarding the original point of attachment between the main roof and the wooden balustrade was also unearthed (refer to Figure 6). The findings lead one to conclude that each wood pedestal was originally attached to the main roof at three separate points with wrought-iron knee braces. In fact, W. H. Williams' original specifications for the building called for the use of wrought-iron knee braces to support the parapets. The large nail holes observed in the engaged turned baluster led to the conclusion that the nail holes were evidence of the baluster's original points of attachment, but the nail holes now exist in a remodeled balustrade (refer to Figure 28).

The search for and analysis of historic photographs resulted in the conclusion that the urns were removed from the building for safety reasons after one on the west elevation broke off at its point of attachment circa 1903 (refer to Figure 25). The photographs also facilitate one to conclude that the tripartite balustrades were removed from all elevations of the building circa 1949 (except for one section on the north elevation). It is further concluded that the north-elevation balustrade and several of the corner-tower engaged-base pedestals were extensively rebuilt using 1" plywood and historically inaccurate moulding profiles circa 1949; and, furthermore, these inaccurate moulding profiles are similar to those found on the east porch during the Historic Preservation Program Workshop (see Appendix A, pages 90-101; and refer to Figure 27). Another important piece of evidence for the circa 1949 remodeling date is the 11-10-11 rhythm of the existing balusters versus the 11-11-11 rhythm observed in the historic photographs.

The original material of the urns was wood. The main body of the urns consisted of a solid one-piece cedar turning into which the vertical gadrooning was later hand-carved. The urns were probably turned by the same wood craftsman who turned the solid-cedar columns of the east porch. Thus, it is concluded that the urns were turned on a large wood lathe through the implementation of a 2-1/2" metal pipe inserted the entire length of the piece. This conclusion permits the consecutive recommendation regarding the proposed-galvanized pipe; which, in turn, is connected to the newly designed structural frame behind the pedestals. The urns are believed to have failed at their base or point of attachment along a concentric-nailing pattern similar to those which were discovered in Portland, Oregon (refer to Figures 15-20).

The recommendation that seasoned Oregon cedar be the material implemented in the proposed restoration was arrived at after other substitute materials were explored as possible replacements. The glass fiber-reinforced polymer finials examined in Portland were found to have several advantages to the cedar replacement (see Figures 31 and 32); however, it was still concluded that cedar in combination with a galvanized-metal internal framework best balanced the criteria for the selection of materials as established by the Secretary of the Interior's Standards for Rehabilitation.

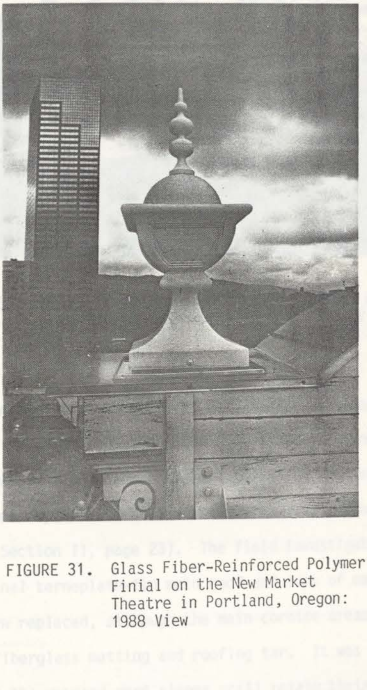

FIGURE 31. Glass Fiber-Reinforced Polymer Finial on the New Market Theatre in Portland, Oregon: 1988 View

FIGURE 32. Glass Fiber-Reinforced Polymer Finial on the Kamm House in Portland, Oregon: 1988 View

The urn/balustrade system, as well as all other exterior wood, had originally been painted with three heavy coats of linseed oil and "Pioneer" white lead paint; the last two coats were sanded with first-grade Monterey, California, white-quartz sand (refer to previous discussion in Section II, page 23). The field investigation revealed that the original terneplate-tin main roof and tops of main cornices have never been replaced, although the main cornice areas have been covered with fiberglass matting and roofing tar. It was also concluded that the mansard-roof slopes still retain their original (1886) 6" Oregon-cedar shingles, which are laid 5" to the weather.

Recommendations

The following recommendations are meant to complement the information presented in the proposed-restoration drawings. Specific, relevant sources are recommended for consultants planning future work. In addition, recommendations for appropriate wood, moulding, metal, and paint-finish choices are discussed. Modifications to the original design and recommended installation procedures round out the section.

Future restoration and preservation work on Villard Hall should begin with a review of several thorough studies (a) associated with the Historic Preservation Program at the University of Oregon and (b) related to this project. Individual studies were compiled to form Fragments From Villard Hall: A Survey of Architectural Elements With Recommendations for Restoration (completed in Winter 1988).[3] The Survey contains several reports on areas directly related to the proposed restoration of the urn/balustrade system. In particular, it is highly recommended that future preservation planners targeting the details considered in this project should consult the following chapters: "Wood Shingles" by Jill A. Chappel, "Gutters and Downspouts" by George Kramer, "Roof Flashing" by Patty Sackett, and "Wooden Ornamentation" by Christine Taylor. All of these sections directly relate to the urn/balustrade restoration design.

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[3] George Kramer, ed., Fragments From Villard Hall: A Survey of Architectural Elements With Recommendations for Restoration (Eugene: University of Oregon, Historic Preservation Program, 1988).

Another valuable source of information is the comprehensive photographic collection possessed by the author of the present manuscript; the collection contains extensive documentation of existing conditions. A similar collection of photographs and slides gives a complete chronological overview of the east-porch restoration workshop. The collection--consisting of Field Measurements for the Existing Condition Drawings of Villard Hall,[4] supplementary videotape,[5] and color slides[6]--provides an invaluable resource of documentation to be referred to during the off-site planning for future restoration work.

Regarding recommendations on the appropriate choices of materials, it must be remembered that practically none of the original materials for the urn/balustrade system exist today--except for the turned bulbous-shaped balusters of the existing north-elevation balustrade. Thus, this project deals more with restoration, than it does with preservation, issues. However, many preservation issues surround the areas directly related to the urn/balustrade system.

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[4] Andrew R. Curtis, Field Measurements for the Existing Condition Drawings of Villard Hall (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

[5] Andrew R. Curtis, 1988 Existing Conditions of Villard Hall: A Videotape (Eugene: University of Oregon, Architecture and Allied Arts Branch Library, Historic Preservation Program Collection, 1988).

[6] For information regarding the availability of the color slides contact Andrew R. Curtis (in care of Dr. Richard Curtis, 42 A Central Street, Hudson, Massachusetts 01749).

It is recommended that work on the urn/balustrade system begin only after a thorough on-site investigation of the entire cornice area. Any future proposed-restoration work would be most successful if the initial planning and investigation occur in an all-encompassing manner. For example, the entire building should be scaffolded to allow a complete investigation of the area in question. In this way, the evidence found while "peeling away" layers of historic fabric in one location may be compared to the often conflicting or corroborating evidence at another location on the building.

The rock-climbing procedure used for the present investigation, described earlier in the text, is not recommended. Further investigations of the cornice area should be carried out only after proper scaffolding has been installed around the building or after adequate funding enables the use of a "cherry picker" for an up-close investigation. The rock-climbing techniques used for the investigation phase of this project were the only means available. Despite the high attention given to safety precautions, it is felt that this method is much too dangerous due to the uncertain stability of the cornice. It is recommended that all future inspections and restoration work be done from a properly installed scaffolding system, inspected by the Occupational Safety and Health Administration (OSHA). All persons involved in work on the scaffolding should be secured to it with a safety harness when working outside the designated safety areas.

The greatest danger results from a lack of communication and inadequately designed temporary implements, including scaffolding and ladders. Often, when doing difficult or dangerous work, the accident record is low because people are more safety conscious. Dangers arise when the difficult work has been conquered and overconfidence builds. Most serious accidents occur around simple hazards when confidence levels are high.[7]

The woodwork of the proposed urn/balustrade system will need to withstand the extreme climatic differences that occur above the cornice level. The expansive roof area radiates intense waves of heat during sunny periods and directs rapid water flow onto the balustrade area on rainy days. The exterior finish surface of all detailing above the cornice should be of first-quality Oregon sawn cedar, as called for in W. H. Williams' original specifications for the building. Cedar, particularly Western Red, is resistant to decay, warping, and checking. The softness of cedar allows for easy nailing, but it is recommended that nails be driven into predrilled holes. Before installation, each individual piece of cedar should be thoroughly primed on all surfaces--especially the exposed end grain--with an oil-based primer.

Marine-quality plywood is suggested for use in constructing the interior structure of the pedestals and the inner box of the

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[7] Bernard M. Feilden, "Appendix VI: Health and Safety for Architects and Conservator/Restorers During Work in the Field," Conservation of Historic Buildings (Boston: Butterworth, 1982), 413.

balustrade's top and lower rails (see Appendix D, pages 193, 195, and 197). Plywood is recommended for use in constructing the inner structure, due to its greater strength relative to solid wood. All 2" × 4" pedestal corner posts are recommended to be of pressure-treated lumber.

It is recommended that the large wooden urns be turned on a lathe. The top and bottom sections should be turned from a solid piece of cedar, whereas the large center section should be turned from a "glued-up" block of cedar timbers. It is recommended that the vertical gadrooning on the center section be hand-carved using v-parting wood chisels. All mitered corners of the square urn base should be splined with 1/4" wafers.

When reproducing the mouldings of the urn/balustrade system, it is recommended that a high level of accuracy be achieved. Moulding-grade cedar should be knot free and thoroughly dried with a moisture content of less than 5% before profiles are shaped. Suggested profiles are presented in the drawings. Much of the engaged-base detail of the corner towers' exterior finish material exhibits profiles similar to the proposed profiles.

The final restoration color should be chosen after an extensive paint analysis of the entire exterior of the building. Because of the wide-ranging colors known to have existed on the building, it is recommended that a thorough paint-analysis study of the original paint scheme be conducted by a professional paint consultant.

It is recommended that sand paint be used to impart a stonelike appearance to the newly restored balustrade. A white lead-based oil paint, similar to that called for in W. H. Williams' original specifications, should be used. An unsanded primer coat should be applied to all faces of the individual pieces; this should be followed by two coats of finish paint, containing sand not only mixed into the finish coats, but also laid into the wet paint. Paint jobs of this type were commonly given 20-year guarantees by good painters around the turn of the century.

A specially designed stainless-steel corner-post shoe is recommended for use under each pressure-treated 2" × 4" post of the pedestals. The shoe, as drawn in Appendix D (page 198) would allow the post to "ride-up" above the flat cornice top, or it could straddle the cornice gutter in such a way that it would allow water and debris to freely flow under the urn/balustrade system. A prefabricated metal framework is recommended for attaching the urn/balustrade system to the main roof slope. A vertical center pole is recommended to secure the urn to the framework. A degree of flexibility should be maintained in the design of the metal framework in order to allow for a degree of adjustment to compensate for the irregularities of the roof and cornice gutter.

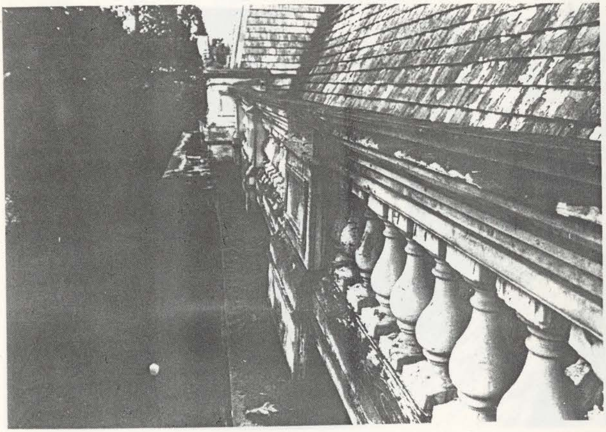
It is recommended that the galvanized-metal framework and marine-plywood box behind each balustrade pedestal be prefabricated and primed in the wood shop. The marine-plywood inner structure of the balustrade's top and bottom rails could also be prefabricated in the shop. In addition, the newly turned cedar balusters could be incorporated into this prefabricated structure. These parts, fully prefabricated and painted in the shop, could be quickly hoisted into place and bolted together--forming a structural whole. The urns could then be lowered onto the vertical center pole and adjusted for true vertical position. The finish cedar material would then be applied on-site and painted.

The overall research and its resulting recommendations have included information crucial to work on other areas of the building in addition to the area concerning the wooden balustrade and urns. The proposed-restoration plan for the wooden balustrade and urns has been presented here with the hope that future restoration efforts on the building will be guided by the research methodology and this research's approach to designing the missing details. Although the restoration of the urn/balustrade system will undoubtedly be placed low on the priority list of future restoration activity, it is hoped that all surrounding restoration and preservation work on Villard Hall will take into account the recommendations proposed in this project.

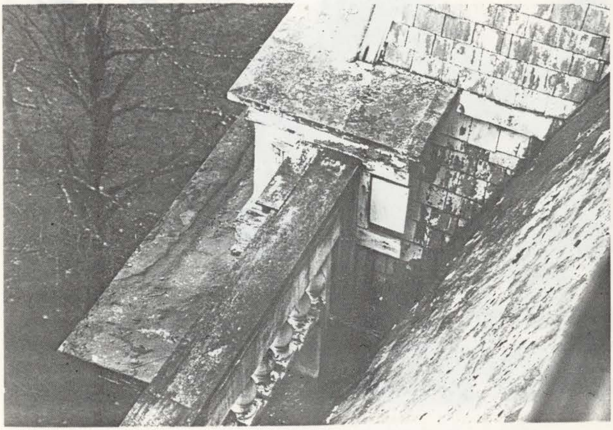
APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

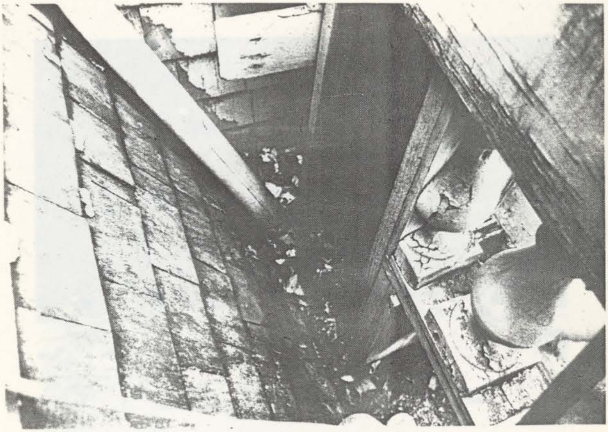
PHOTOGRAPH 1. Detail of Existing Engaged Pedestal on the North-Elevation Roof-Line Balustrade: Remodeled Circa 1949 (Note historically inaccurate flat-moulding profiles and the use of plywood.)



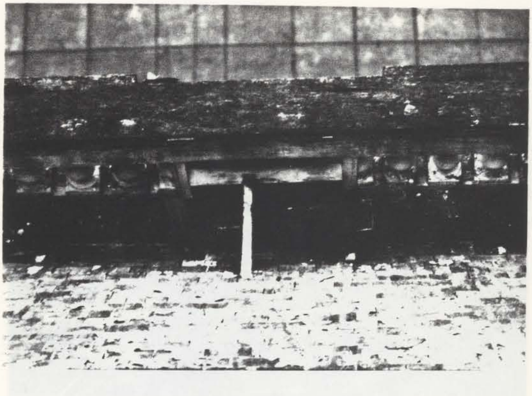
PHOTOGRAPH 2. North-Elevation Balustrade Above the Cornice: Existing Condition



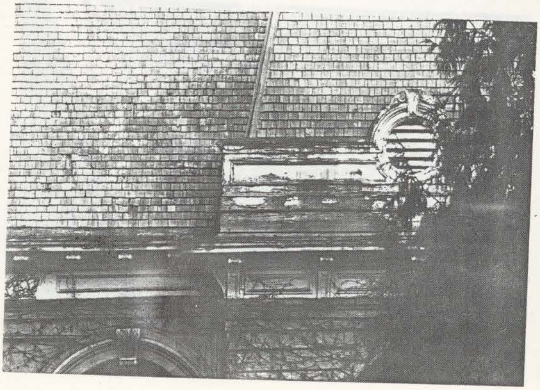
PHOTOGRAPH 3. North-Elevation Balustrade as Viewed From the Main Roof: Existing Condition



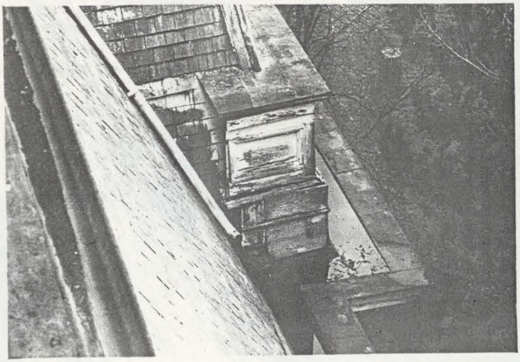
PHOTOGRAPH 4. Detail of Area Behind the Engaged Pedestal of the Existing North-Elevation Balustrade (Note trapped sediments and location of the leader drain from the main roof.)



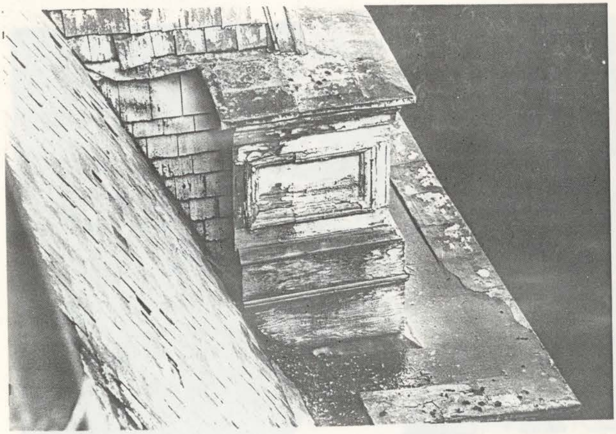
PHOTOGRAPH 5. Detail of Area Behind Existing North-Elevation Balustrade Pedestal (Note the iron knee brace extending back into the main-roof structure.)



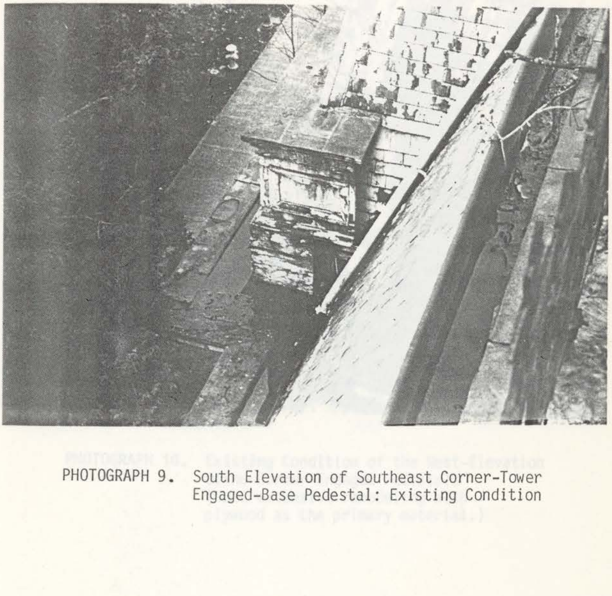
PHOTOGRAPH 6. South Elevation of Existing Southeast Corner-Tower Engaged-Base Pedestal



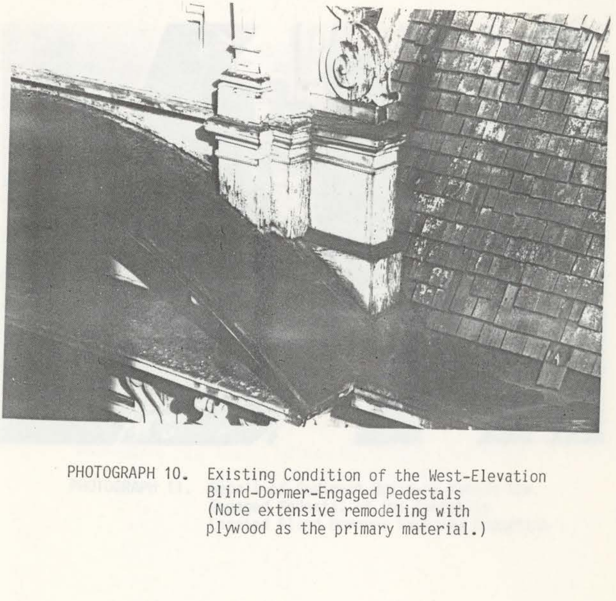
PHOTOGRAPH 7. Northeast Corner-Tower Engaged Pedestal: Existing Condition (Note vertical paint-shadow line.)



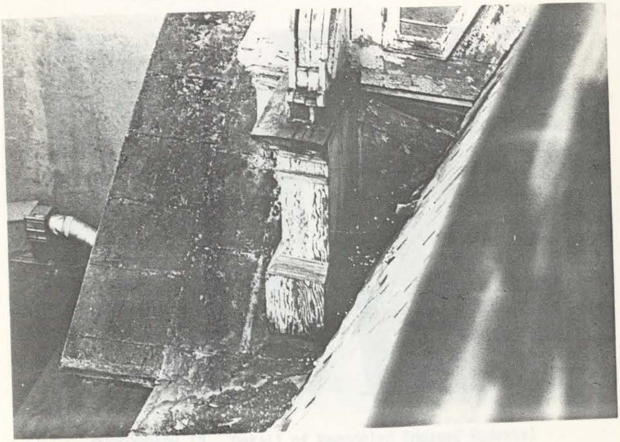
PHOTOGRAPH 8. West Elevation of Southeast Corner-Tower Engaged-Base Pedestal: Existing Condition (Note that the top of the pedestal and tin roofing have been cut away from roof valley.)



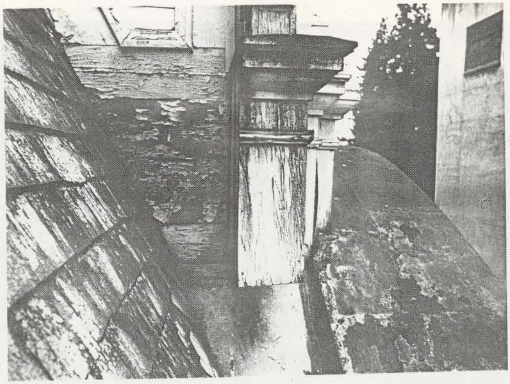
PHOTOGRAPH 9. South Elevation of Southeast Corner-Tower Engaged-Base Pedestal: Existing Condition



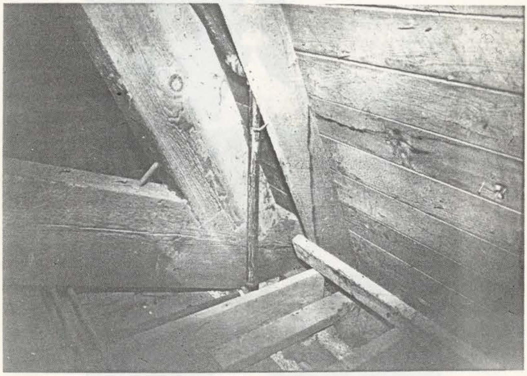
PHOTOGRAPH 10. Existing Condition of the West-Elevation Blind-Dormer-Engaged Pedestals (Note extensive remodeling with plywood as the primary material.)



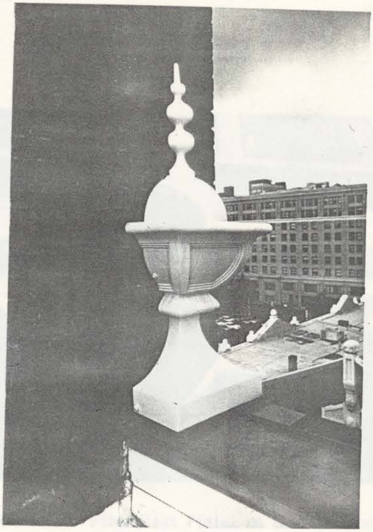
PHOTOGRAPH 11. Detail of Sediment Build-Up Behind the Engaged Pedestal of the Centrally Located Blind Dormer: Existing Condition



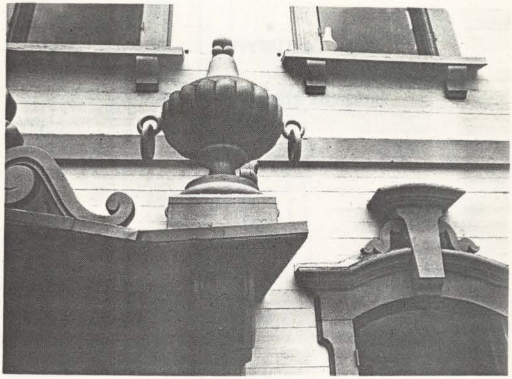
PHOTOGRAPH 12. Detail of Remodeled Engaged Pedestal of the West-Elevation Centrally-Located Blind Dormer



PHOTOGRAPH 13. Detail of Main Roof Truss: Existing Condition



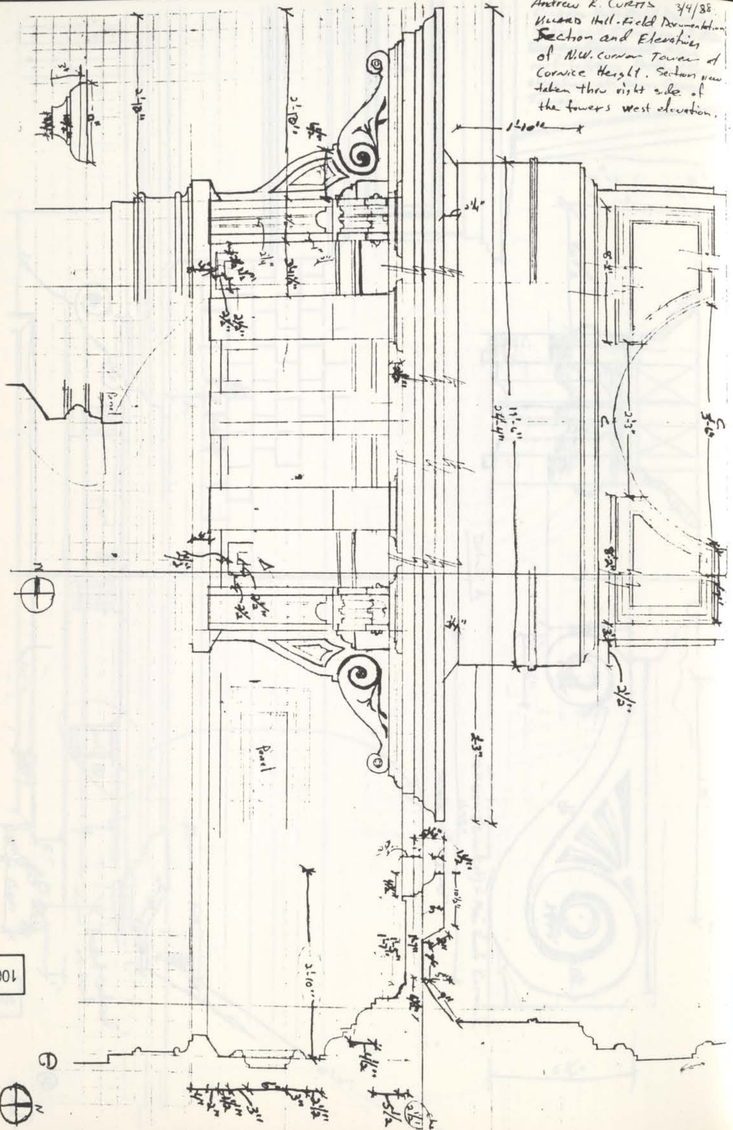
PHOTOGRAPH 14. Fiberglass and Aluminum Finial on the New Market Theatre Roof Parapet in Portland, Oregon: 1988 View



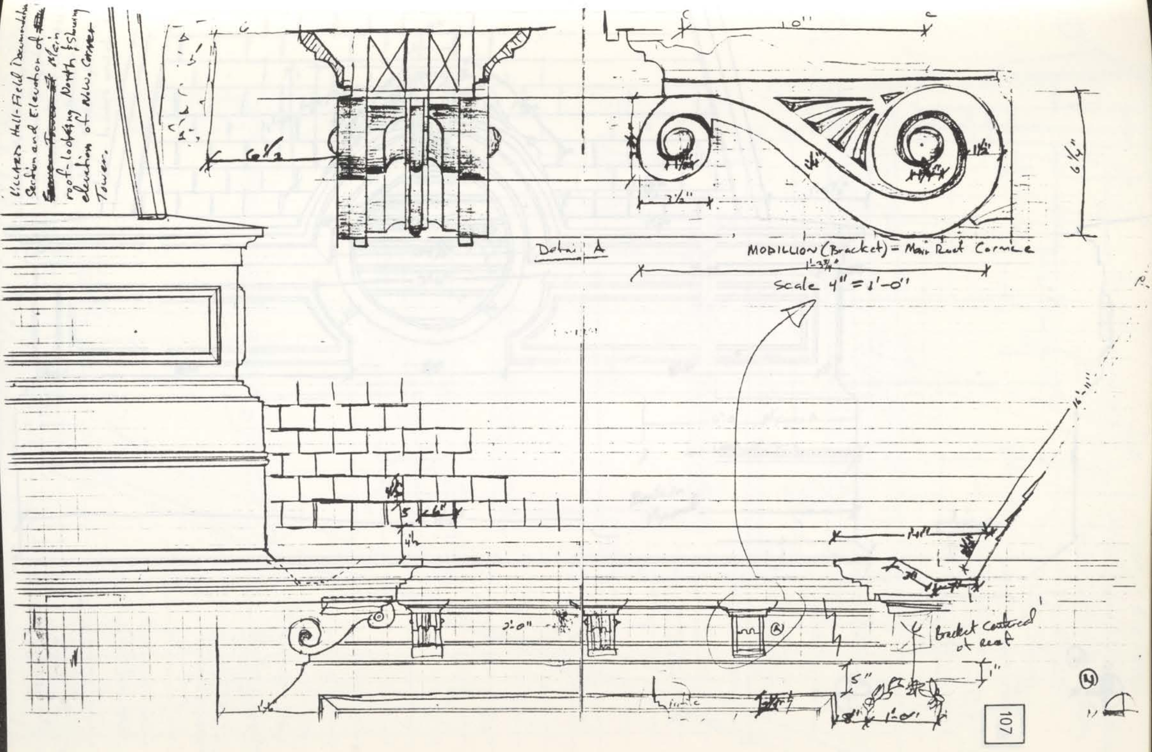
PHOTOGRAPH 15. Fiberglass Finial on the Kamm House in Portland, Oregon: 1988 View

APPENDIX B

FIELD MEASUREMENTS AND NOTES

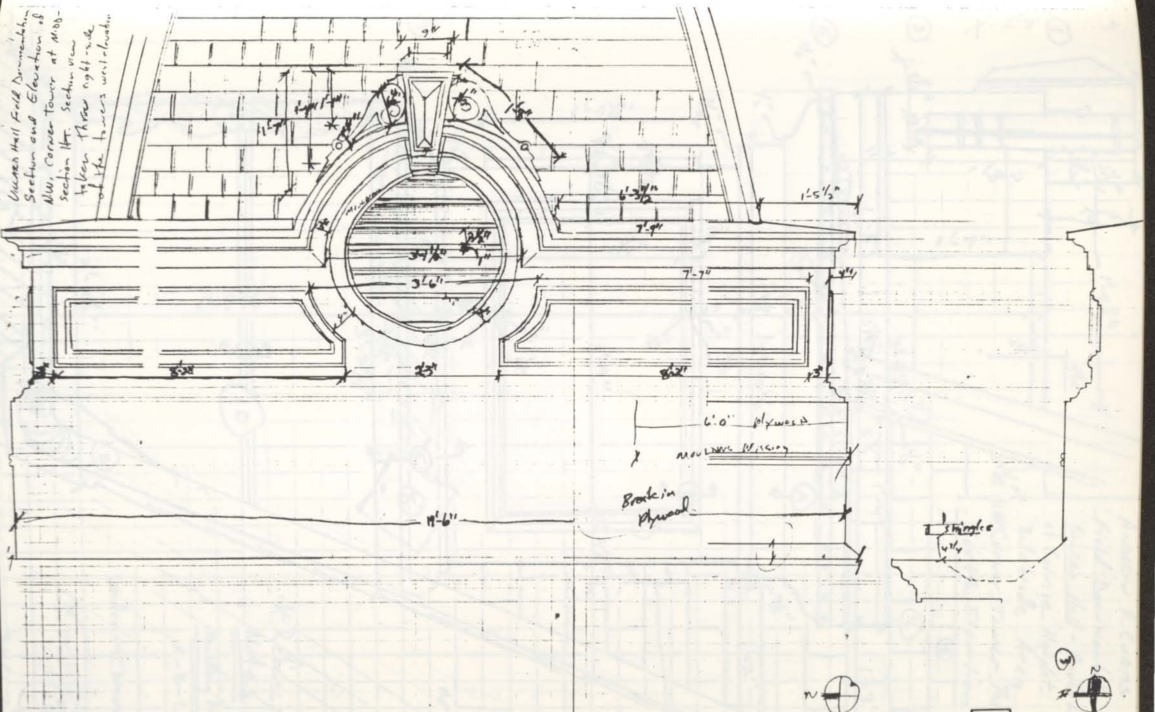


Andrew K. Curtis 3/4/88
VILLARD Hall-Field Documentation
Section and Elevation
of N.W. corner Tower at
Cornice Height. Section view
taken thru right side of
the towers west elevation.

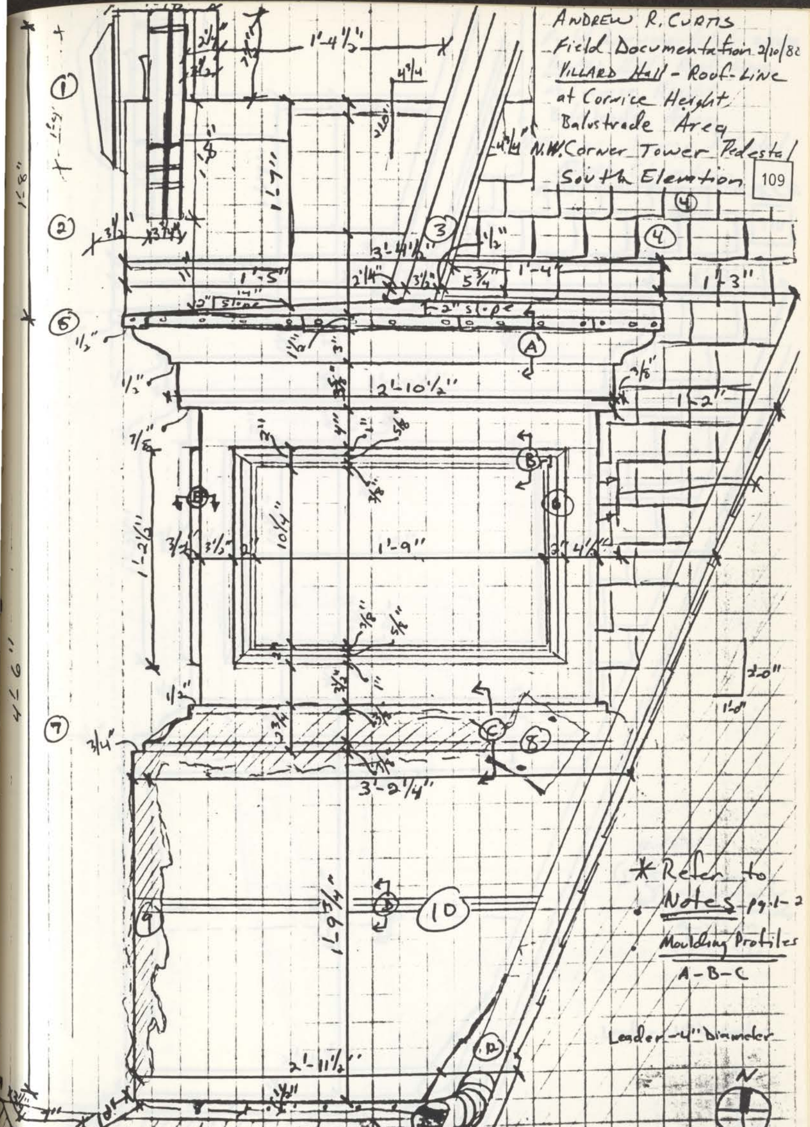


Villard Hall-Field Documentation
Section and Elevation of ~~Corner Tower~~ Main
roof-looking North, showing
elevation of N.W. Corner
Tower.

Mechanics Hall Field Documentation
Section and Elevation of
N.W. Corner Tower at Midd-
section Ht. Section view
taken three right-side
of the towers west elevation.



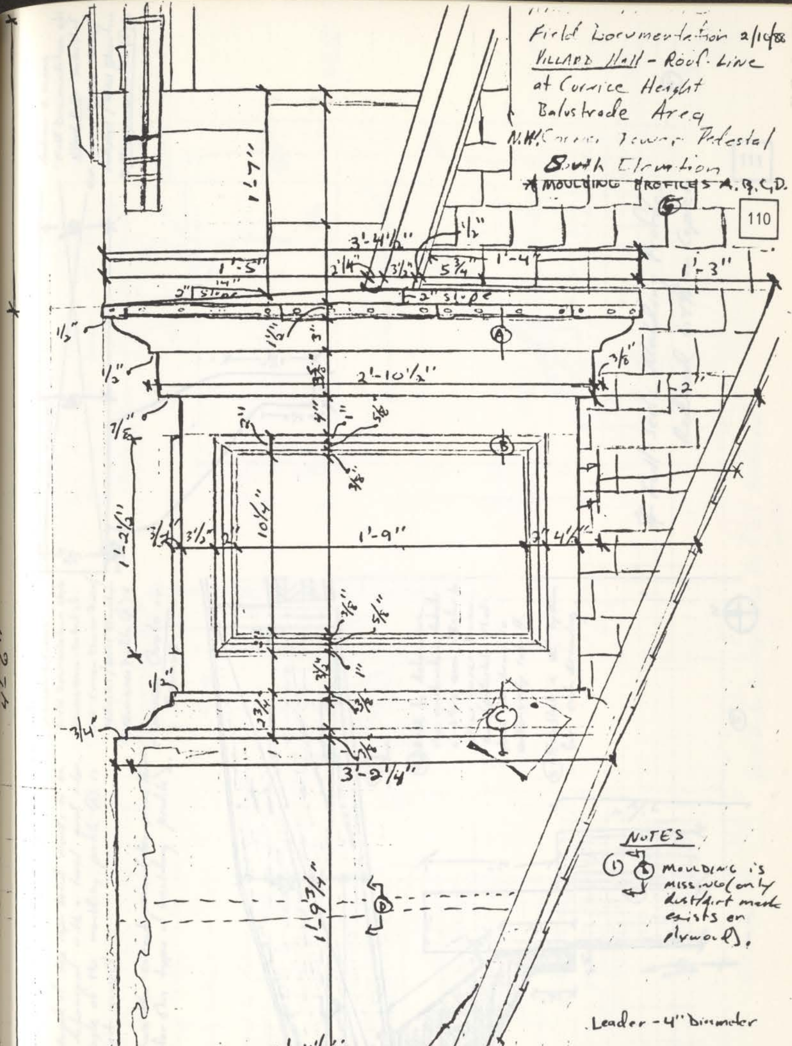
ANDREW R. CURTIS
Field Documentation 2/10/82
Villard Hall - Roof-Line
at Cornice Height
Balustrade Area
N.W. Corner Tower Pedestal
South Elevation



*Refer to
• Notes pg. 1-2
• Moulding Profiles
A-B-C

Leader-4" Diameter

Field Documentation 2/10/88
VILLARD Hall - Roof-Line
at Cornice Height
Balustrade Area
N.W. Corner Tower Pedestal
South Elevation
*MOULDING PROFILES A.B.C.D.



NOTES
① Ⓓ MOULDING IS MISSING (only dust/dirt mark exists on plywood).

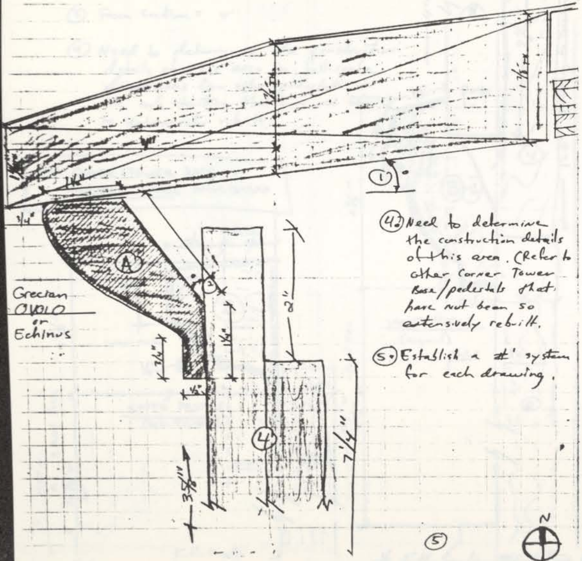
Leader - 4" Diameter

NOTES (1.) Angle of top cap-board needs to be determined with a level and ruler.

(2.) Angle of the moulding profile Ⓐ is not correct.

(3.) Find the correct name (descriptive term for this type of moulding profile). = Grecian Ovolo or Echinus

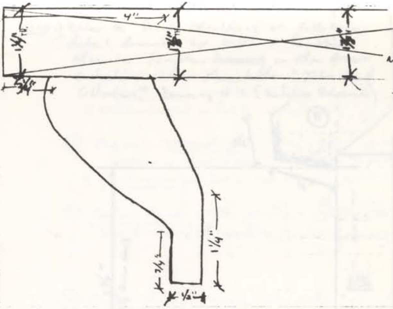
ANDREW R. CURTIS
Field Documentation 2/12/83
VILLARD HALL - Detail of
N.W. Corner Tower Base/
Pedestal/West Elevation
* MOULDING Profile Ⓐ *



(4.) Need to determine the construction details of this area. (Refer to other Corner Tower Base/pedestals that have not been so extensively rebuilt.

(5.) Establish a #' system for each drawing.

⑤



Andrew R. Curtis
Field Documentation 2/12
Villard Hall - Detail of
N.W. Corner Tower Base/
Pedestal / West Elevation
* MOULDING Profile Ⓐ *

* Full-Scale Moulding Profiles
Reduced 64% on Copier

⑥

NOTES ① THIS MOULDING Profile was taken from the west Elevation of the N.W. CORNER TOWER BASE/Pedestal, It does not have the same profile as the similarly located panel moulding on the south face.

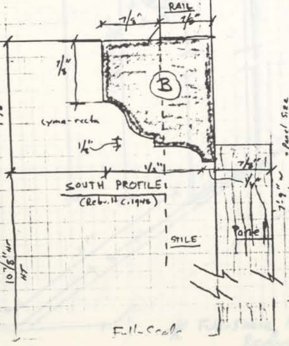
② Panal Section = 10 1/2" HT.

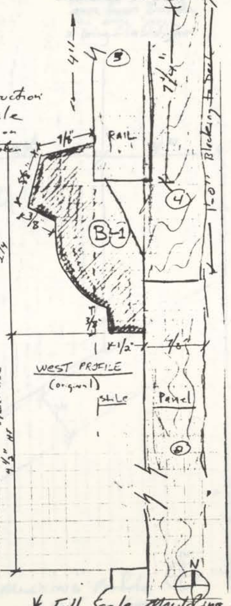
③ Facia Section = 4"

④ Need to determine the construction details of this area in full-scale dimensions from other pedestals on the roof structure that have not been so extensively rebuilt.

ANDREW R. CURTIS
Field Documentation 2/18/88
Villard Hall - Detail of N.W. Corner Tower Base/
Pedestal/West Elevation
* MOULDING Profile (B) *

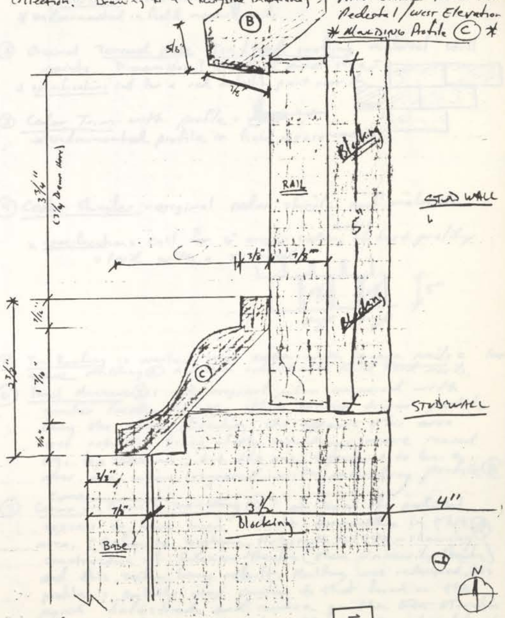
N.W. CORNER TOWER BASE
PEDESTAL PANEL MOULDING



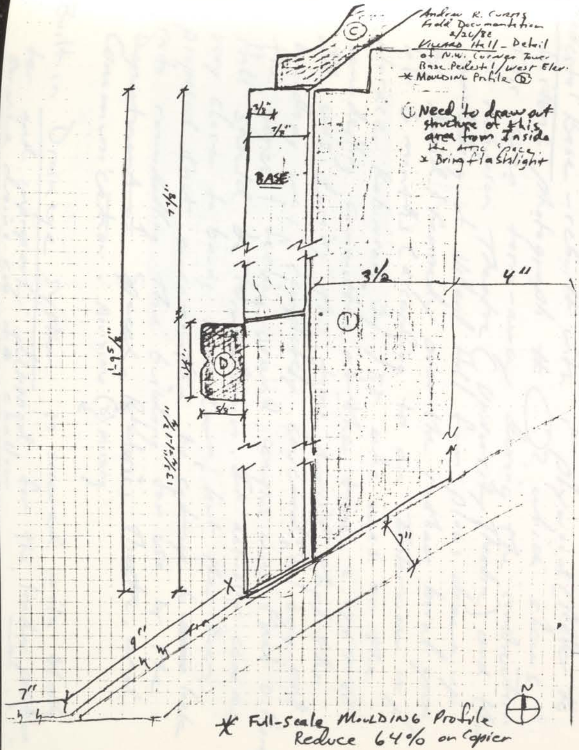


NOTE: 1) Refer to Porch Moulding or Full-Scale detail drawings by Williams for the Masonic Temple. ~~Drawing~~ in the Oregon Collection under the title "John Pratt Collection." Drawing # 4 (Roofline Balustrade)

ANDREW R. CURTIS
Field Documentation
2/28/88
Villard Hall - Detail of
N.W. Corner Tower Base
Pedestal/West Elevation
* MOULDING Profile (C) *



* Full-Scale Moulding Profiles Reduced
64o/o on Copier



Andrew R. Curtis
Field Documentation
2/26/88
Villard Hall _ Detail
of N.W. Corner Tower
Base Pedestal / West Elev.
* Moulding Profile Ⓓ

① Need to draw out structure of this area from Inside the attic space
x Bring flashlight

* Full-Scale Moulding Profile
Reduce 64% on Copier

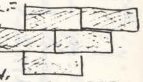
ANDREW R. CURTIS
Field Documentation
2/18/88
Villard Hall NOTES on
N.W. CORNER TOWER BASE/
Pedestal. South Elevation

NOTES
①

NOTES

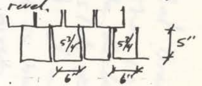
① Laminated wood volute or scroll = w/ keystone wood block =
* Undocumented in field measurements

② Original Terned plate Tin / lead roofing material still exists. Dimension? standard panel size =
* specifications call for a red metallic paint over it.



③ Cedar Trim - with profile =
* Undocumented profile in field measurements

④ Cedar Shingles - original cedar shingle roof materials.
x specifications call for 6" oregon cedar shingles of best quality laid with a 5" reveal.



⑤ Tin Roofing is nailed over edge with square nails = loose
ovolo moulding Ⓐ has been rebuilt with round head nails.

⑥ Panel Moulding Ⓑ is not original when compared with similar location on the other corner tower pedals facing the same direction. It appears this area was rebuilt. Some of the mouldings were reused eg. top ovolo, but this one appears to be a new one when compared with moulding profile Ⓑ

⑦ Crown or Cornice moulding Ⓒ (Cyma) at base of pedestal appears to have been rebuilt ~~from the~~ in this Ⓐ area. (Refer to Historic Photograph c 1948 - showing construction of Robinson Theatre (then University Theatre) and this section being rebuilt. Moulding was redesigned. Its profile is probably very similar to that found on the porch balustrade and cornice on the EAST Elevation which was rebuilt at this time (Refer to Kennedy and Annual

Ⓕ

NOTES – Continued...

Field Documentatio
2/18/88
VILLARD Hall NOTES
on Existing N.W.
Corner Tower Base
Pedestal, South El.
⑨

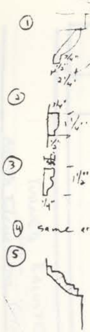
⑦ continued from pg. 1
Kennedy and Annad Remodel Drawings call for the rebuilding of the porch deck, which was wood. The deck was replaced with a concrete slab ~~that~~ ~~is refered to~~ the detail of which is found on sheet #?. It is believed from investigation and documentation of the porch mouldings and structure of the column pedestals. That they were extensively rebuilt during the 1948 Theater addition (Refer to Field Documentation File for the Villard Hall Porch Project winter and Spring 1987 Andy Cerros/Neal Vogel) c/o Michael Shellenberger

⑧ Sheet Metal Patch 4"x5"

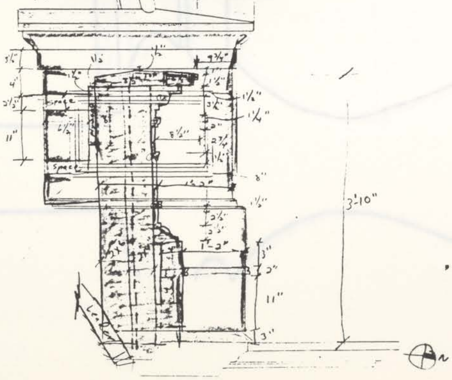
⑨ Crown or Cornice? Moulding and joints at corners of the pedestalbase are coated with black tar ▨

⑩ Pedestal Base – rebuilt with 1" plywood (Refer to Historic photograph # ◯? which shows this area torn-away during the construction of Robinson Theatre (University Theatre) and the remodelling of Villard Hall from plans drawn up by Annad & Kennedy over the rather brief span of 6 months (according to an Interview w/ Horace Robinson 2/ /88 who was on the remodelling committee at the time. c.1947-48. It was during this time period that the building was completely covered w/ foliage and the general feeling around campus was that Villard Hall should be torn down. It actually came very close to being torn down, but the Dean proposed that a committee be set-up to ~~[illegible]~~ look into remodelling the building for use by the ~~Department of~~ Speech, Rhetoric, Theatre, and Communication. MOULDING Ⓓ MISSING

⑪ Built in Drainage system is covered with black tar and improperly designed, for the leader position
Cornice drains are too shallow

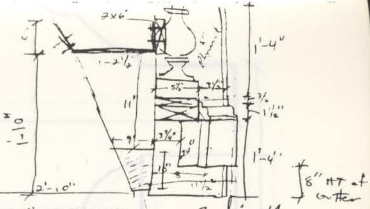


Andrew Curtis
Villard Hall 3/12/88
Field Documentation
Existing Condition
Drawings
North Elevation
Balustrade
Detail
NW. Corner Tower
Base Pedestal
- East Elevation
- Section View of
Balustrade

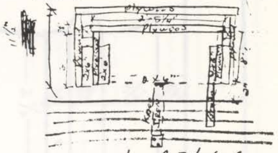


Andrew Curtis
Villard Hall 3/12/88
Field Documentation
Existing Condition
Drawings
North Elevation
- Section thru cornice
Balustrade and
Balustrade Pedestal

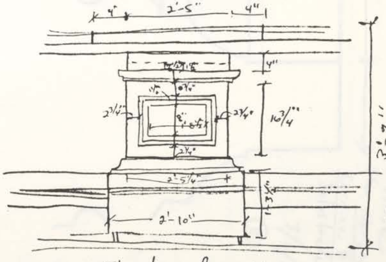
- Plan View of Pedestal



Section thru
North Elevation
Balustrade Pedestal.



Plan of Balustrade
Pedestal

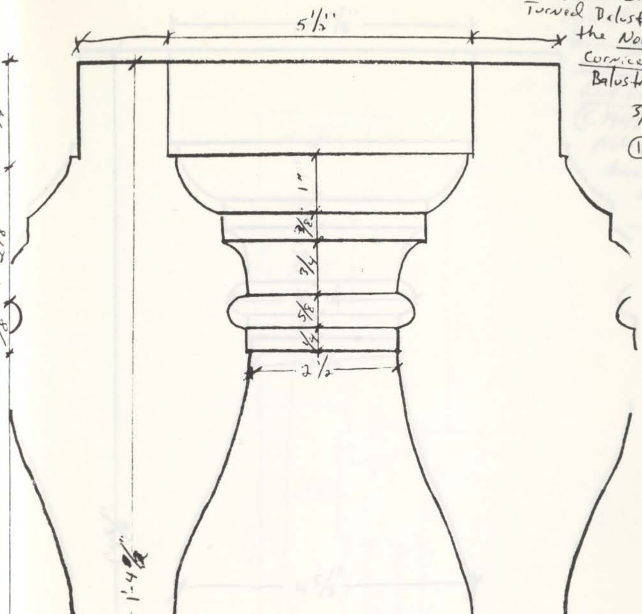


⑩

Elevation of North
Balustrade Pedestal

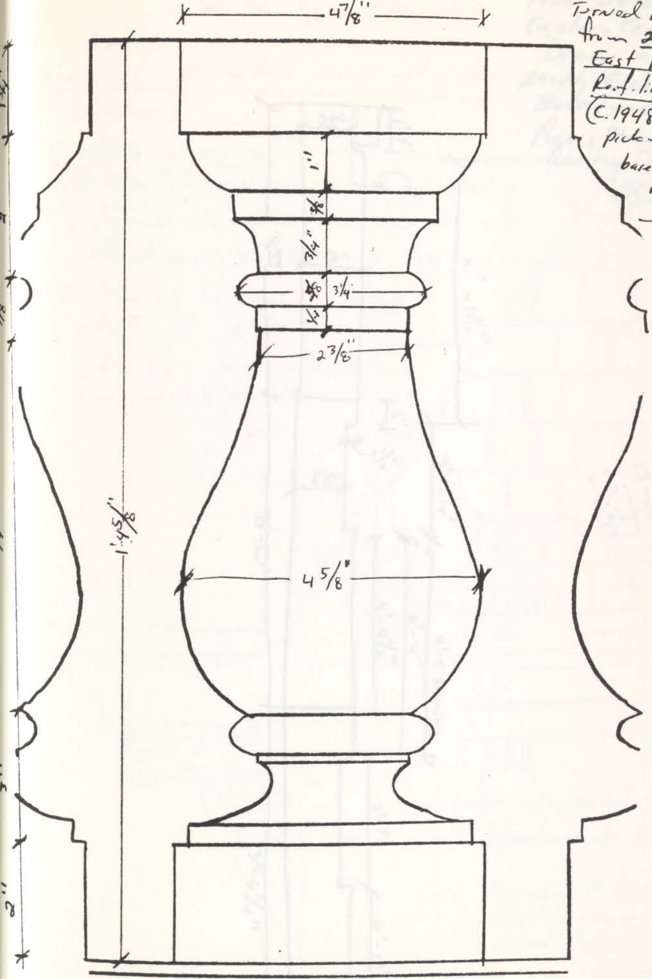
Andrew Curtis
Villard Hall
Field Documentation
Turned Baluster from
the North Elevation
Cornice Ht.
Balustrade
3/11/88

⑪



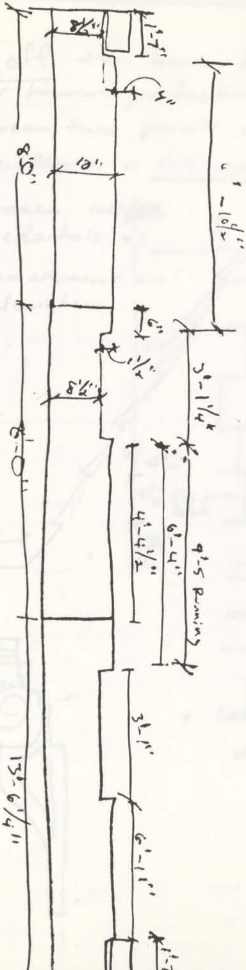
TURNED BALUSTER
from
North Elevation Cornice level Balustrade

Andrew Curtis
Villard Hall
Field Documentation
Turned Balusters
from 2nd level at
East Porch or
Roof-line Balustrade
(C.1948 It was
pick-up at the
base of the
building by
_____? See
Mike
Shellenberger
for
Details.
10/1/88
⑫



TURNED Baluster Found
Mike Shellenberger

Andrew CURTIS
VILLARD Hall 3/12/8
Field Documentation
Existing Condition
Drawings
North Elevation
Balostrade
Plan View of
Railing Top
⑬



6/14/88

South Roof Elevation

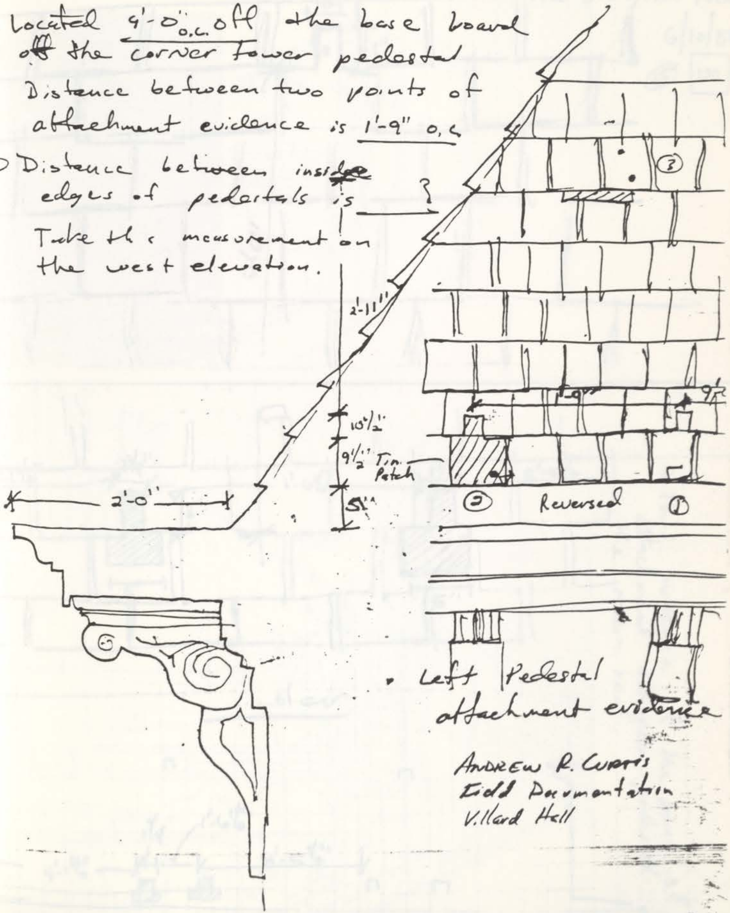
(14)

Evidence of pedestal point of attachment

3 locations

① Located 4'-0" o.c. off the base board ~~off~~ the corner tower pedestal
Distance between two points of attachment evidence is 1'-9" o.c.

② Distance between inside edges of pedestals is ____ ?
Take this measurement on the west elevation.



Left Pedestal attachment evidence

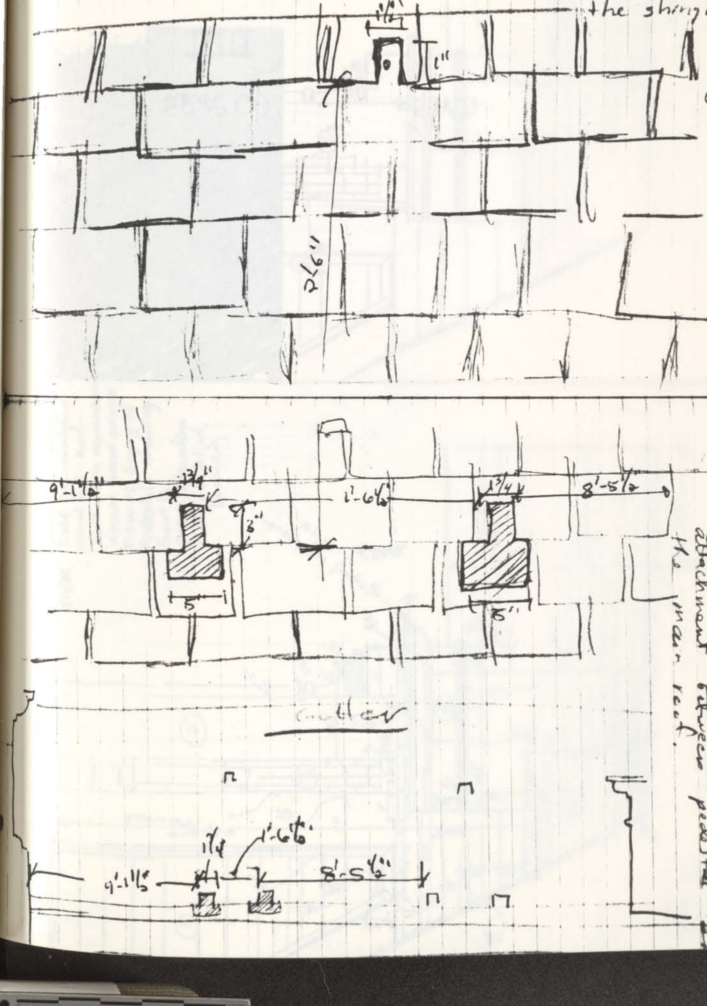
Andrew R. Curtis
Field Documentation
Villard Hall

• Andrew Cross

Villard Hall
Field Documents
West Elevation.
Evidence of point of attachment between balustrade pedestal and the shingled roof

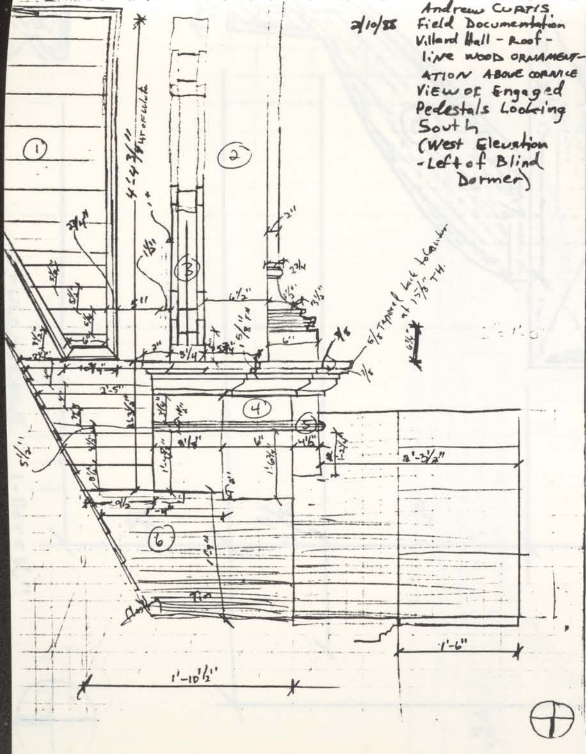
6/10/88

⑮ 120



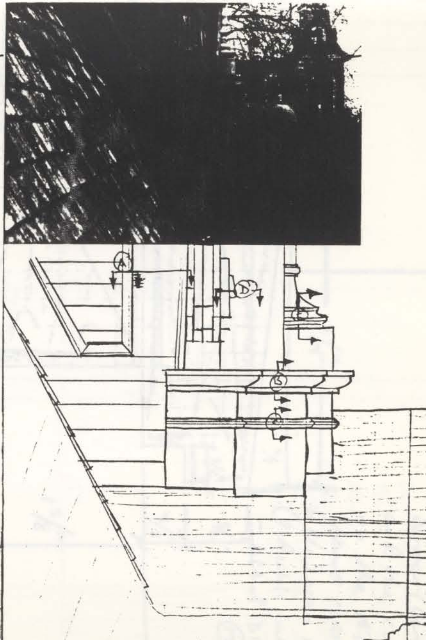
* Found evidence of the point of attachment between pedestal of the main roof.

2/10/88 Andrew CURTIS.
Field Documentation
Villard Hall - Roof-
line WOOD ORNAMENT-
ATION ABOVE CORNICE
VIEW OF Engaged
Pedestals Looking
South
(West Elevation
-Left of Blind
Dormer)



Andrew CURTIS
Field Documentation
Villard Hall - Roof-
line WOOD ORNAMENT
ATION ABOVE CORNICE
VIEW OF Engaged
Pedestals Looking
South
(West Elevation
Left of Blind
Dormer)
(MOLDING Profiles)

A thru E



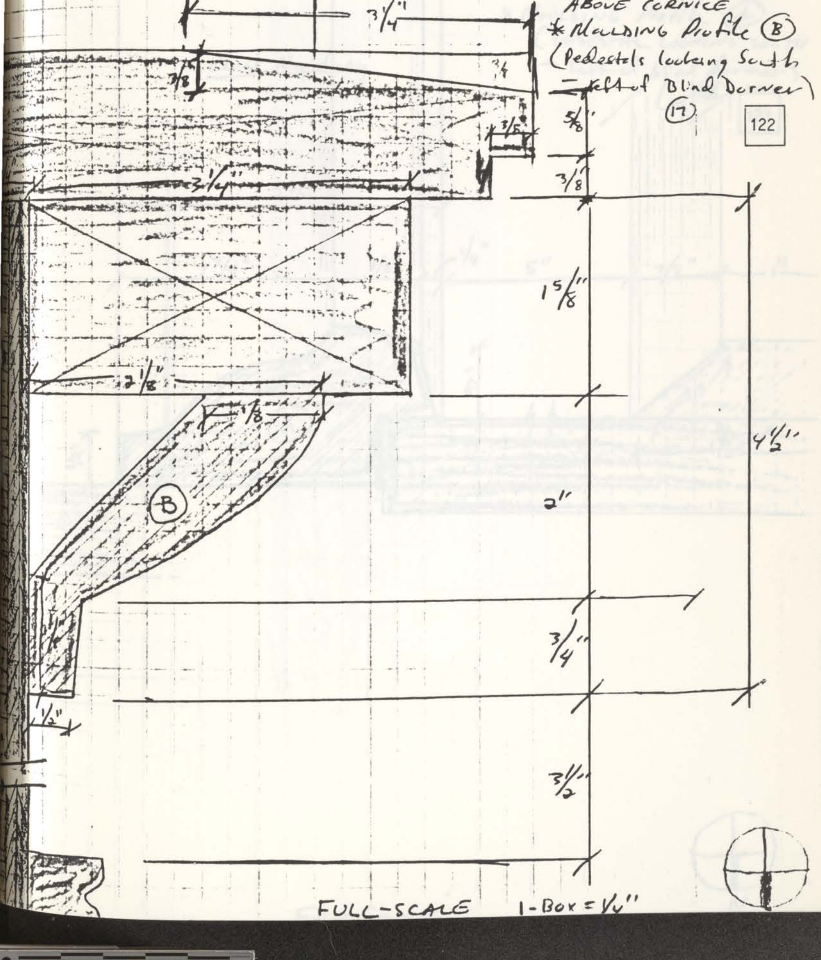
⑯

Andrew Curtis
Field Documentation
2/27/88

Villard Hall - Area of the Roof-line Balustrade between the blind Dormer (Centrally located and the corner tower on the N.W. Elevation ABOVE CORNICE

* MOLDING Profile (B)
(Pedestals looking South - left of Blind Dormer)

(17)

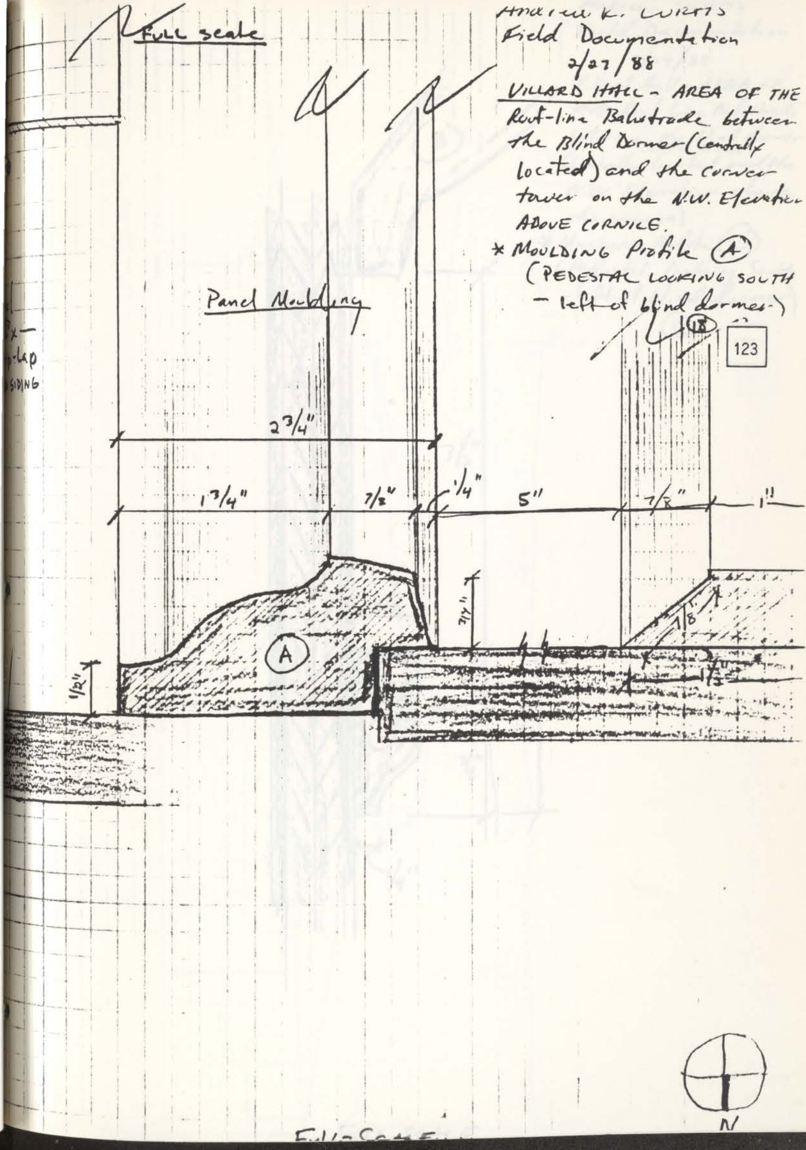


FULL-SCALE 1-Box = 1/4"

Andrew K. Curtis
Field Documentation
2/27/88

VILLARD HALL – AREA OF THE Roof-line Balustrade between the Blind Dormer (Centrally located) and the corner tower on the N.W. Elevation ABOVE CORNICE.

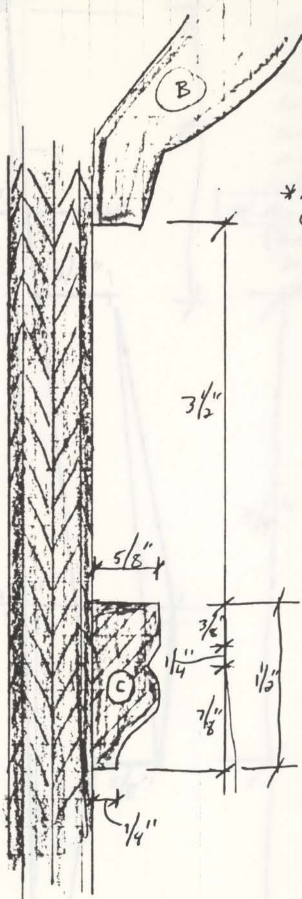
* MOULDING Profile Ⓐ
(PEDESTAL LOOKING SOUTH – left of blind dormer)



Full SCALE

Andrew Curtis
Field Documentation
2/27/88
Villard Hall - AREA OF
THE Roof Line Balustrade
between the blind dormer
(Centrally located, corner tower and the
N.W. Elevation above
the cornice)
* MOULDING Profile Ⓒ
(Pedestal looking South
- left of blind dormer)
⑲

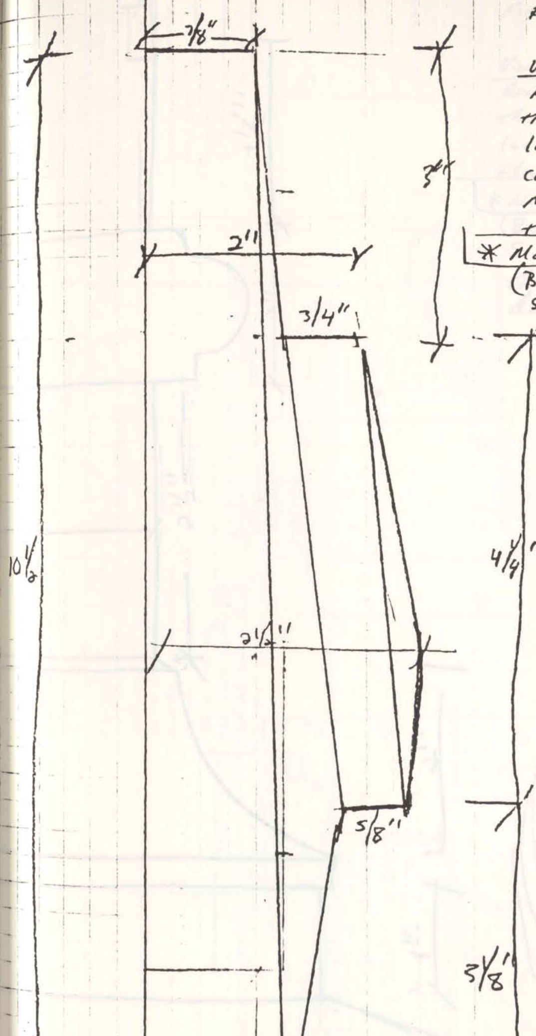
124



FULL-SCALE

Andrew K Curtis
Field Documentation
2/27/88
<u>VILLARD Hall</u> - AREA of th
Roof-line Balustrade betw
the blind dormer-(centrally
located) and the N.W.
corner tower on the
N.W. Elevation above
the cornice Height.

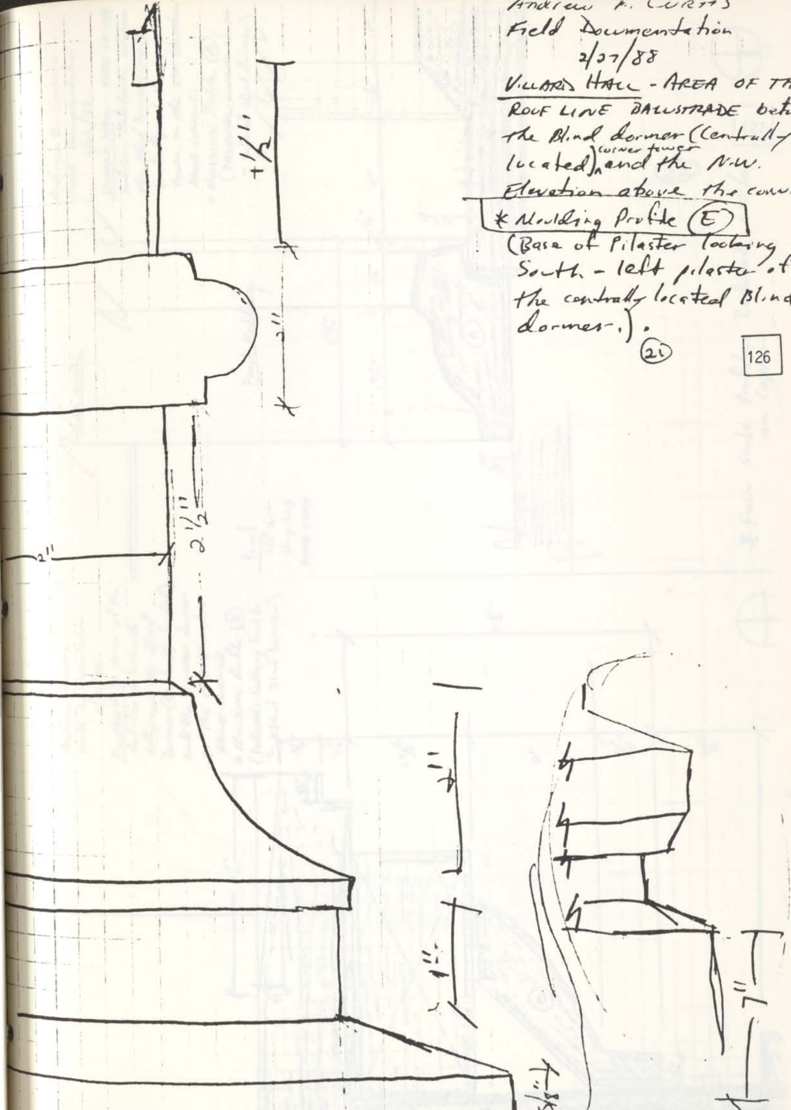
* Molding Profile Ⓓ
(Bracket Volute looking
south-left of Blind
dormer).
⑳



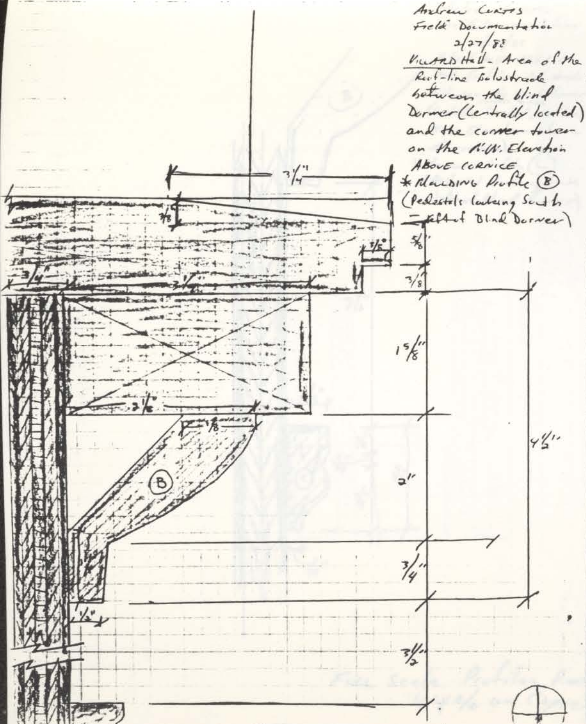
Andrew F. Curtis
Field Documentation
2/27/88
Villard Hall - AREA OF THE ROOF LINE BALUSTRADE between the Blind dormer (Centrally located) and the ^corner tower N.W. Elevation above the cornice

* Moulding Profile Ⓔ
(Base of Pilaster looking South. - left pilaster of the centrally located Blind dormer.).

㉑

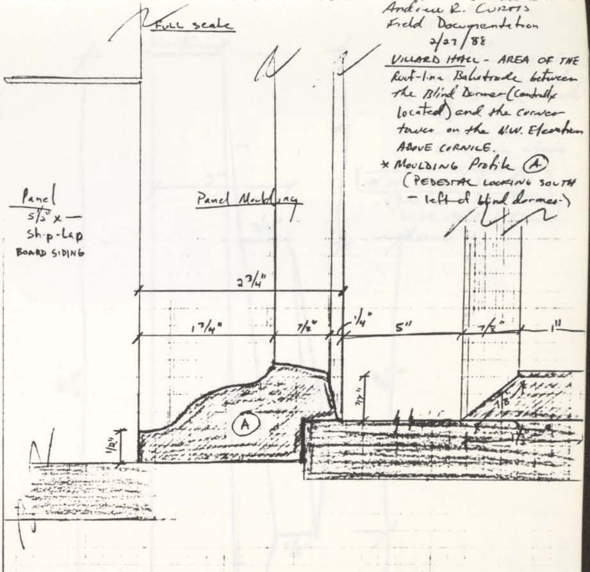


Andrew Curtis
Field Documentation
2/27/88
Villard Hall - Area of the
Roof-line Balustrade
between the blind
Dormer (Centrally located)
and the corner tower
on the N.W. Elevation
ABOVE CORNICE
* Moulding Profile Ⓑ
(Pedestals looking South
- left of Blind Dormer)



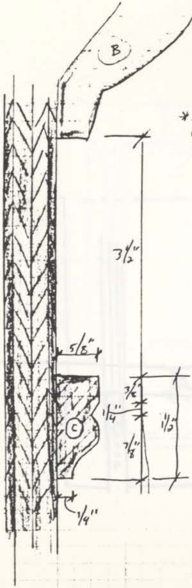
Full scale

Andrew R. Curtis
Field Documentation
2/27/88
VILLARD HALL - AREA OF THE
Roof-line Balustrade between
the Blind Dormer (Centrally
located) and the corner
tower on the N.W. Elevation
ABOVE CORNICE.
* MOULDING Profile Ⓐ
(PEDESTAL LOOKING SOUTH
- left of blind dormer)

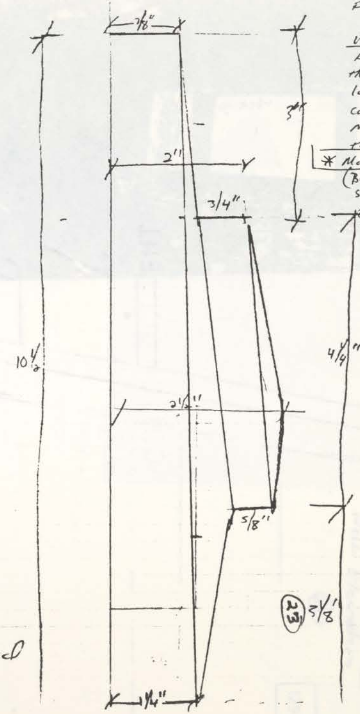


㉒

*Full Scale Profiles Reduced 64% on Copier



Andrew Curtis
Field Documentation
2/27/88
Villard Hall - AREA OF
THE Roof Line Balustrade
between the blind dormer
(Centrally located, and the corner tower
N.W. Elevation above
the cornice)
* MOULDING Profile (C)
(Pedestal looking South
- left of blind dormer)



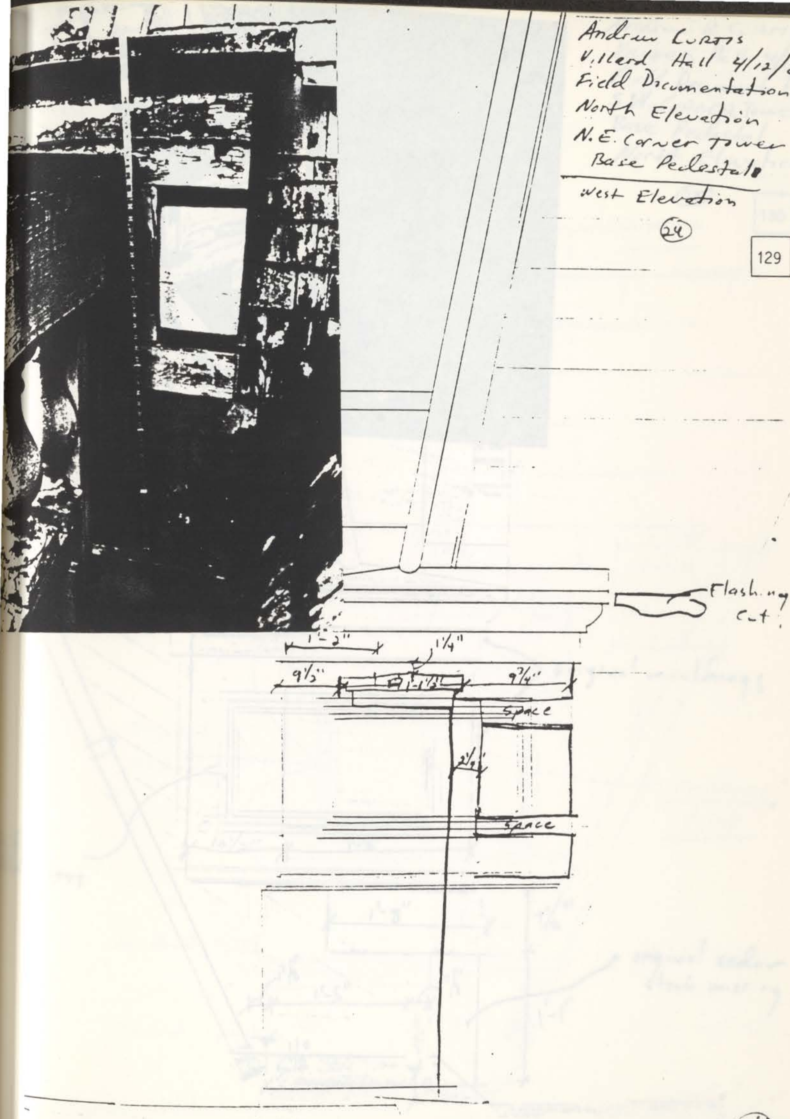
Andrew R Curtis
Field Documentation
2/27/88
Villard Hall - AREA of the
Roof-line Balustrade below
the blind dormer (Centrally
located) and the N.W.
corner tower on the
N.W. Elevation above
the cornice Height.
* Moulding Profile (D)
(Bracket Volute looking
South - left of Blind
dormer).

Full Scale Profiles Reduced
64% on Copier.

Andrew Curtis
Villard Hall 4/12/88
Field Documentation
North Elevation
N.E. Corner Tower
Base Pedestals

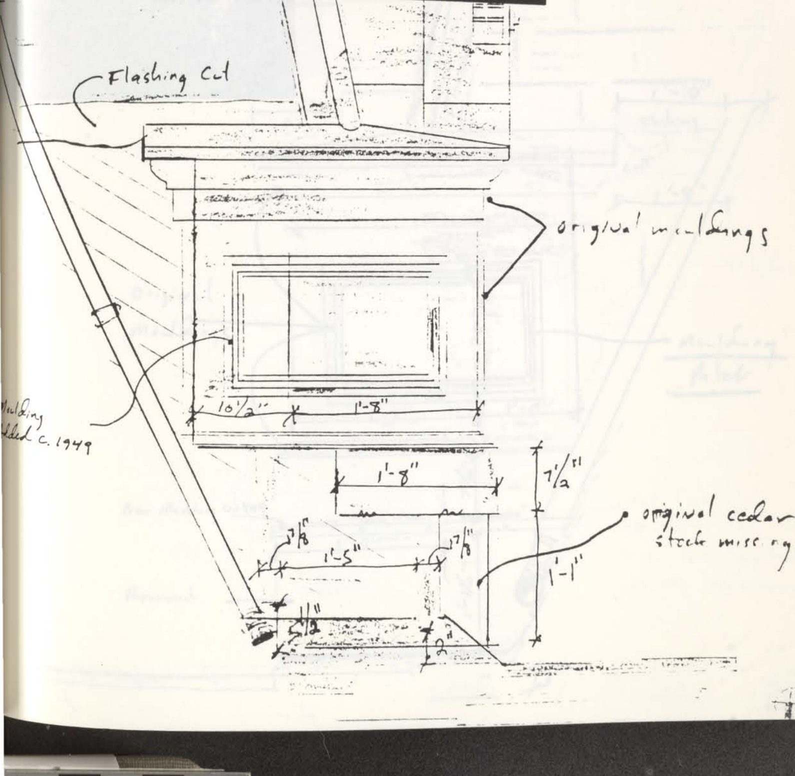
West Elevation

㉔



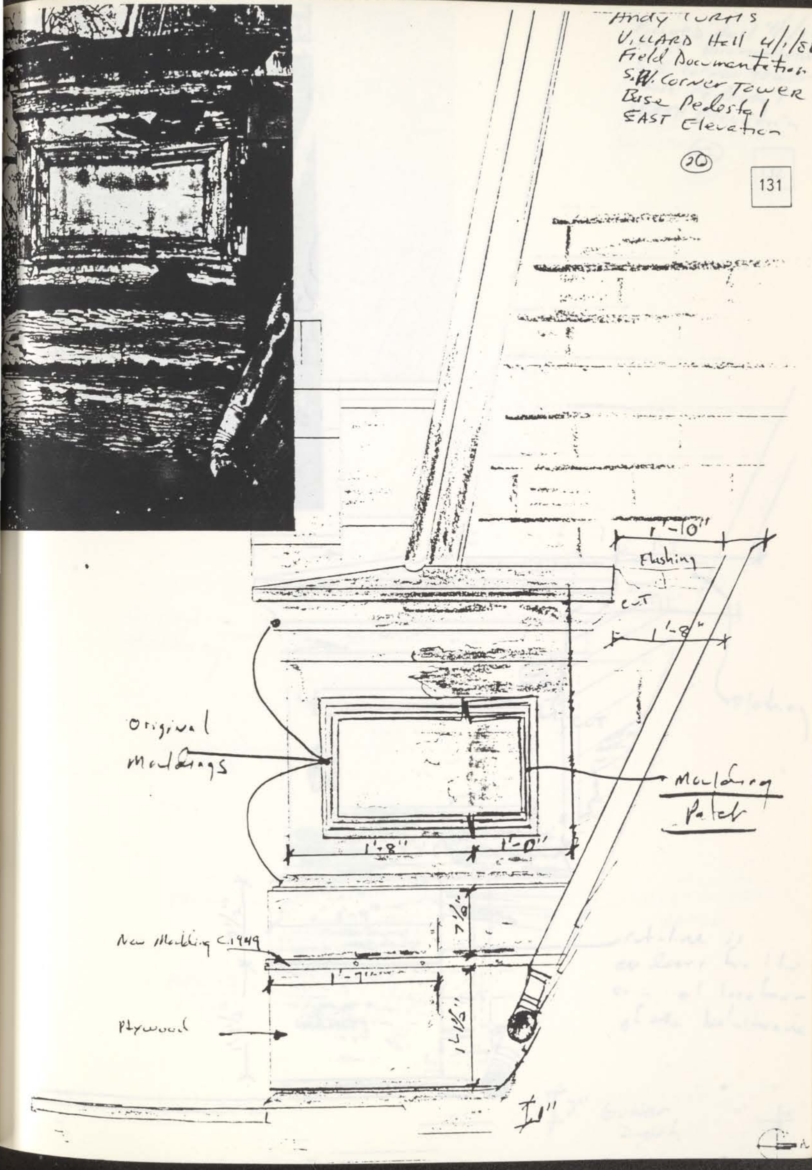
Andrew R. Curtis
Villard Hall 4/1/88
Field Documentation
S.W. Corner Tower
Base Pedestal
North Elevation

(25)



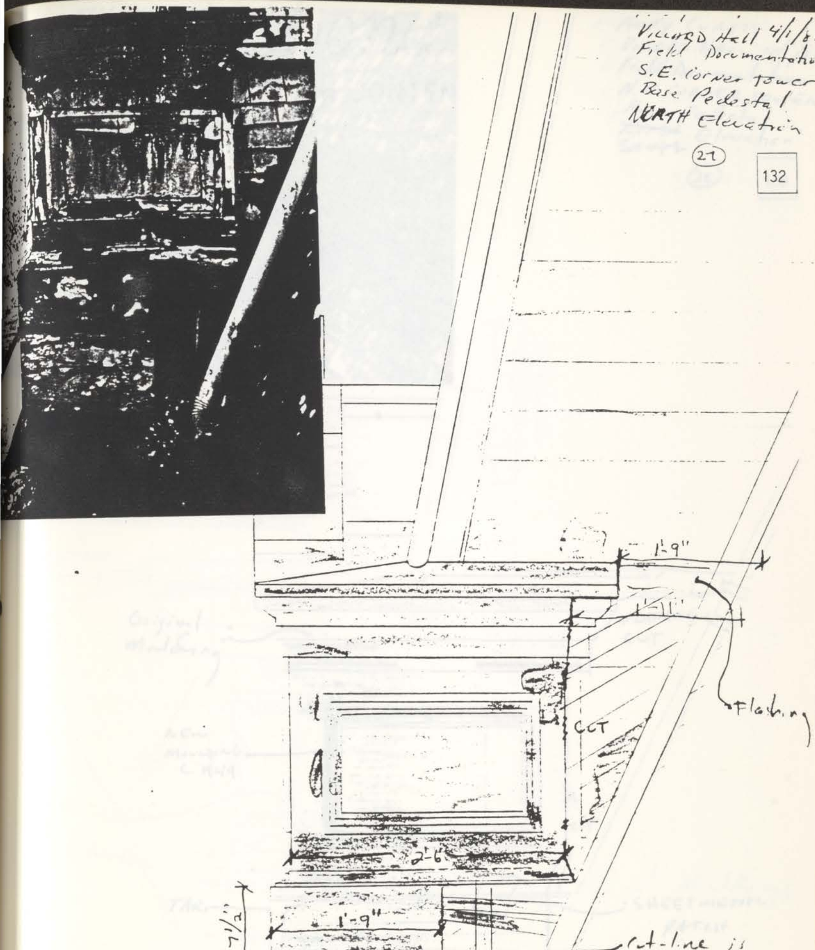
Andy Curtis
Villard Hall 4/1/88
Field Documentation
S.W. Corner Tower
Base Pedestal
EAST Elevation

(20)



Villard Hall 4/1/88
Field Documentation
S.E. Corner Tower
Base Pedestal
NORTH Elevation

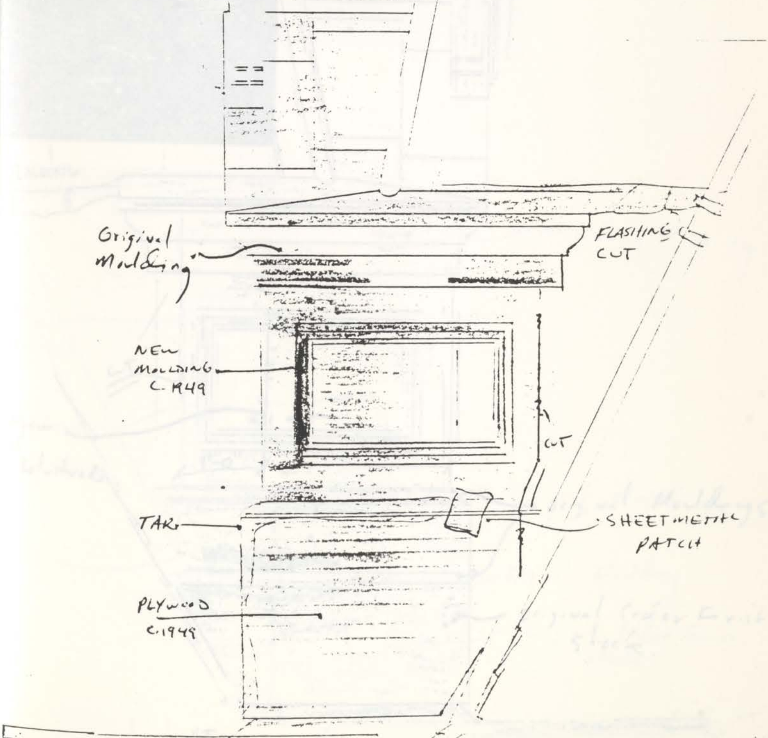
(27)



cut-line is evidence for the original location of the balustrade

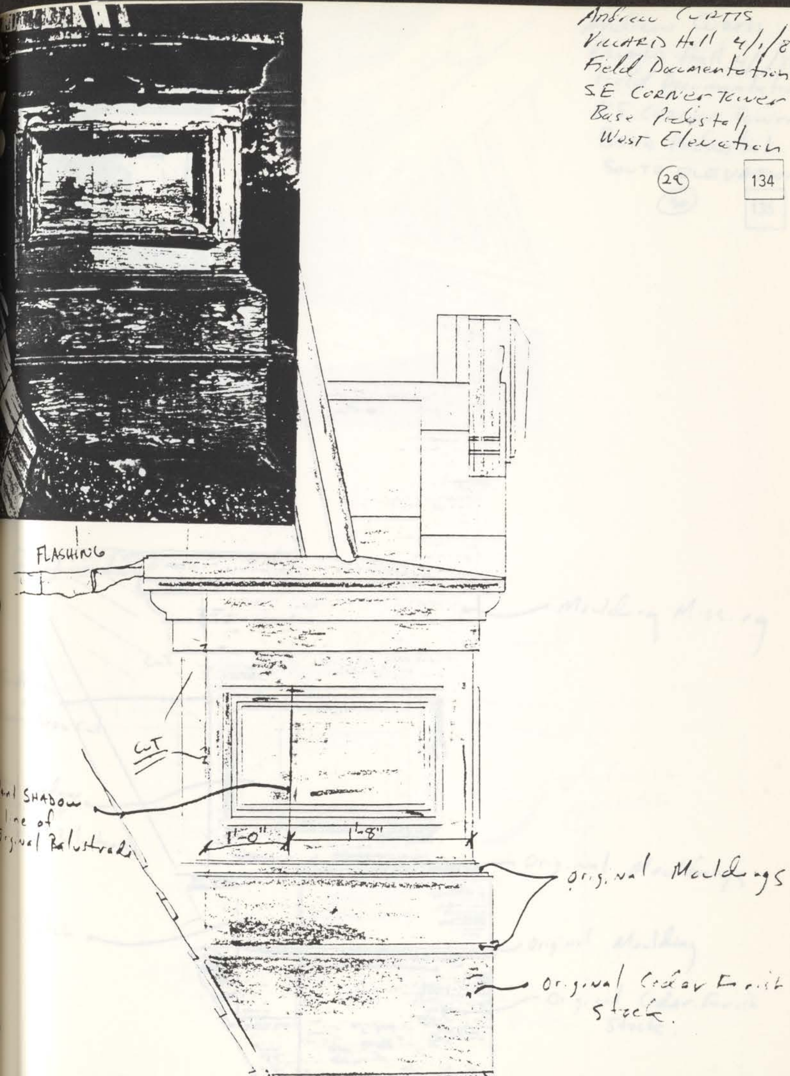
Andy Curtis
Villard Hall 4/1/88
Field Documentation
N.W. CORNER TOWER
Base Pedestal
~~North~~ Elevation
South

㉘

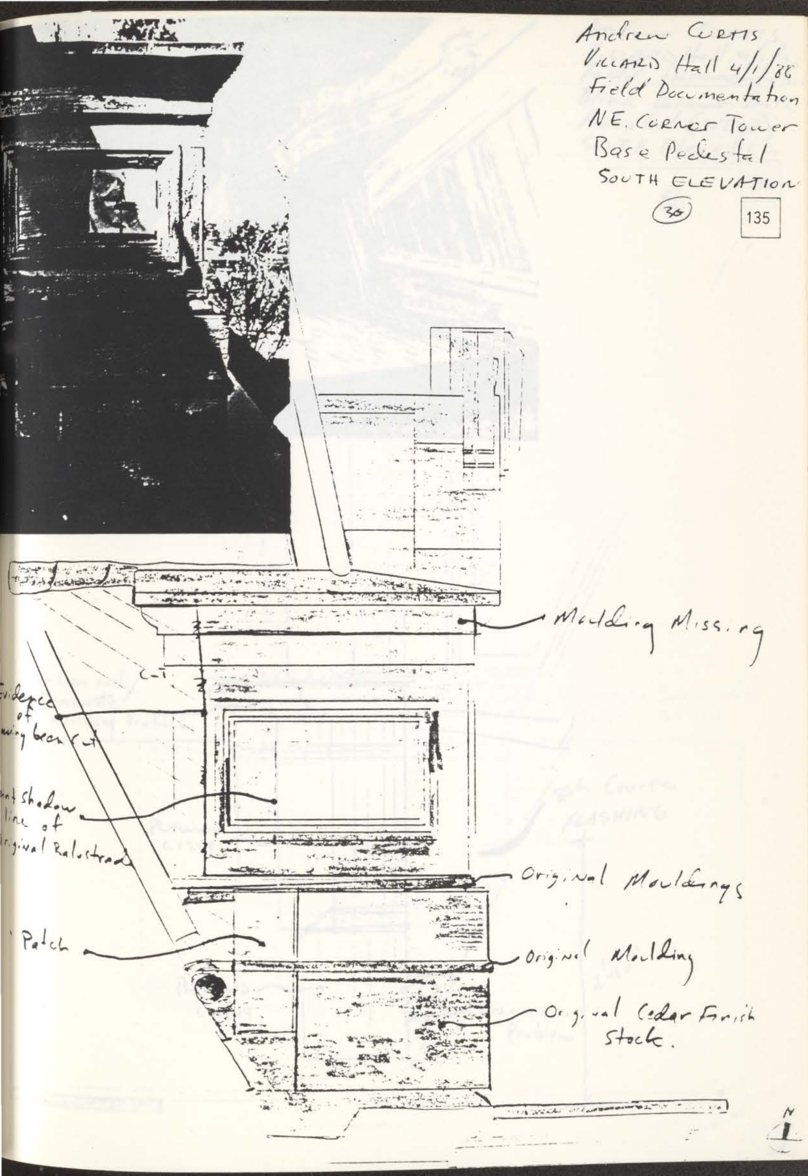


Andrew Curtis
Villard Hall 4/1/88
Field Documentation
S.E Corner Tower
Base Pedestal,
West Elevation

㉙

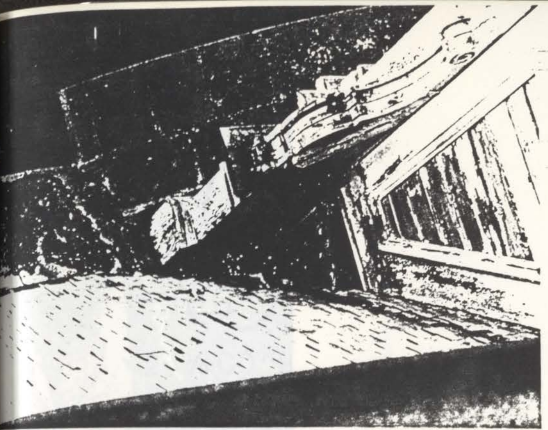


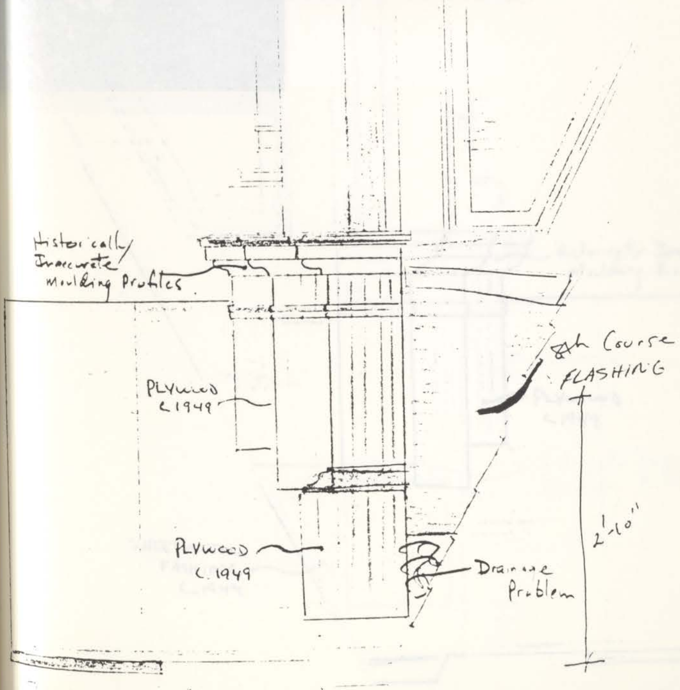
Andrew Curtis
Villard Hall 4/1/86
Field Documentation
N.E. Corner Tower
Base Pedestal
SOUTH ELEVATION
㉚



Andrew CURTIS
VILLARD Hall 4/1/80
Field Documentation
Blind Dormer Base
Pedestal (WEST)
SOUTH Elevation

㊱

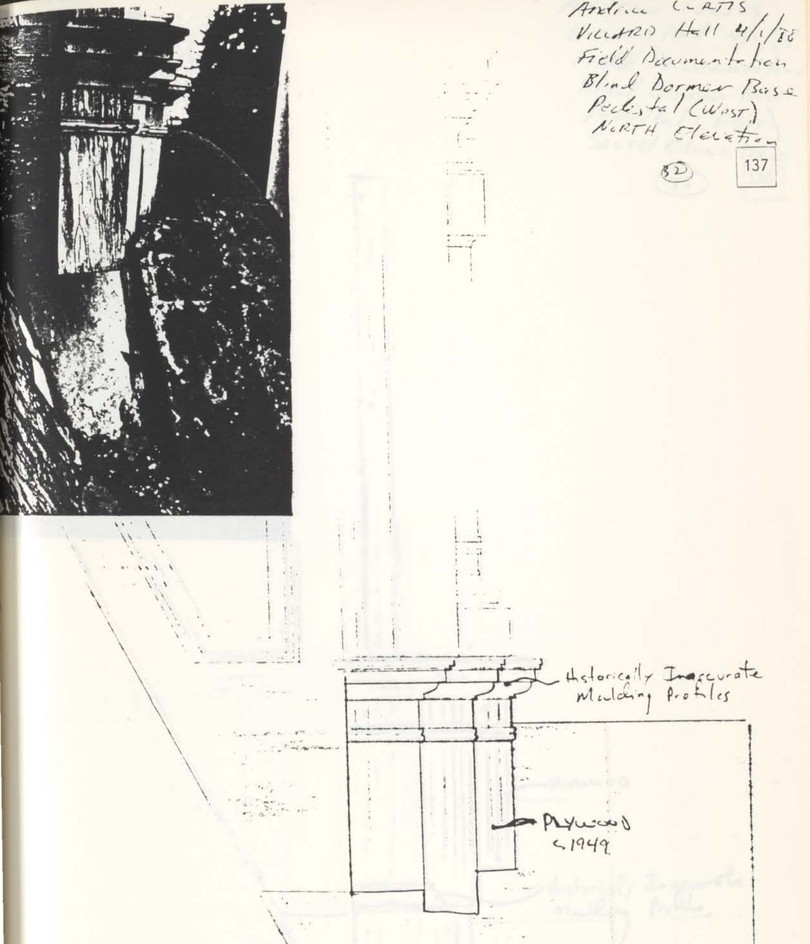




1.

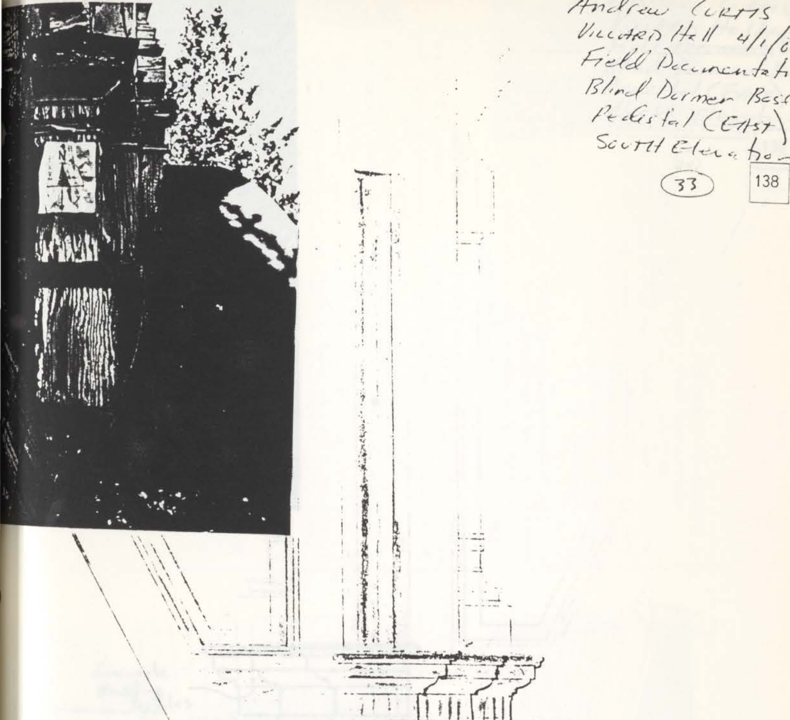
Andrew CURTIS
VILLARD Hall 4/1/88
Field Documentation
Blind Dormer Base
Pedestal (West)
NORTH Elevation

82



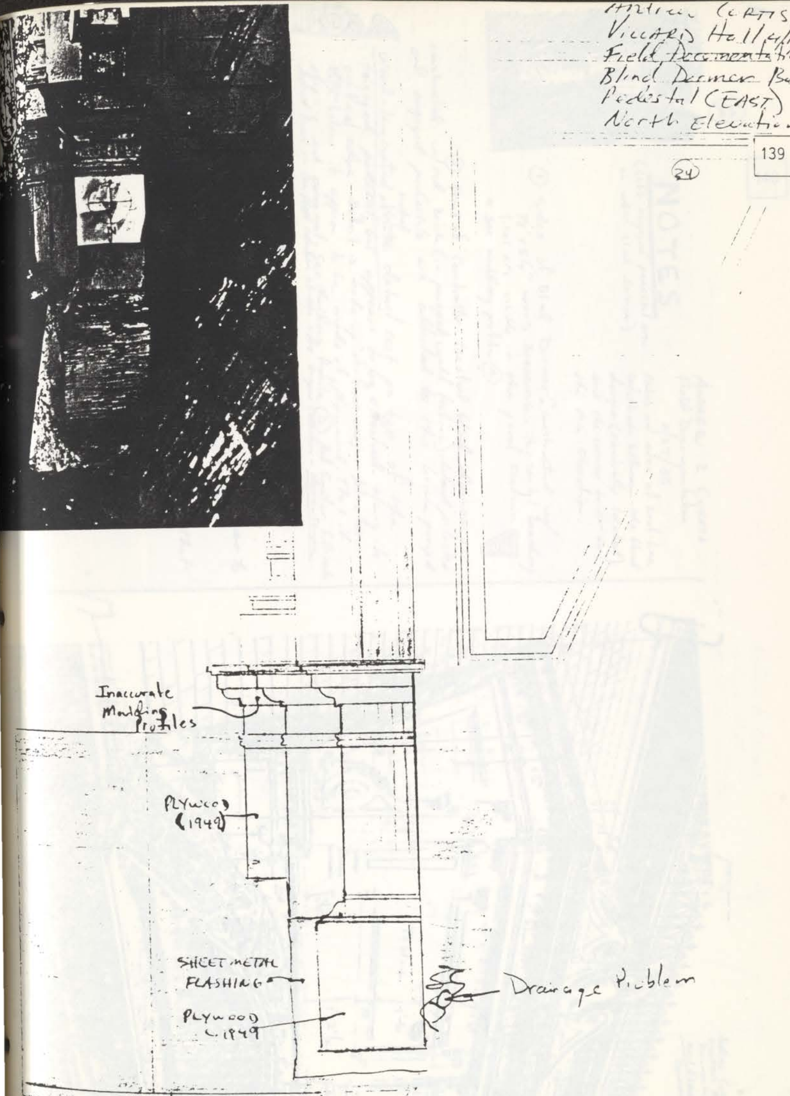
Andrew Curtis
Villard Hall 4/1/07
Field Documentation
Blind Dormer Base
Pedistal (East)
South Elevation

㉝



Andrew Curtis
Villard Hall U of O
Field Documentation
Blind Dormer Base
Pedestal (EAST)
North Elevation

(34)



(35)

NOTES

(Left engaged pedestal area on WEST Blind dormer)

ANDREW R CURTIS
Field Documentation
2/27/88
Notes on area of Roof-line balustrade between the blind dormer (centrally located) and the corner tower on the N.W Elevation.

① Sides of Blind Dormer is constructed w/ 7/8" x 5¼" WOOD BOARDING. Horizontal boarding lines are visible in the panel section
* See molding profile (A)

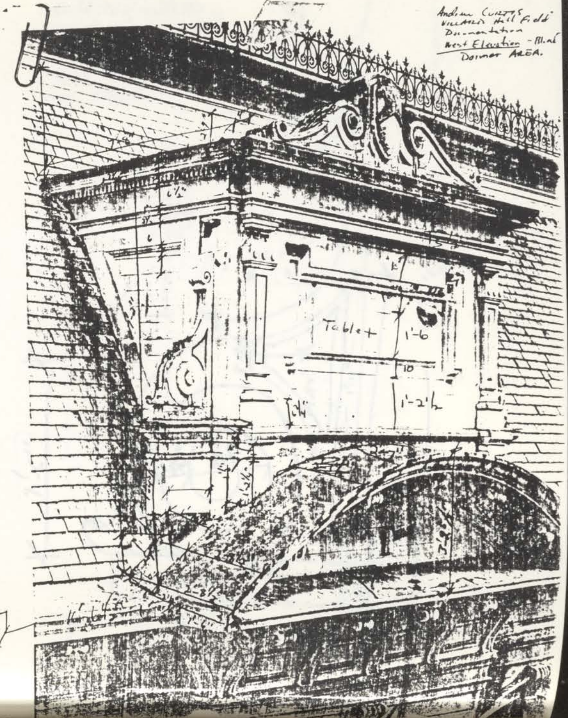
② Front of centrally located blind dormer is constructed w/ red Brick (in parapet wall fashion). Wood pilaster and engaged pedestals are attached to this brick parapet

③ Wood-laminated bracket Volute detail rest on top of the engaged pedestal but appears to be attached along its vertical edge. Detail is made up of four major planks. ~~Box~~ Base below it appear to be made of plywood. This it also is not original. See Molding Profile (D) And Similar full-scale detail found in Jon Platt Collection at the U of O. Oregon Collection - Masonic Temple

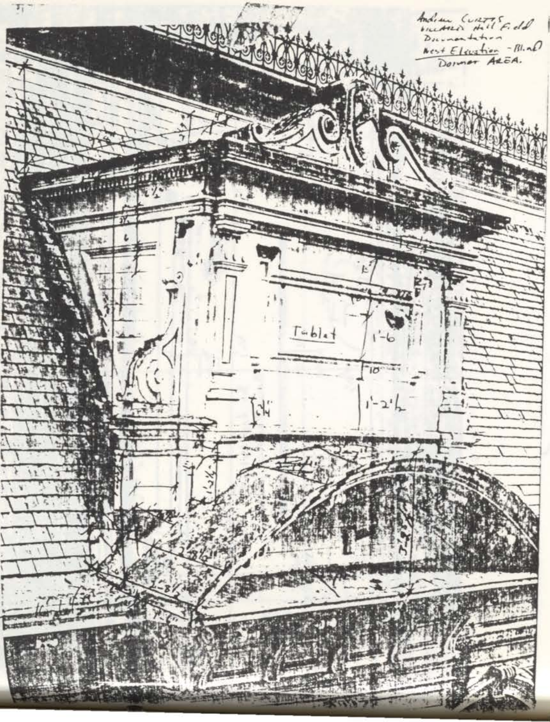
④ Engaged pedestals have been completely rebuilt during the 1948 Remodelling.

⑤ Mouldings on engaged pedestals do not appear to to be original. See Moulding Profile (B, C).

⑥ Tin Roof - one continuous piece of metal roofing that appears to have been added later.

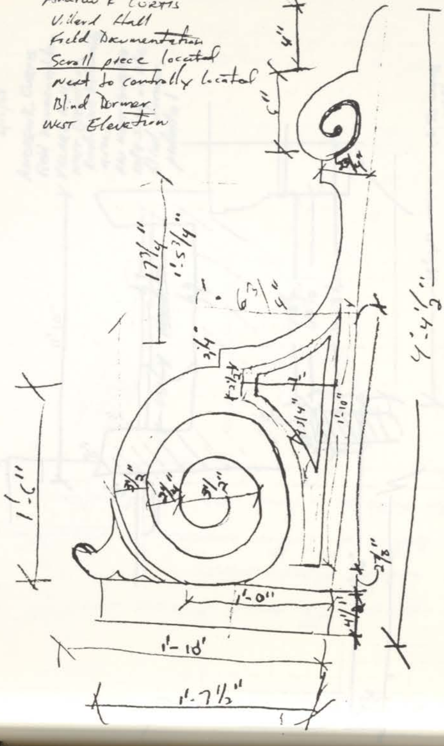


Andrew Curtis
Villard Hall Field Documentation
West Elevation - Blind Dormer AREA.

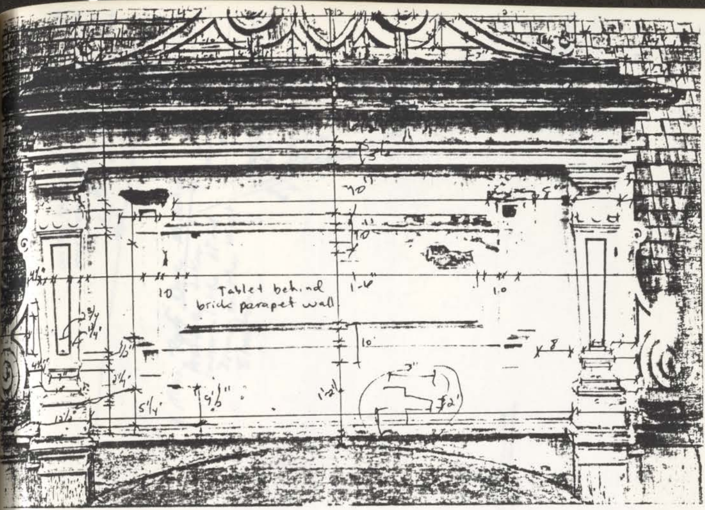


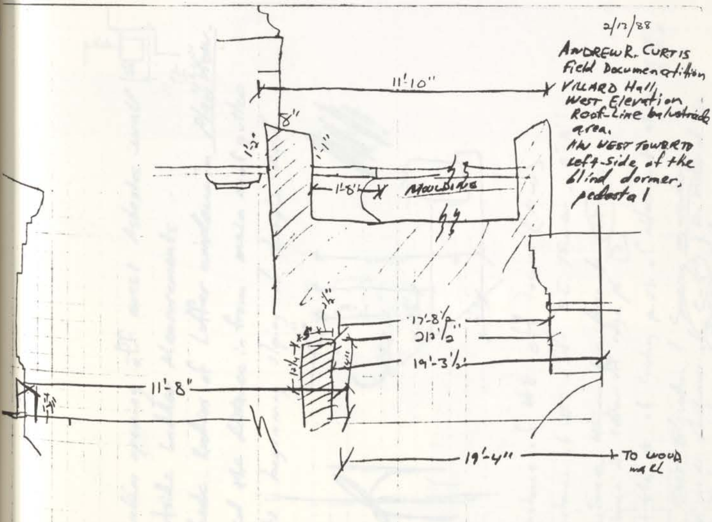
Andrew Curtis
Villard's Hall Field
Documentation
West Elevation - Blind
Dormer AREA.

Andrew P Curtis
Villard Hall
Field Documentation
Scroll piece located
next to centrally located
Blind Dormer
West Elevation



(37)

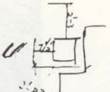




2/13/88

ANDREW R. CURTIS
Field Documentation
VILLARD Hall,
WEST Elevation
Roof-Line balustrade
area.
NW WEST TOWER TO
Left-Side of the
blind dormer,
pedestal

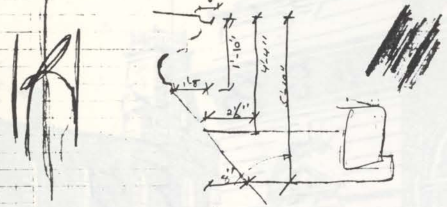
✓ Ladder opening off west Asbestos wall



- outside Ladder Measurements

✓ check Radius of Loffer window in Plan View. 4'4"

✓ Find the distance in from main roof gutter to beginning sloping of shingle roof



✓ Distance of #8 off tower (NW)

✓ Distance of #3 off SE. Tower. 9'-8"

✓ Distance between two bases at (Dk-2)

✓ Distance of tether off ridge pt. D

- Count the # of Cresting points of attachment along 64 W-S 29 End

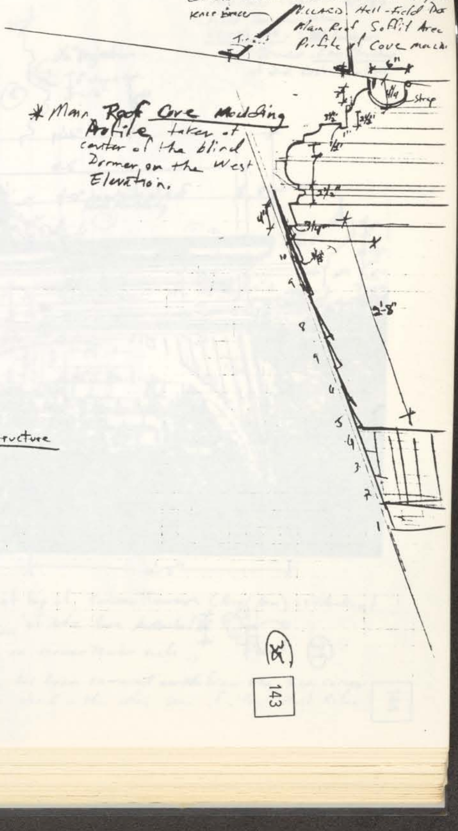
✓ East Elevation & Spacing on-center.

✓ check inside thickness of (C-5) & Diameter of Top.

✓ check Distance between (C-7) (C-8) 5'-4"

✓ Distance of C-10 off ⊥ 2'-8" and 7'-7" ☒.

Andrew Curtis 3/6/82
Willard Hall-Field Dor
Main Roof Soffit Area
Profile of Cove mould.

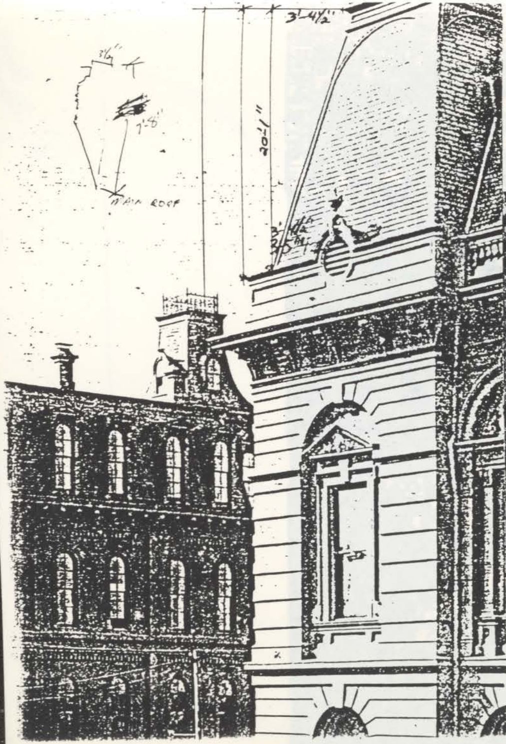


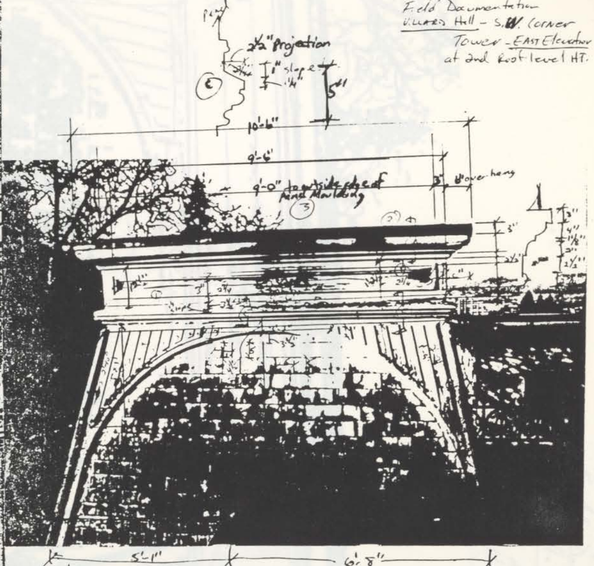
* Main Roof Cove Molding Profile, taken at center of the blind Dormer on the West Elevation.

Section Structure

(36)

Andrew Curtis 3/5/87
Field Documentation
Villard Hall - S.W. Corner
Tower - East Elevation
at 2nd Roof level HT.





Notes

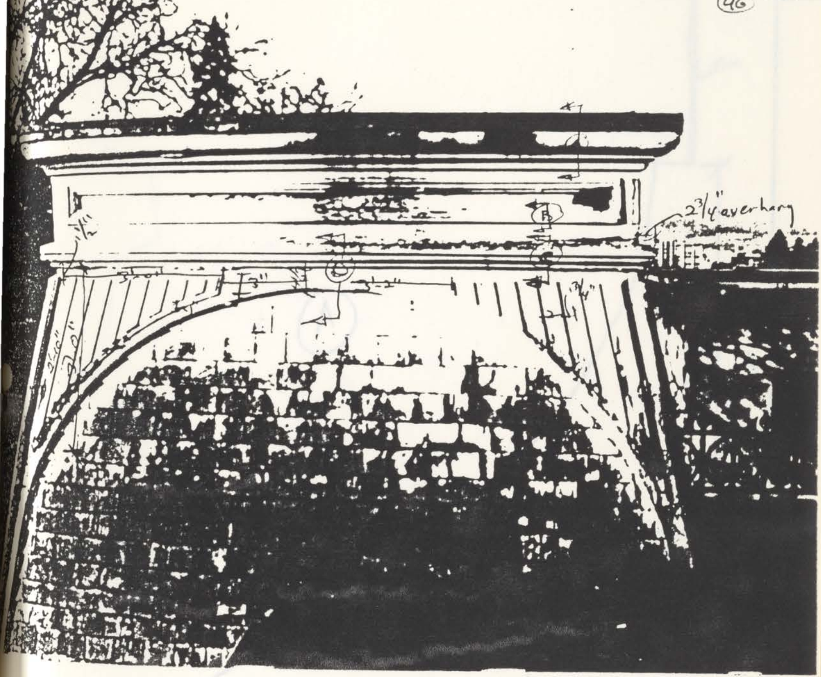
① "Moulding found at top of Corner Towers (Panel Area) is identical to profile B of the base pedestal 3¼" ① Panel

② Terned Plate Roof on corner tower roofs is badly deteriorated.

③ Cast-Iron Cresting has been removed ~~on the~~ from the S.W. corner Tower (Currently stored in the attic space of Villard Hall Refer

㉛

Andrew R. Curtis
3/5/87
Field Documentation
Villard Hall_ S.W. Corner
Tower Moulding Profile
at Full- Scale

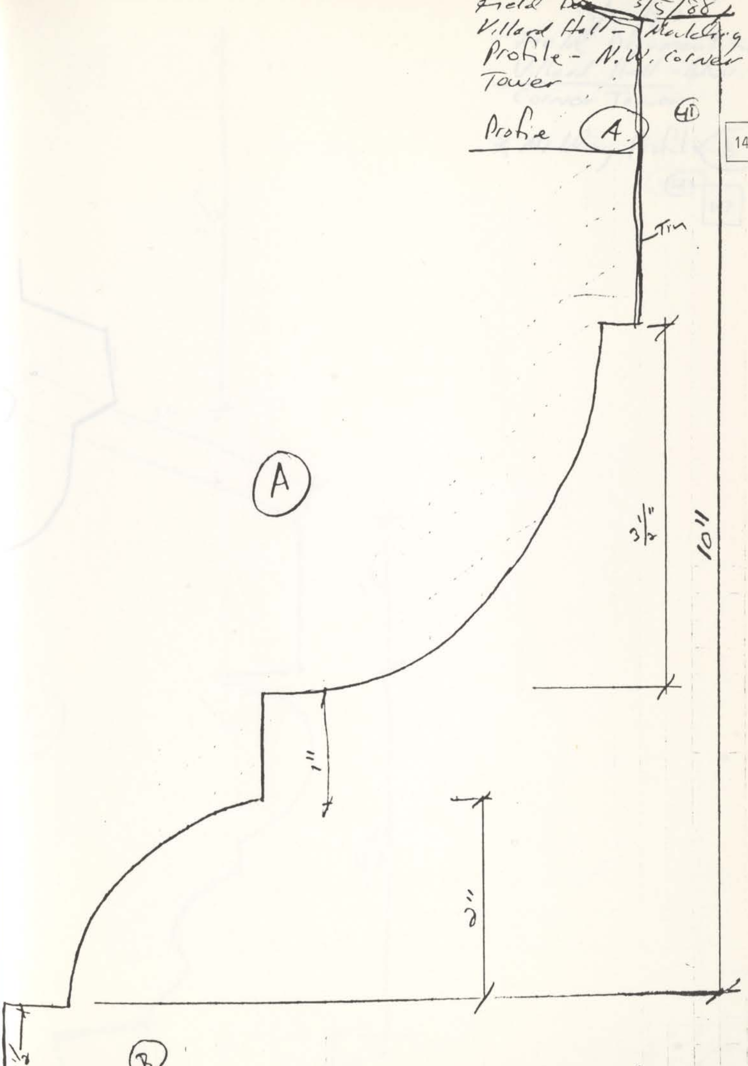


]

Andrew Curtis
Field D 3/5/88
Villard Hall - Moulding
Profile - N.W. corner
Tower

4I

Profile (A.)



Andrew Curtis
3/5/87
Field Documentation
Villard Hall - Arch.

Corner Tower

* Molding Profile (B)

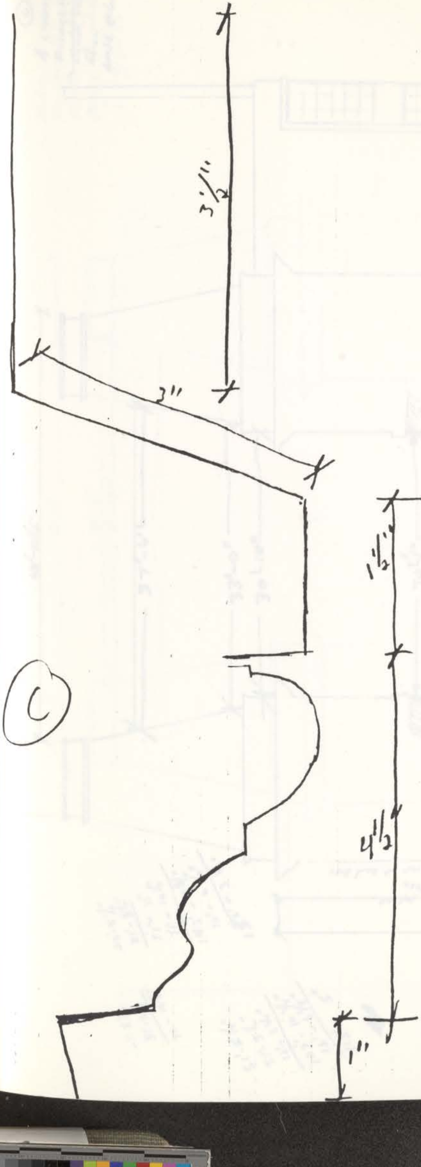
(42)

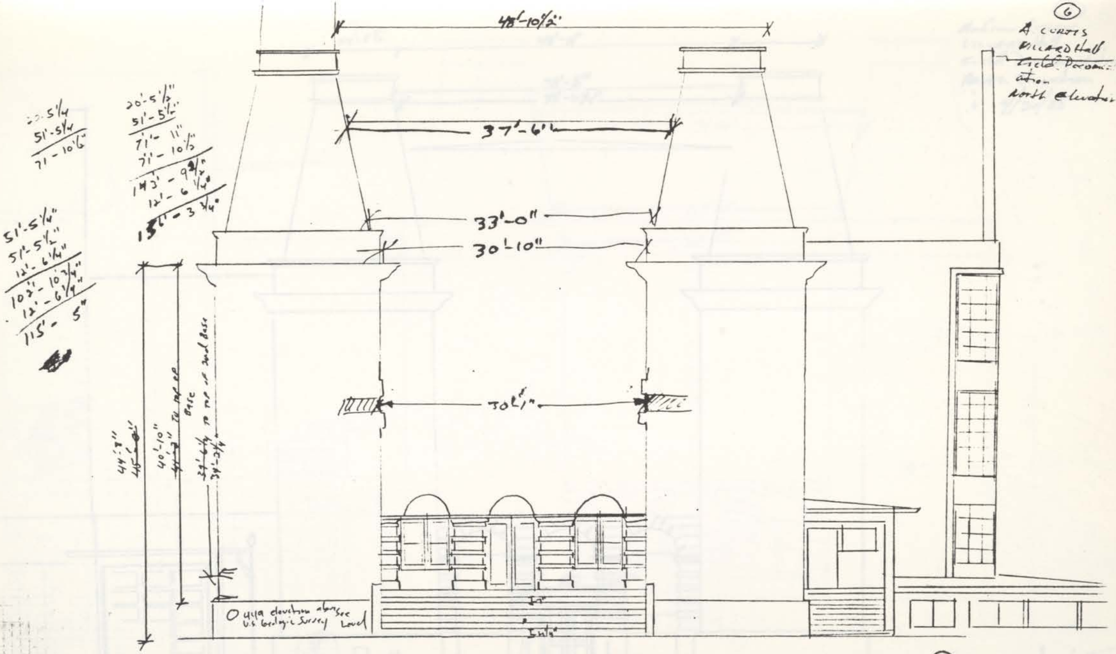
147

Andrew Curtis
3/5/87
Field Documentation
Villard Hall - N.W. Corner
Tower - Top Section

* Molding Profile ©

㊸ 148



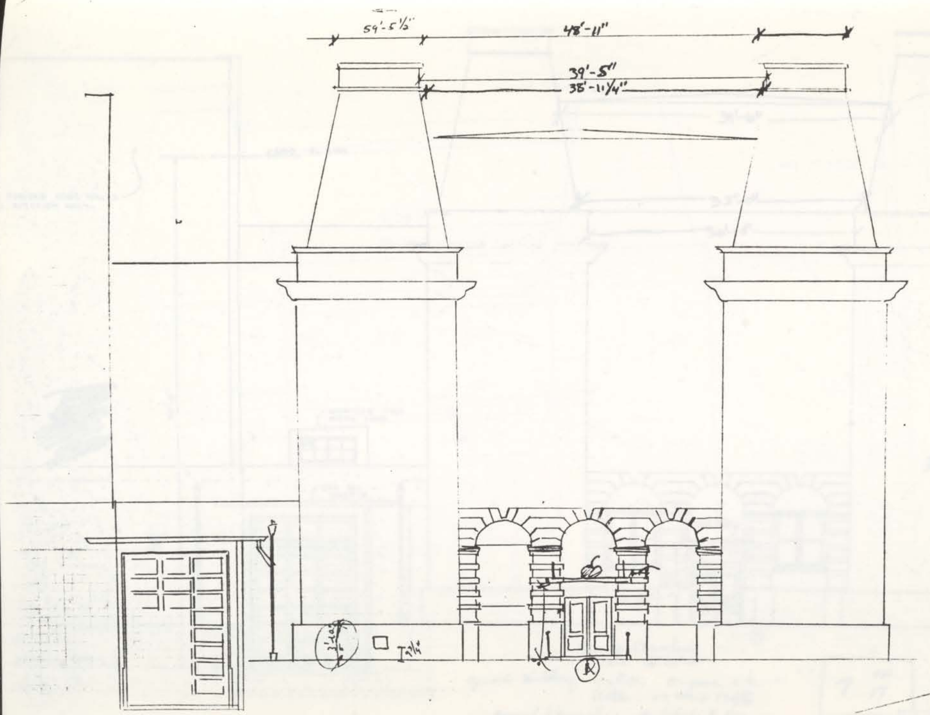


⑥

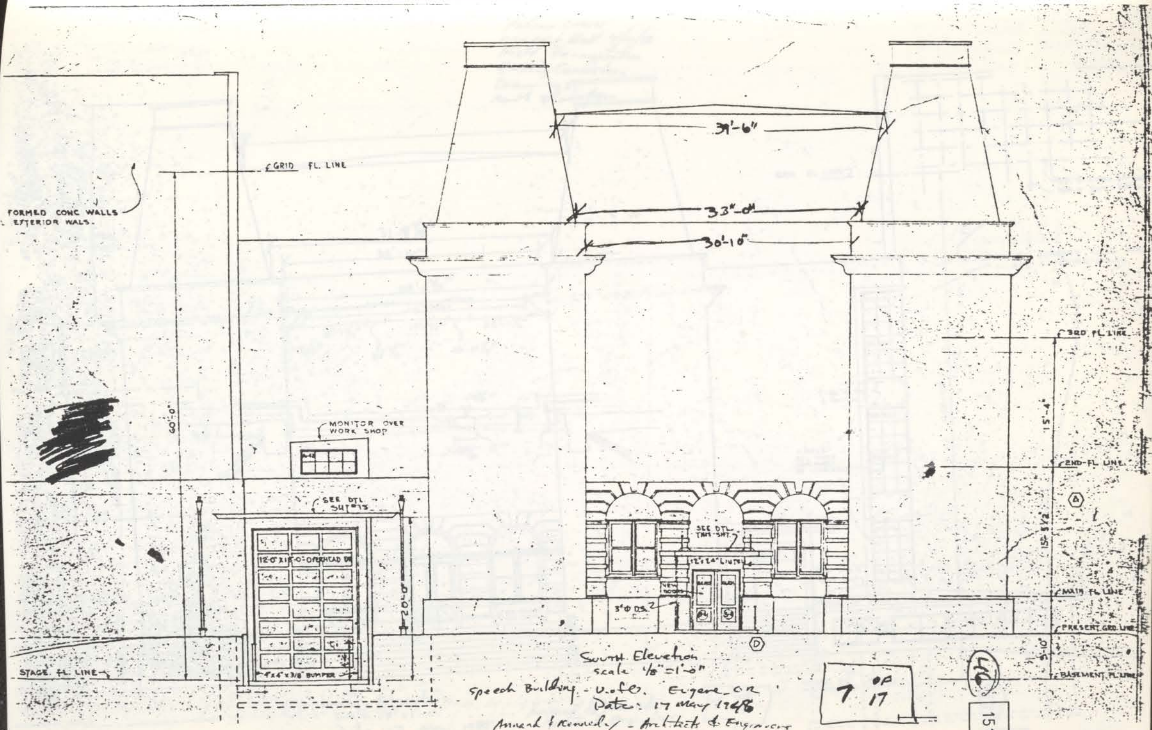
A Curtis
Villard Hall
~~Field~~ Field Documentation
North Elevation

㊹

⑤
Andrew Curtis
Villard Hall
Field Documentation
South Elevation
4/20/88



(45)



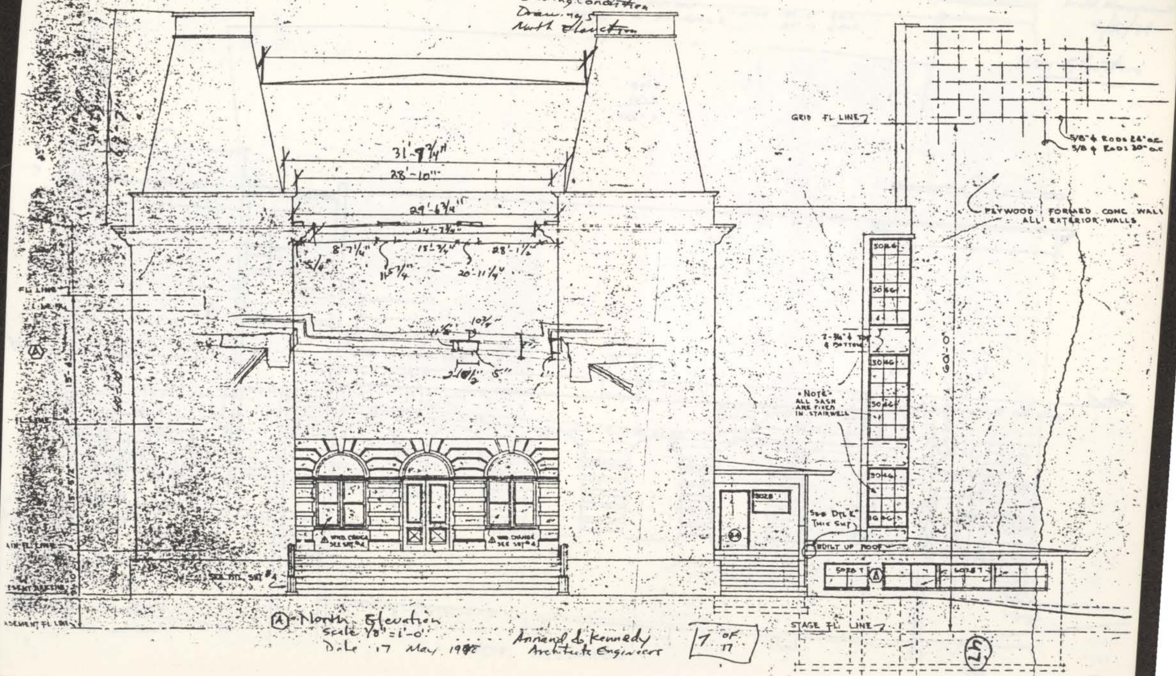
[redacted]

South Elevation
scale 1/8" = 1'-0"
Speech Building - U. of O. Eugene, OR
Date: 17 May 1948
Annand & Kennedy - Architects & Engineers

7 of 17

46

Andrew Curtis
Villard Hall 4/16/88
Field Documentation
Existing Condition
Drawings
North Elevation



(A) North Elevation
Scale 1/8" = 1'-0"
Date 17 May 1988

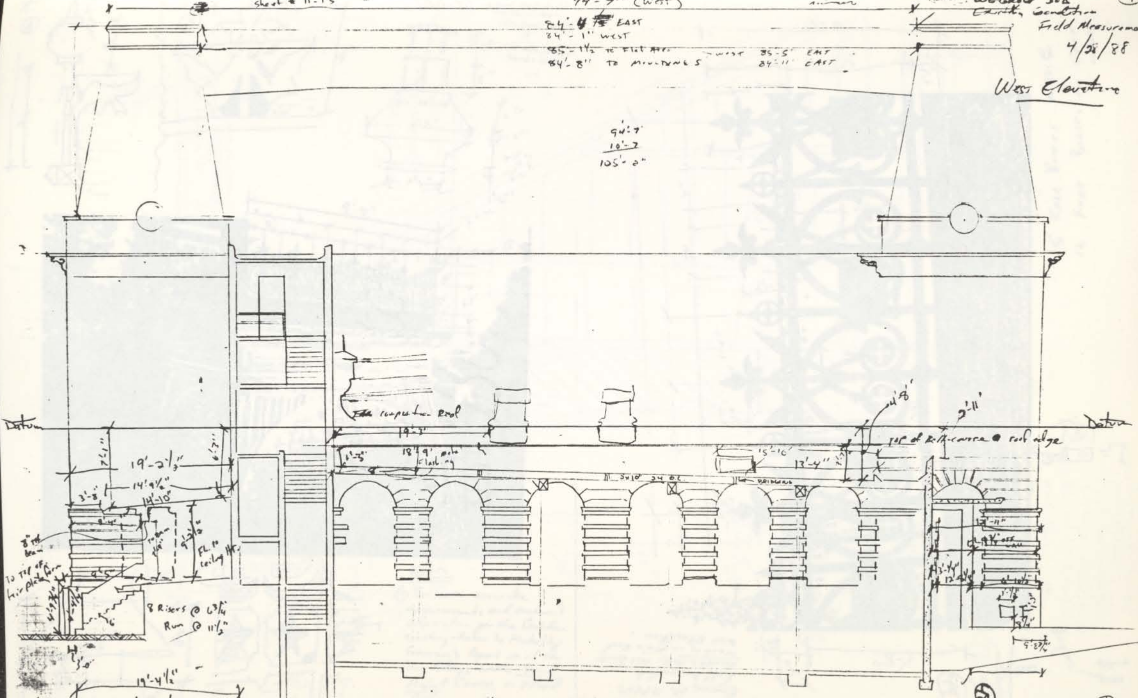
Annand & Kennedy
Architects Engineers

1 of 17

④

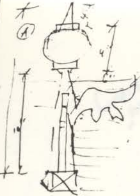
Andrew Curtis
McGrow Job
Existing Condition
Field Measurement
4/28/88

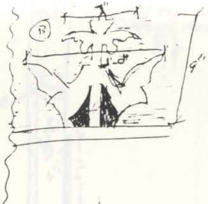
West Elevation

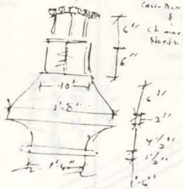


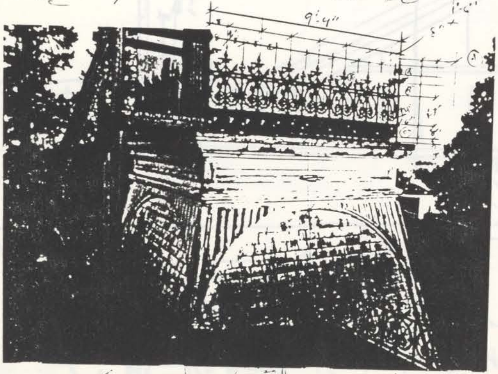
WEST ELEVATION

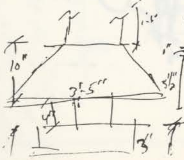
A. Curtis 3/6/06
Villard Hall - Field Documentation
Cast Iron Cresting
&
Chimney Detail North Tower

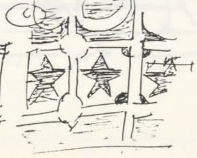






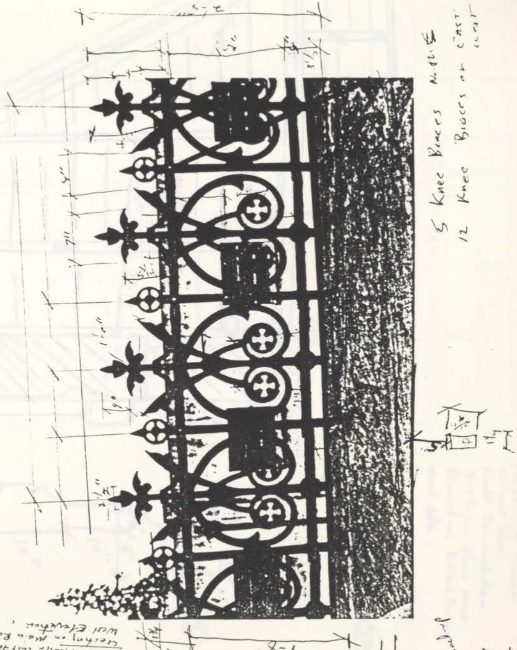






Notes

① For more accurate measurements and technical information on the Cast Iron cresting - Refer to Kimberly Emerson's Report on it for Don Petings Winter - Special Project Course on Villard Hall.



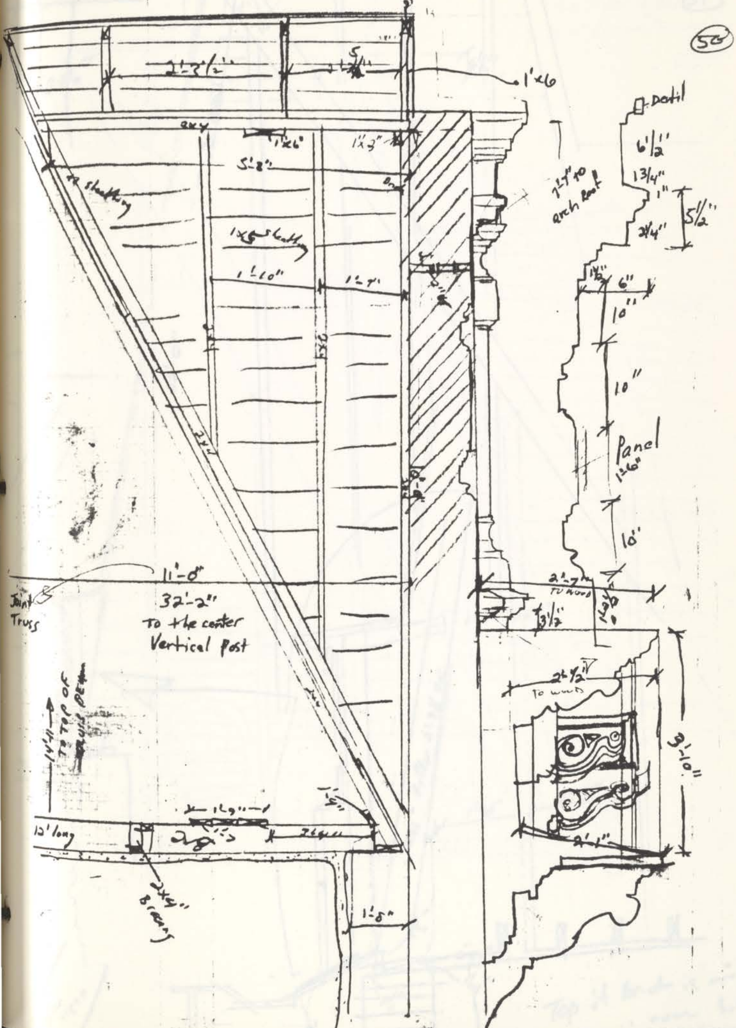
5 Knee Braces North
12 Knee Braces on East West

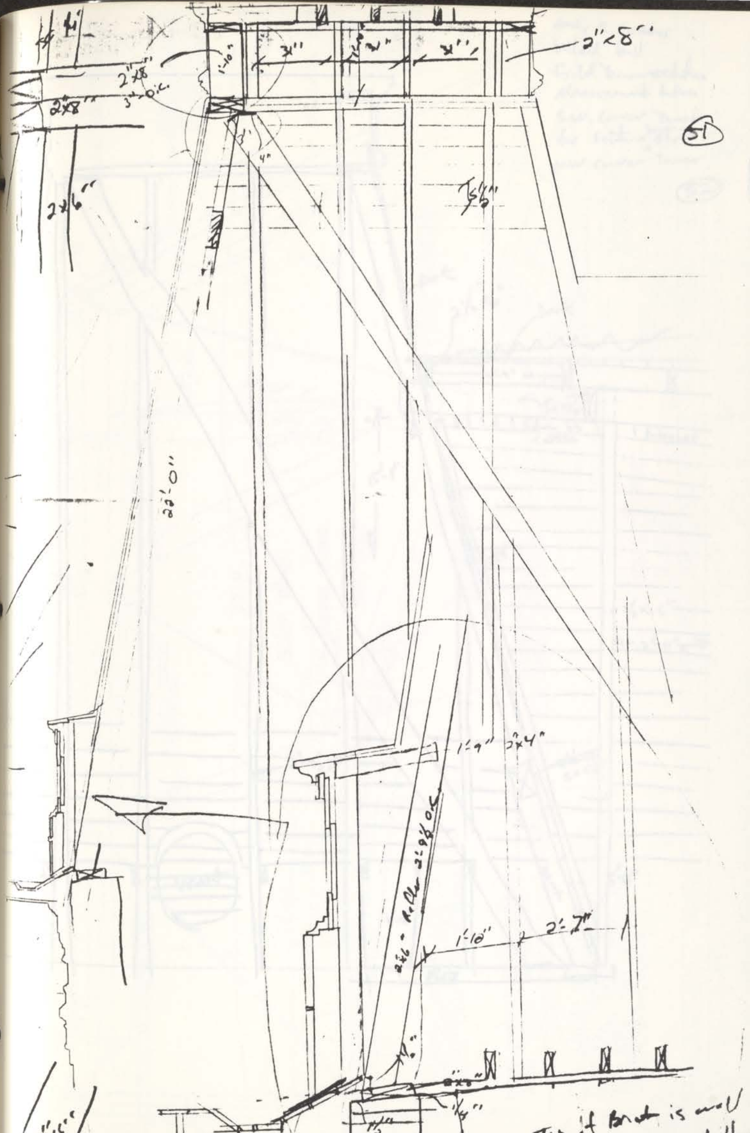
1031 Kincaid St #20
Eugene, OR. 97403
Field Documentation
Villard Hall, Cast Iron
Cresting on Main Roof
West Elevation.

(49)

Andrew P. Corrs
Villard Hall
Field Documentation
Section thru West
Elevation Blind Dormer
and Attic.

(56)

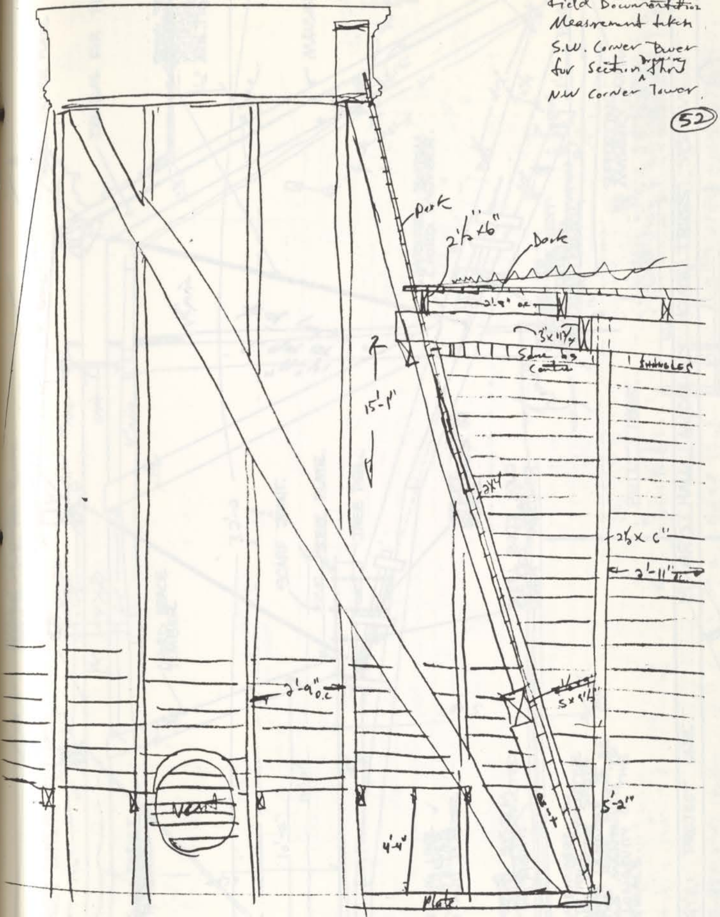


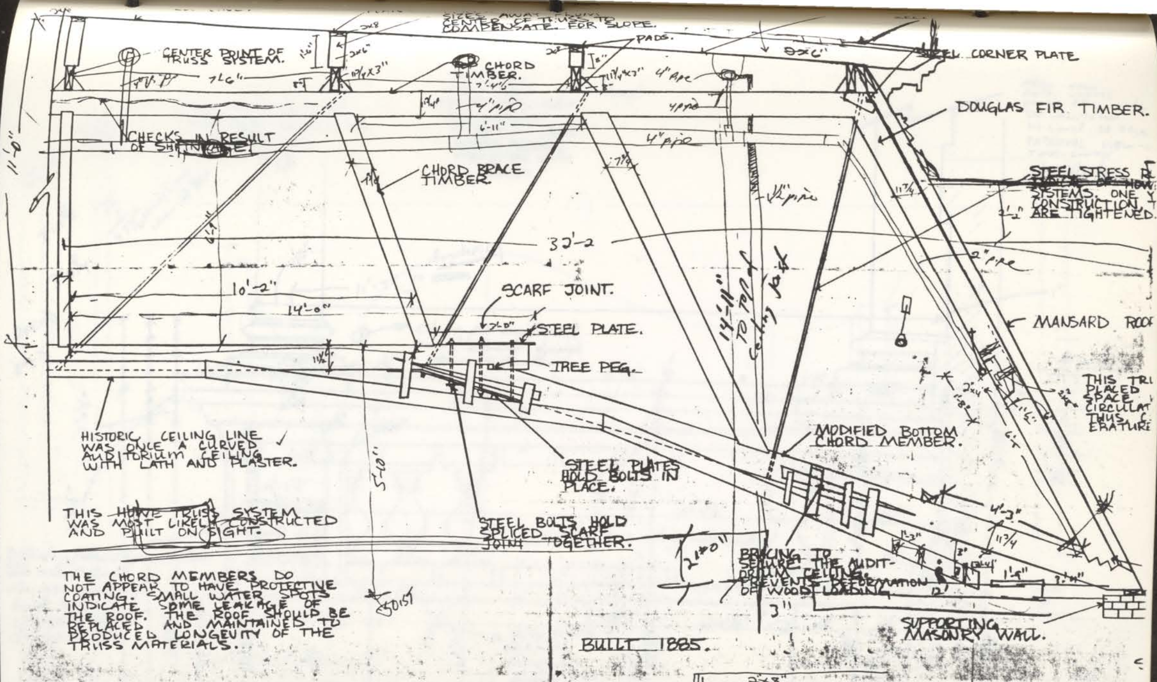


(51)

Top of Bracket is well over bull.

Andy R. Gurass
Villard Hall
Field Documentation
Measurement taken
S.W. Corner Tower
for Section ^drawing^ shown
NW Corner Tower.





STEEL STRESS R
SYSTEMS. ONE Y
CONSTRUCTION, T
ARE TIGHTENED.

THIS TRI
PLACED
SPACE
CIRCULAT
THUS
ERATURE

HISTORIC CEILING LINE ✓
WAS ONCE A CURVED
AUDITORIUM CEILING
WITH LATH AND PLASTER.

THIS HOWE TRUSS SYSTEM
WAS MOST LIKELY CONSTRUCTED
AND BUILT ON SIGHT.

THE CHORD MEMBERS DO
NOT APPEAR TO HAVE PROTECTIVE
COATING. SMALL WATER SPOTS
INDICATE SOME LEAKAGE OF
THE ROOF. THE ROOF SHOULD BE
REPLACED AND MAINTAINED TO
PRODUCED LONGEVITY OF THE
TRUSS MATERIALS.

BUILT 1885.

ATION TECHNOLOGY : PROJECT ONE   VILLARD HALL MODIFIED HOWE TRUSS SYSTEM   K.E

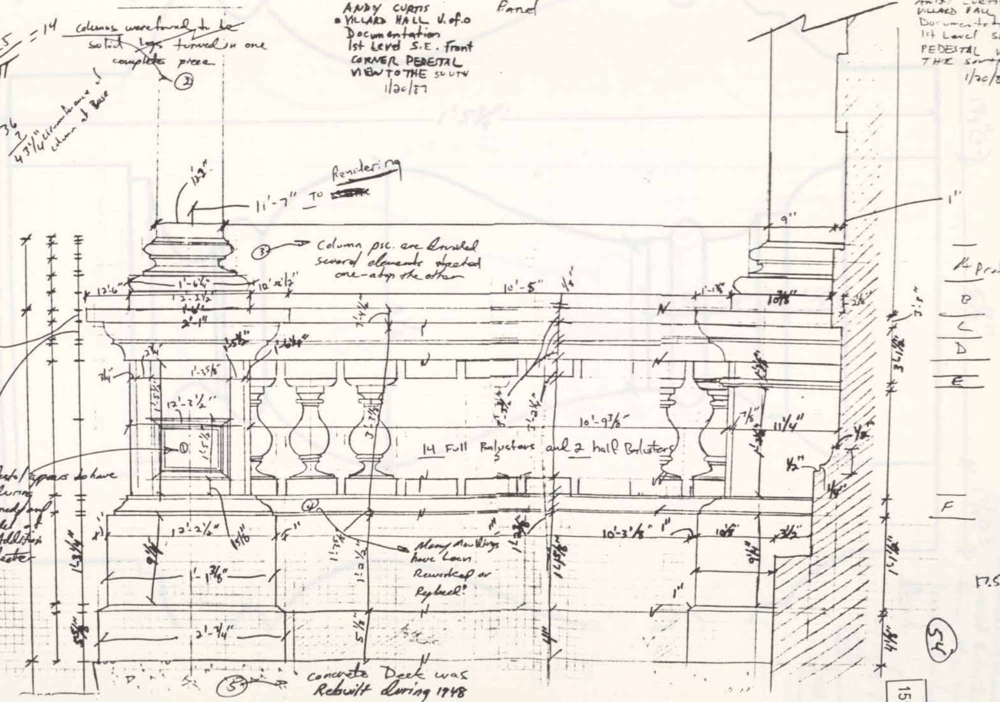
NEAL VOGEL
ANDY CURTIS
VILLARD HALL U. of. O
Documentation
1st Level S.E. Front
CORNER PEDESTAL
VIEW TO THE SOUTH
1/20/87

NEAL VOGEL
ANDY CURTIS
VILLARD HALL U of O
Documentation
1st Level SE. BACK
PEDESTAL VIEW TO
THE SOUTH
1/20/87

$\frac{C}{\pi} = D$ $\frac{43.25}{\pi} = 14$

~~columns were found to be solid logs turned in one complete piece~~ ②

43¼" circumference of column at Base



③ Column psc. are Provided several elements stacked one-atop the other

14 Full Balusters and 2 half Balusters

① Existing Pedestal appears to have ~~con~~ rebuilt during the 1948 Kennedy and Annual Remodel of Villard Hall & Addition of Wright Theater

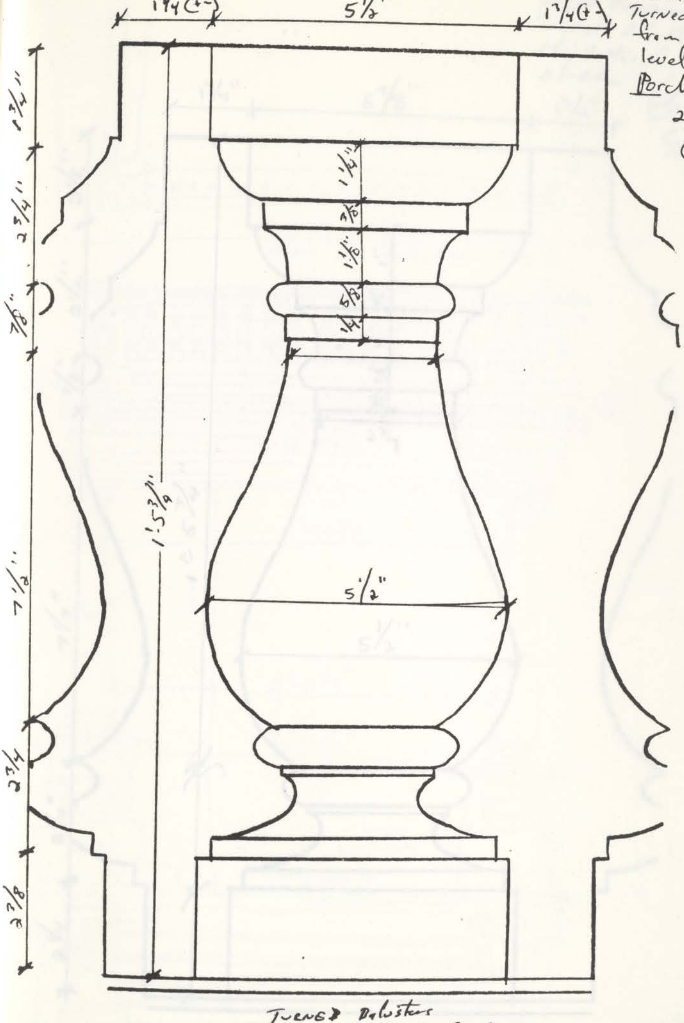
3'
1⅞
3⅞
2'
3
1⅞
3⅞

④ Many Mouldings have been Reworked or Replaced?

⑤ concrete Deck was Rebuilt during 1948

54

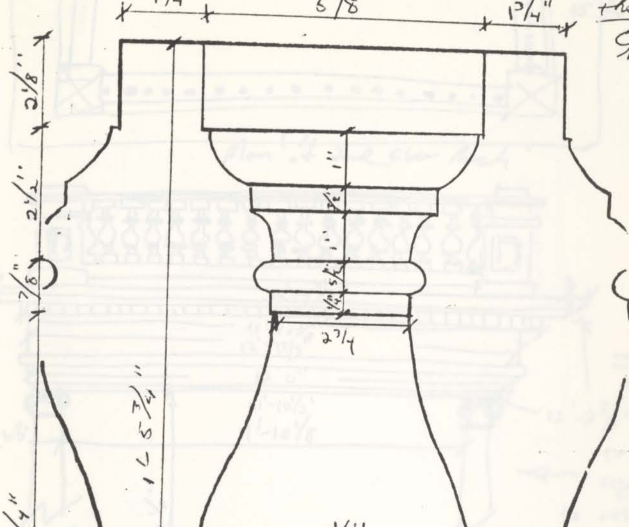
Andy Curtis
Villard Hall
Field Measurements
Turned Baluster
from the 1st
level of the East
Porch
2/13/87
(55)



Turned Balusters
1st Level East Porch

Andrew Curtis
Villard Hall
Field Documentation
Turned Baluster from the Restored Balustrade at the 2nd level of the East Porch

Spring 1987
(56)

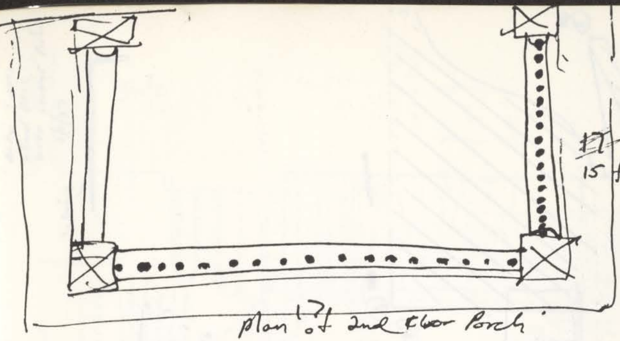


2nd Level
East Porch

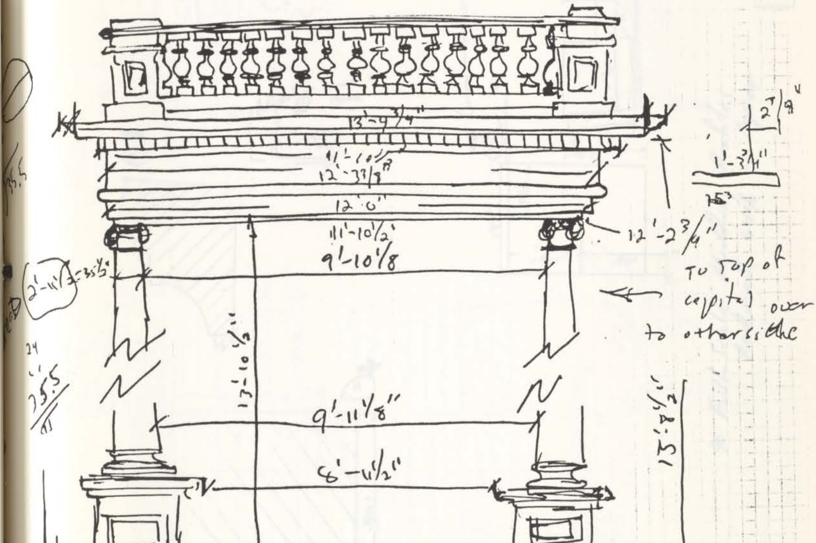
Need Vogel
Villard Hall
Porch Documents
EAST ELEVATION

~~17~~
15 full size

(52)

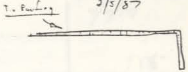


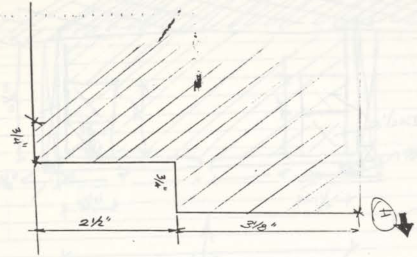
plan of 2nd floor porch

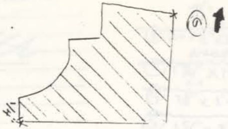


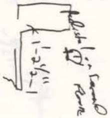
EAST PORCH Villard Hall sketch from archived photo 1/14/87

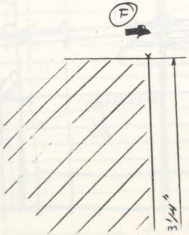
Andy Curtis
Villard HABC
South Cornice Profile
2/5/87

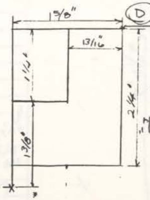




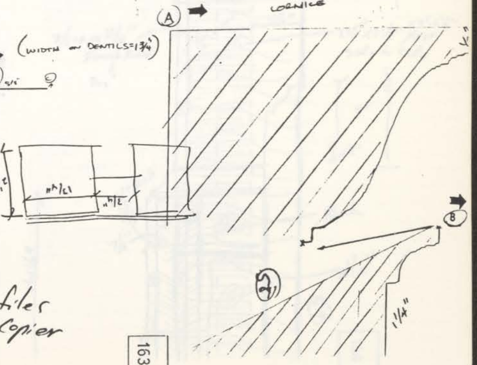






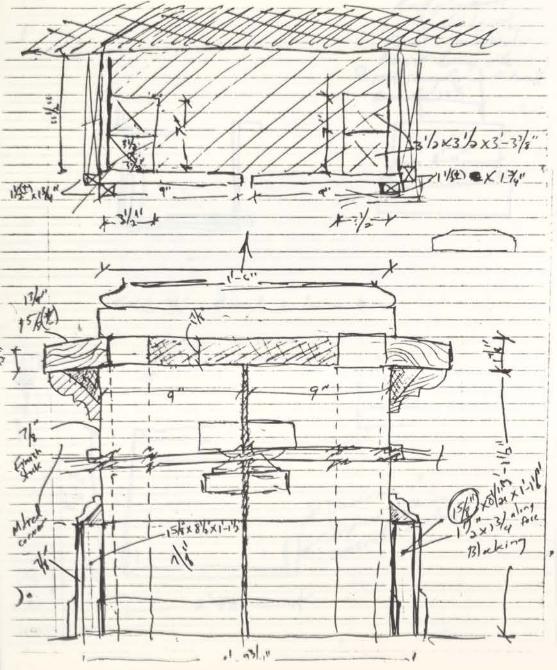


(WIDTH on DENTILS=1¾")



* Full-Scale Molding Profiles
Reduced 64% on Copier

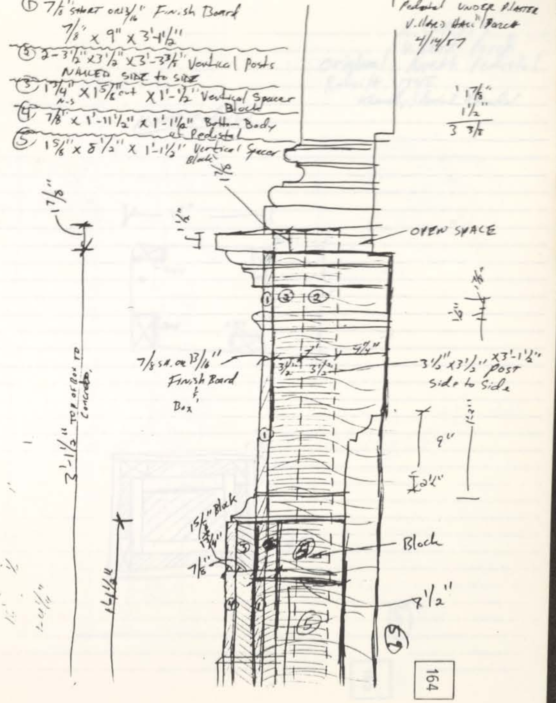
A Curtis
Villard Porch
South Verge
Pilaster Pedestal



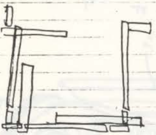
Notes
① 7/8" SHORT OR 13/16" Finish Board
7/8" x 9" x 3'-1½"
② 2-3½"x3½"x3'-3⅜" Vertical Posts
NAILED SIDE to SIDE
③ 1¾" N-S X 1⅝" cut X 1'-1½" Vertical Spacer Block
④ 7/8" x 1'-11½" x 1'-1½" Bottom Body at Pedistal
⑤ 1⅝" x 8½" x 1'-1½" Vertical Spacer Block

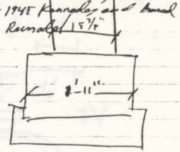
A. CURTIS
STRUCTURE OF S.W
Pedestal UNDER PLASTER
Villard Hall Porch
4/14/87

1⅞"
1½"
3⅜

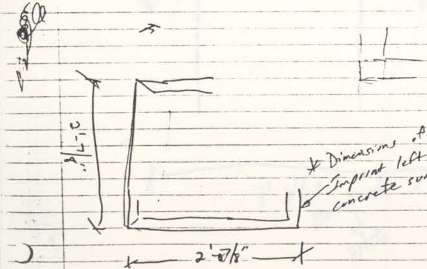


Andy Curtis
Villard Porch
South Pedestal
Rebuilt during the
1948 Kennedys and Annual
Remodel





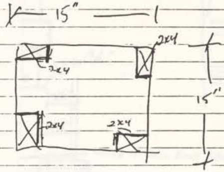
Finish 3/4" shimmed to lower base

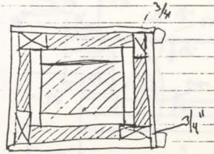


* Dimensions of Imprint left in concrete surface

A. CURTIS
Villard Porch
Original North Pedestal
Rebuilt 1948
Kennedy's Annual Remodel

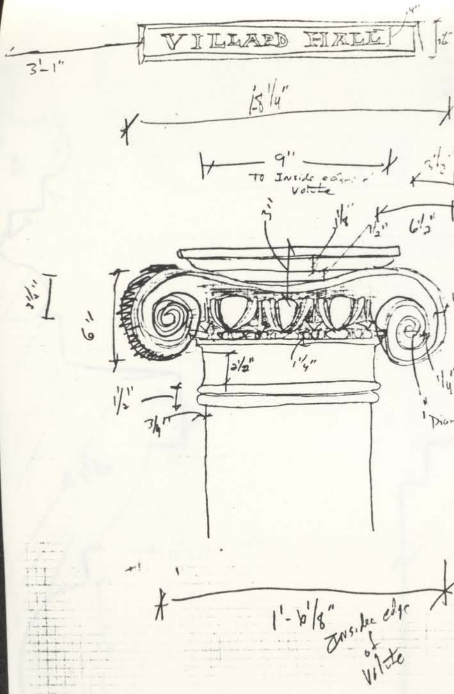
North Pedestal

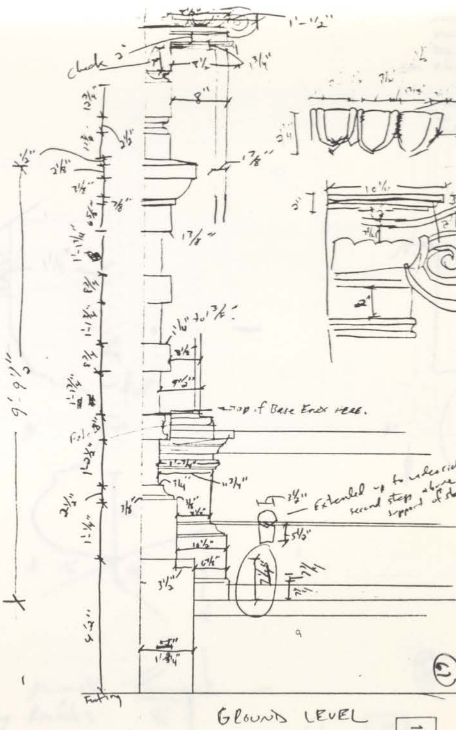




(6a)

ANDREW CURTIS
Neal Vogel
Villard Hall Photo
Documentation
capital of S.E.
Column Viewed
from the West
2/14/87



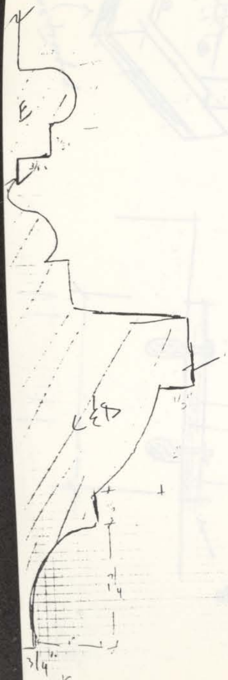


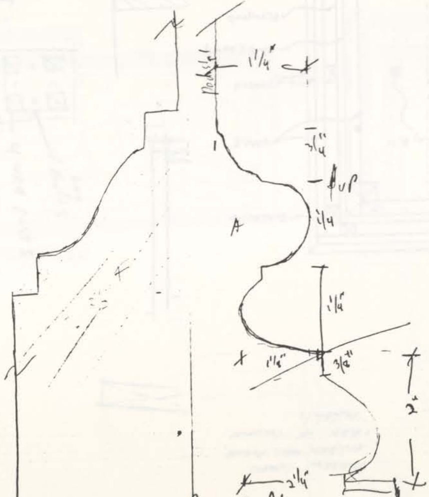
ANDREW CURTIS
Neal Vogel
Villard Hall
East Porch
Documentation
Building Facade
ELEVATION
2/6/87

61

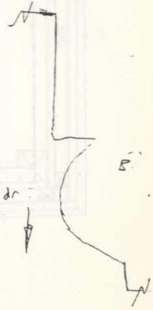
Andy Curtis
Neal Vogel
Villard Fall volo
Documentation
Pedestal Top
Moulding Profile
C & D & E & F

ANDREW CURTIS
VILLAGE HALL U.C.
DOCUMENTATION
SW. Pilaster Base
1/28/87
Profile A & B
East Porch





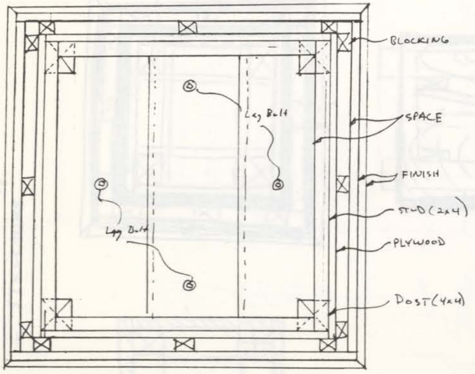
*Full Scale Moulding Profiles
Reduced 64% on copier

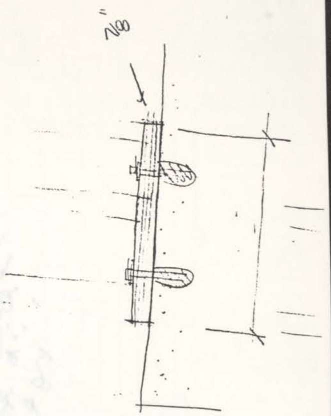


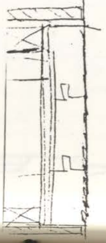
(62)

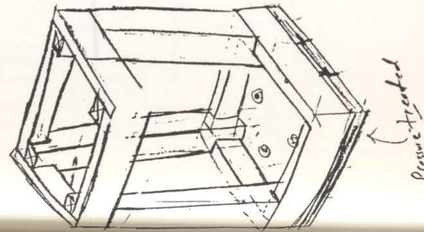
(63)

ANDREW CURTIS
VILLARDS HALL PORCH
• PLAN OF COLUMN
Pedestals



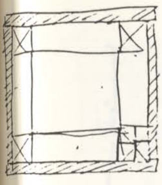


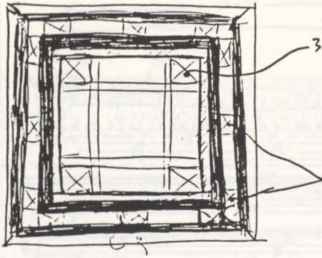


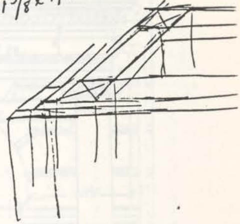


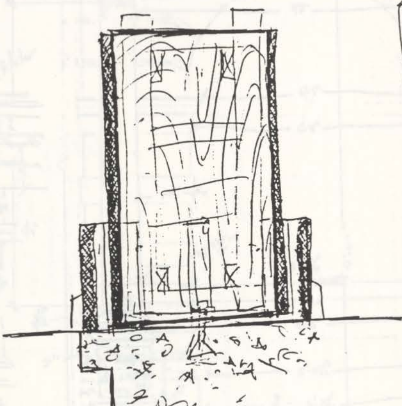
▨ = PLYWOOD 5/8"
▬ = FINISH 7/8"
☒ = STRUCTURE

(64)









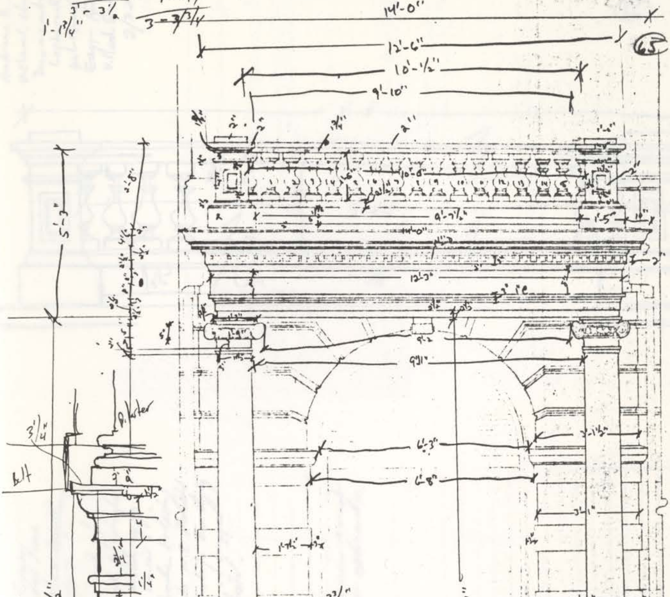
"Andrew Cerots ⑦
Villard Hall
Field Documentation
East Elevation of
Porch

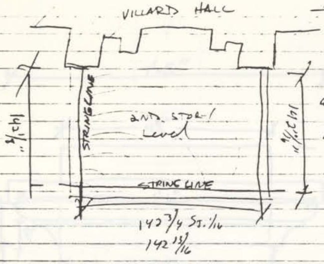
PROPOSED ~~WEST~~ EAST ELEVATION

SCALE: 1/2" = 1'-0"

6¼
1'-8⅜
2'-2½
1'-1¼
3-3¾

1'-1¼"
1'-7¼
-5
3'-3½
1'-1¾"

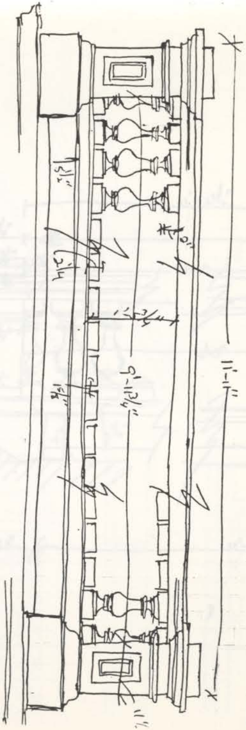




Andrew Curotis
Villard Hall Porch
Restoration Project
3/27/87

Measurement of proposed balustrade from building to outside corner of balustrade pedestal across to N E pedestal and back to building at pt. of engaged pedestal.

* Engaged Pedestal to outer Pedestal corner measurement was measured at a large angle (thus not extremely accurate.)

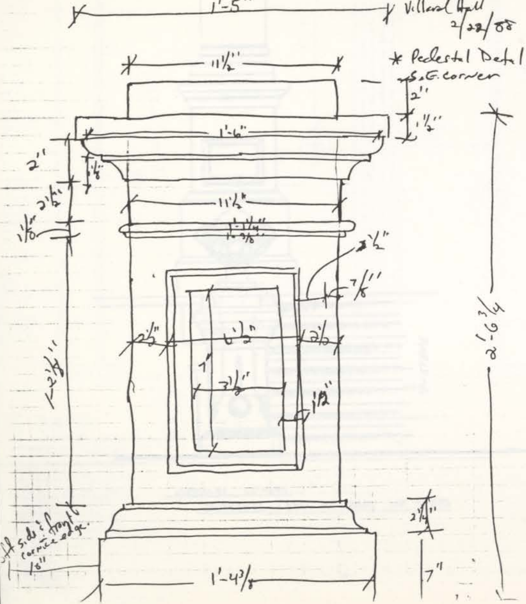


Andrew R. Curotis
Villard Hall
Documentation of
Restored upper lev.
balustrade on the
EAST Portico of
Villard Hall
2/22/88

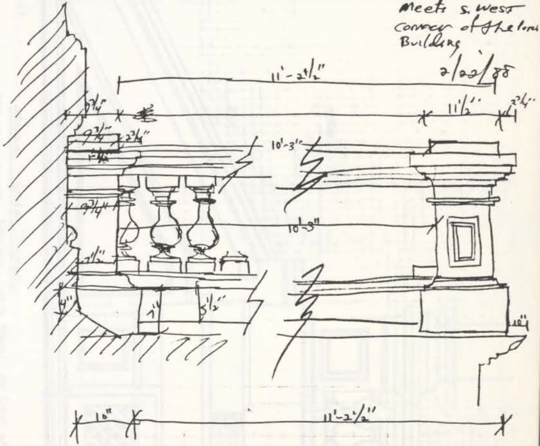
(66)

Andrew R Curtis
Villard Hall
Documentation of
Restored Upper level
Balustrade on the
East Portico of
Villard Hall
2/22/88

* Pedestal Detail *
S.E. corner



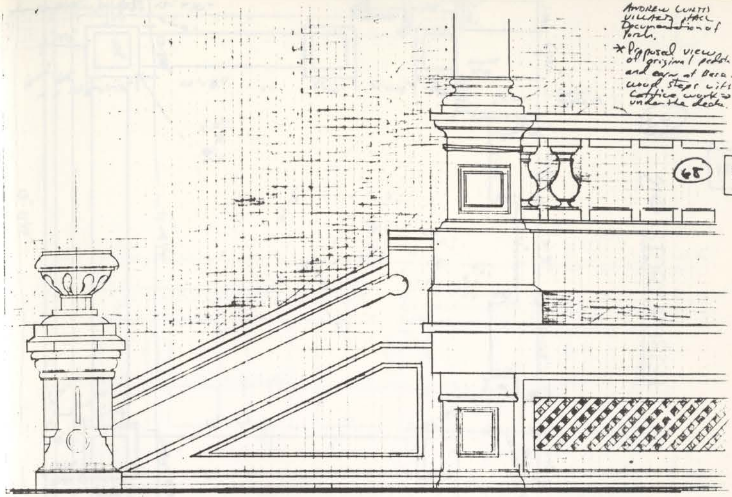
Andrew R Curtis
Villard Hall
Documentation of
Restored Engage
Pedestal and
Balustrade as it
meets S. West
corner of the Porti
Building
2/22/88



⑥⑦

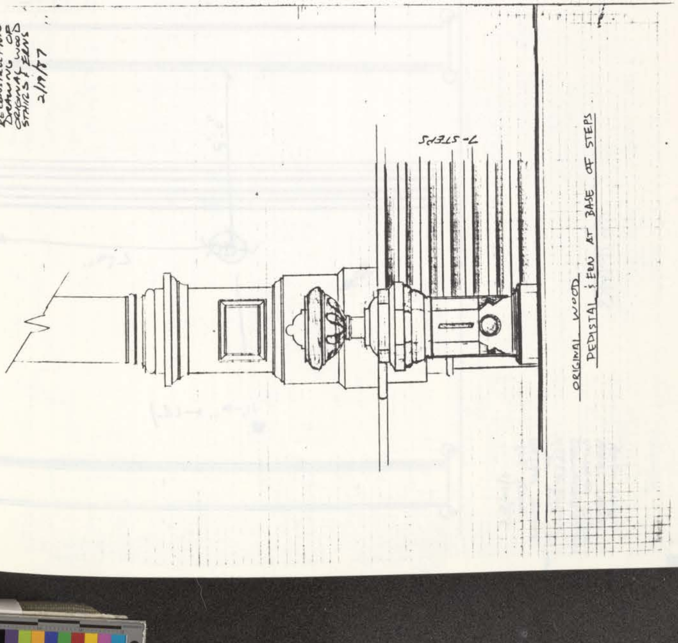
Andrew Curtis
Villard Hall
Documentation of
Porch.

* Proposal view of original pedestal and ern at Base. wood steps with lattice work under the deck.



ORIGINAL STAIR DETAIL
SHOWING WOOD PEDISTAL AND ERN AT BASE OF STEPS

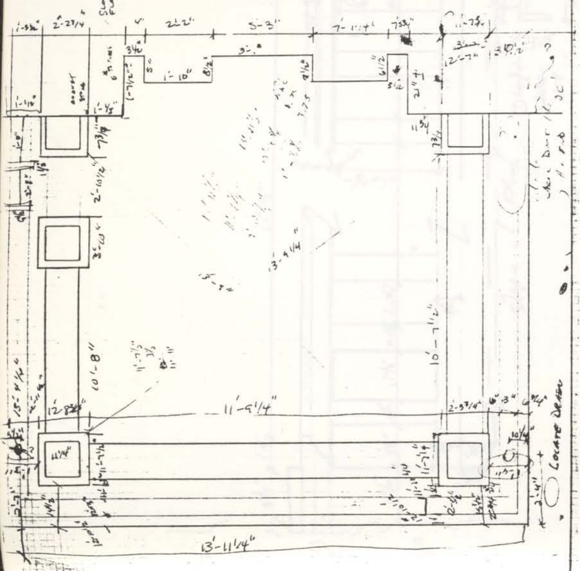
ANDREW CURTIS
NEAL VOGEL
VILLARD HALL WOOD.
DOCUMENTATION
RECONSTRUCTION
DRAWING OF
ORIGINAL WOOD
STAIRS & ERNS
2/19/87



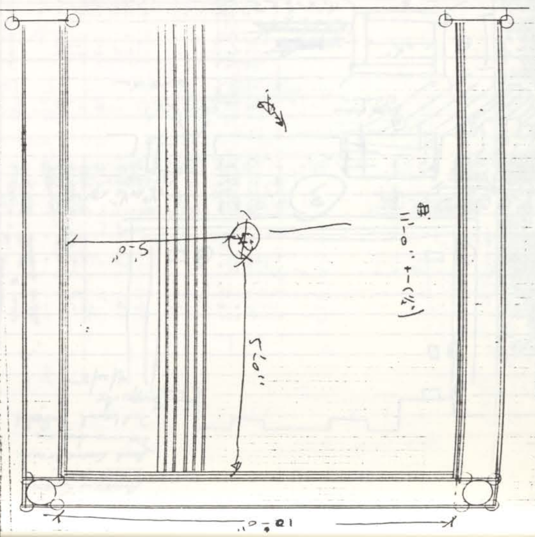
ORIGINAL WOOD
PEDISTAL & ERN AT BASE OF STEPS

(69)

2ND STORY PORCH



CEILING

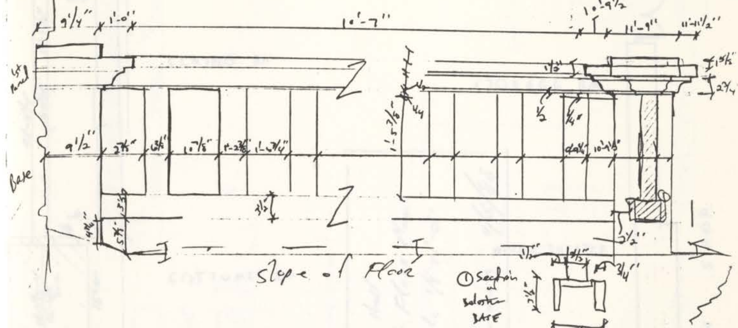


ANDY CURTIS
NEAL VOGEL
VILLARD HALL
DOCUMENTATION
UPPER FLOOR
PLAN AND CEILING
DETAIL ABOVE
1ST FLOOR.
1/30/87

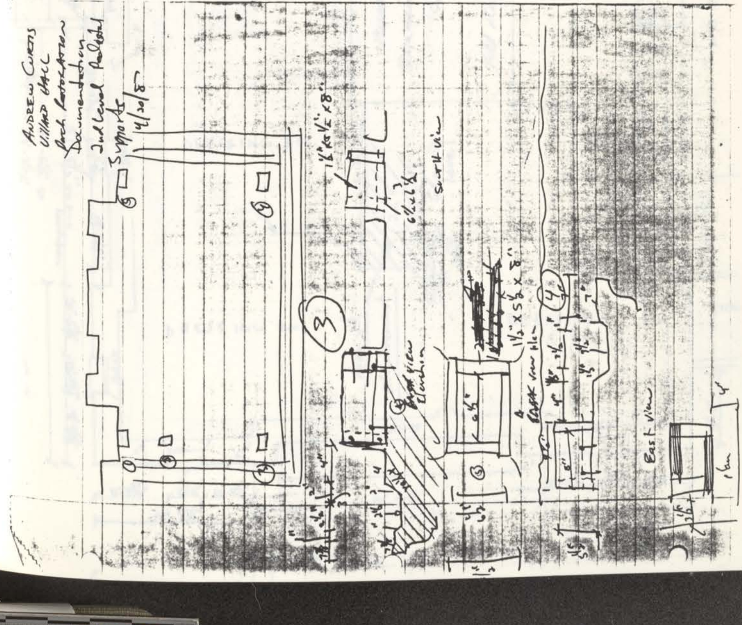
Neal Vogel
Andy Curtis
Villard Hall
Porch Documenta.
North Balustrade
(Existing on 2nd)
2/5/87

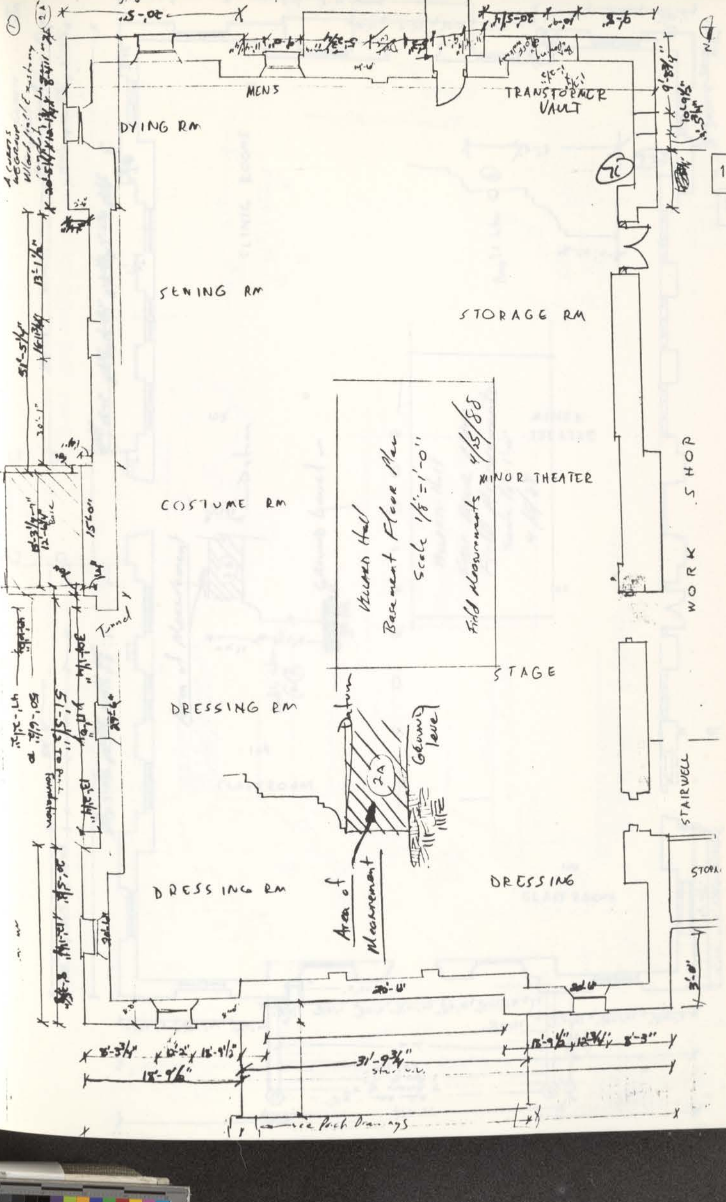
70

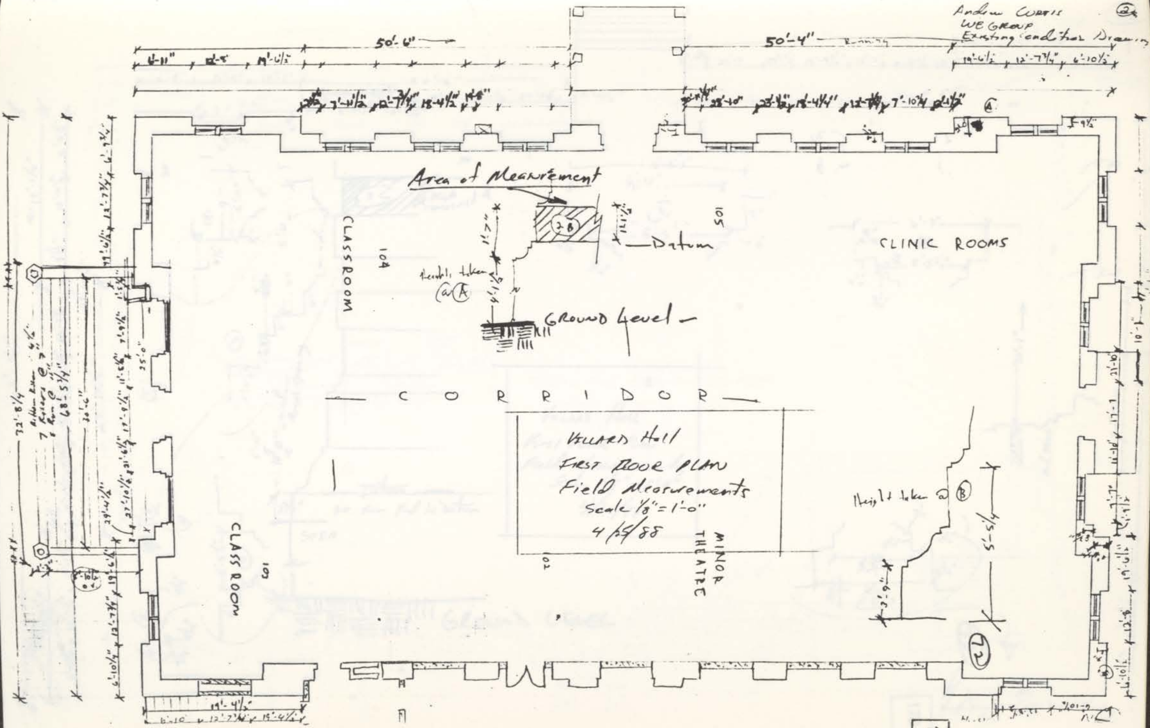
175

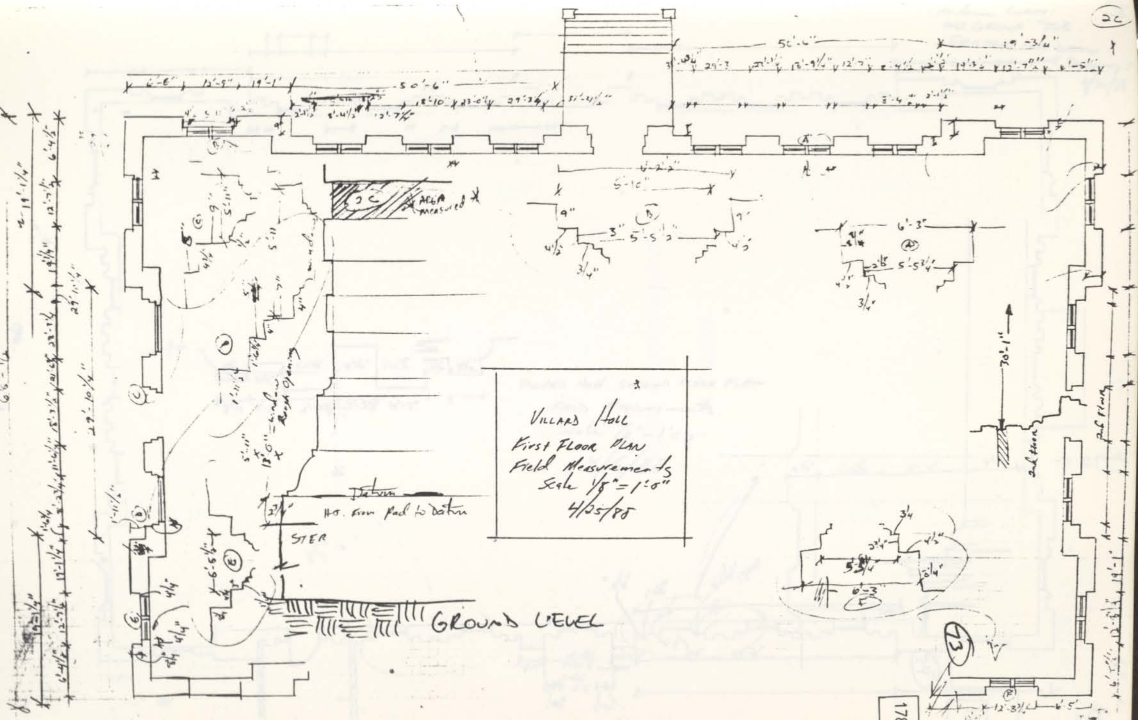


Andrew Curtis
Villard Hall
Porch Restoration
Documentation
2nd Level Pedestal
Supports
4/30/8



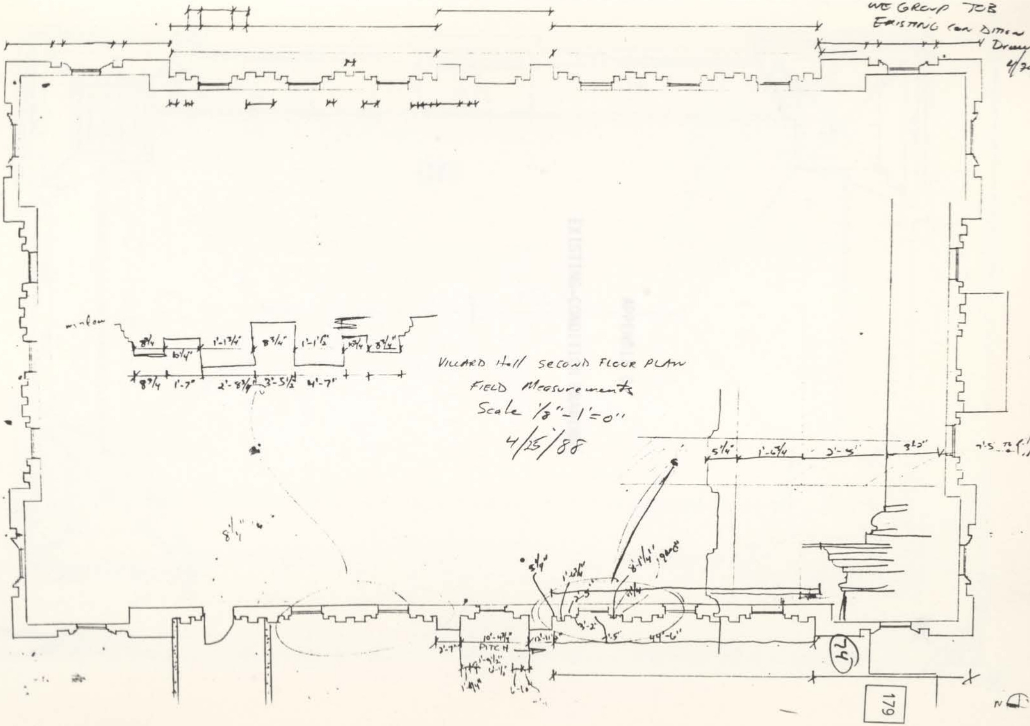

Villard Hall
Basement Floor Plan
Scale 1/8"=1'-0"
Field Measurements 4/25/88
①
2A
30'-5"
MENS
TRANSFORMER VAULT
DYING RM
SEWING RM
STORAGE RM
COSTUME RM
MINOR THEATER
WORK SHOP
Tunnel
STAGE
DRESSING RM
Datum
Ground level
2A
Area of Measurement
STAIRWELL
STORA.
DRESSING RM
DRESSING
51'-5¼"
13'-1⅞"
16'-1¾"
30'-1"
15'-0"
9'-8¾"
10'-9⅝"
3'-8"
8'-3¾"
12'-2"
15'-9½"
15'-9½"
31'-9¾"
15'-9½"
12'-3¾"
8'-3"
see Porch Drawings


Andrew Curtis
WE GROUP
Existing Condition Drawing
②
Villard Hall
First Floor Plan
Field Measurements
Scale 1/8" = 1'-0"
4/15/88
CLINIC ROOMS
105
CLASSROOM
104
CLASSROOM
103
MINOR THEATRE
102
CORRIDOR
Area of Measurement
2B
Datum
Ground Level
Heights taken @ (A)
Height taken @ (B)
(A)
(72)
50'-6"
50'-4"
6'-11"
12'-5"
19'-6 1/2"
7'-11 1/2"
12'-7 3/4"
18'-4 1/2"
14'-8"
19'-6 1/2"
12'-7 3/4"
6'-10 1/2"
7'-10 3/4"
9 1/2"
72'-8 1/4"
68'-5 3/4"
30'-6"
25'-0"
7 Risers @ 7"
8 Runs @ 11"
6'-10 1/4"
12'-7 3/4"
19'-6 1/2"
29'-4 1/2"
27'-10 1/2"
21'-6 1/2"
17'-9 1/2"
11'-5 1/2"
7'-9 1/2"
1'-5 1/2"
19'-4 1/2"
6'-10
12'-7 3/4"
5'-5 1/4
3'-6"
10'-1"
12'-10"
17'-1
11'-10"
7'-7"
19'-6"
12'-8


2C
Villard Hall
First Floor Plan
Field Measurements
Scale 1/8" = 1'-0"
4/25/85
GROUND LEVEL
Datum
Ht. from Pad to Datum
STEP
Area measured
2C
Rough Opening
13'-0" window
50'-6"
50'-6"
68'-1/2"
29'-10 1/2"
19'-3/4"
30'-1"
2nd floor
6'-3"
5'-5 3/4"
5'-5 1/2"
5'-10"
6'-2 1/2"
6'-5 1/2"
12'-3 3/4"
6'-5"
73

(3)

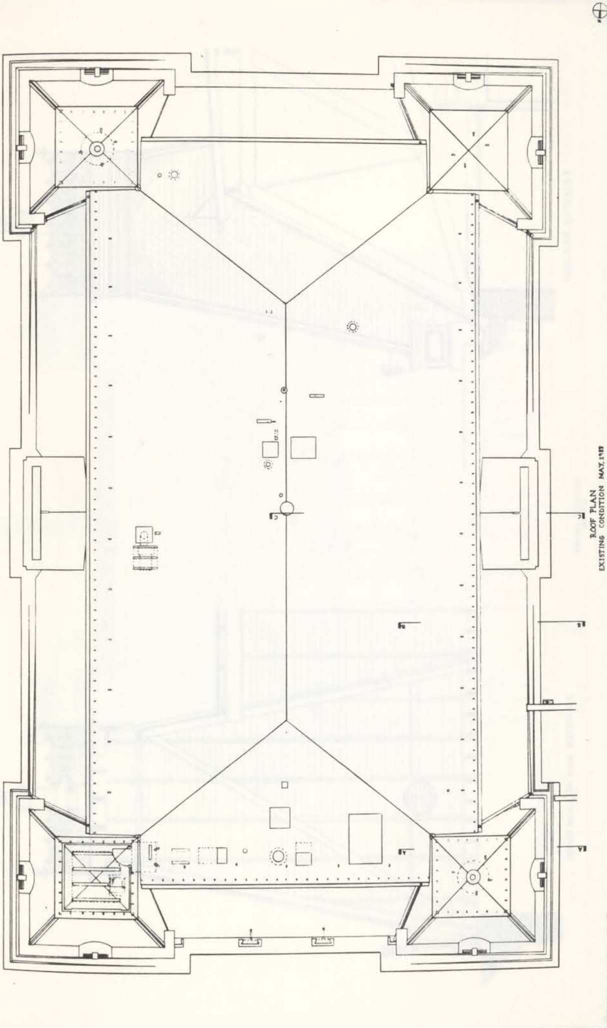
Andrew Watts
WE Group JOB
Existing Condition Drawings
4/22/88



VILLARD Hall SECOND FLOOR PLAN
FIELD Measurements
Scale 1/8" - 1'=0"
4/25/88

APPENDIX C

EXISTING-CONDITION DRAWINGS



ROOF PLAN
EXISTING CONDITION MAY, 1988

DRAWN BY ANDREW R. CVETTS MAY, 1988

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

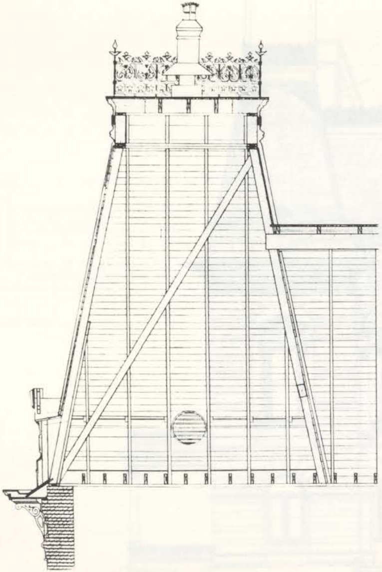
VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

EUGENE, OREGON

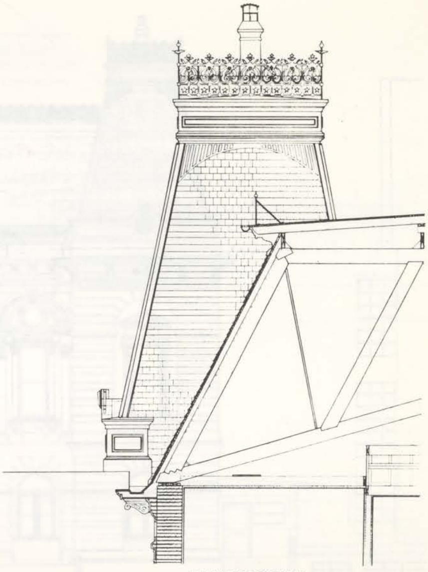
SCALE:
1/4"=1'-0"

ROOF PLAN
EXISTING CONDITION

SHEET 1
OF 1



CORNER PAVILLION ROOF SECTION C-C



MAIN ROOF SECTION B-B

EXISTING CONDITION
MAY 1988

DRAWN BY ANDREW R. CURTIS MAY 1988 FOR [illegible] ARCHITECTS & PLANNERS

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

VILLARD HALL
KINCAID STREET BETWEEN EAST 11TH & 12TH
UNIVERSITY OF OREGON CAMPUS
EUGENE, OREGON

SCALE: 1/2"=1'-0"

PAVILLION & MAIN ROOF SECTIONS
EXISTING CONDITION

SHEET 3 OF 4

NORTH ELEVATION
EXISTING CONDITION

DRAWN BY ANDREW R. CURTIS MAY 1978 FOR [illegible] ARCHITECTS & PLANNERS

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

EUGENE, OREGON

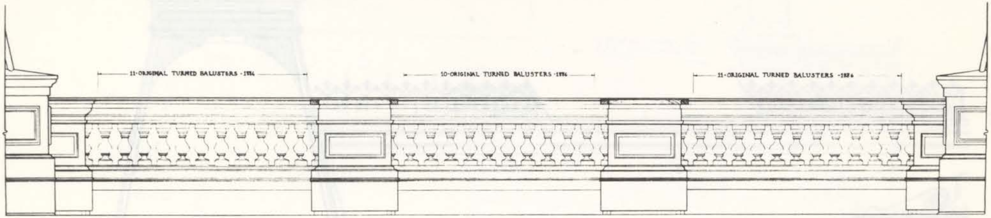
SCALE
1/4"=1'0"

NORTH ELEVATION
EXISTING CONDITION

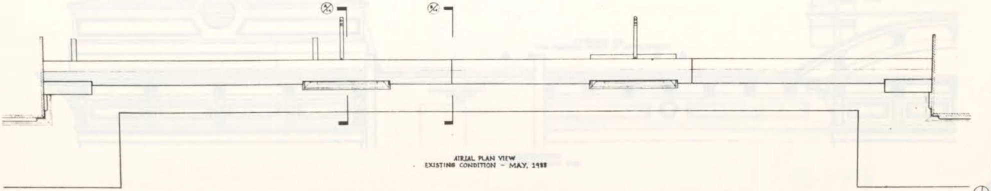
SHEET 4
OF 4

EVIDENCE FOR 1949 REMODELING

- PEDESTALS REBUILT USING 1" PLYWOOD FOR ALL EXTERIOR SURFACES
- FLAT PROFILES OF MOULDINGS ARE IDENTICAL TO THOSE FOUND ON THE REMODELED EAST PORCH PEDESTALS - 1949
- TOP RAIL OF BALUSTRADE SHOWS NO EVIDENCE OF URN POINT OF ATTACHMENT
- 11-10-11 RHYTHM OF TURNED BALUSTERS IS NOT OBSERVED IN HISTORIC PHOTOGRAPHS



ELEVATION
EXISTING CONDITION - MAY, 1988



AIRIAL PLAN VIEW
EXISTING CONDITION - MAY, 1988

DRAWN BY ANDREW R. CURTIS MAY 1988

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

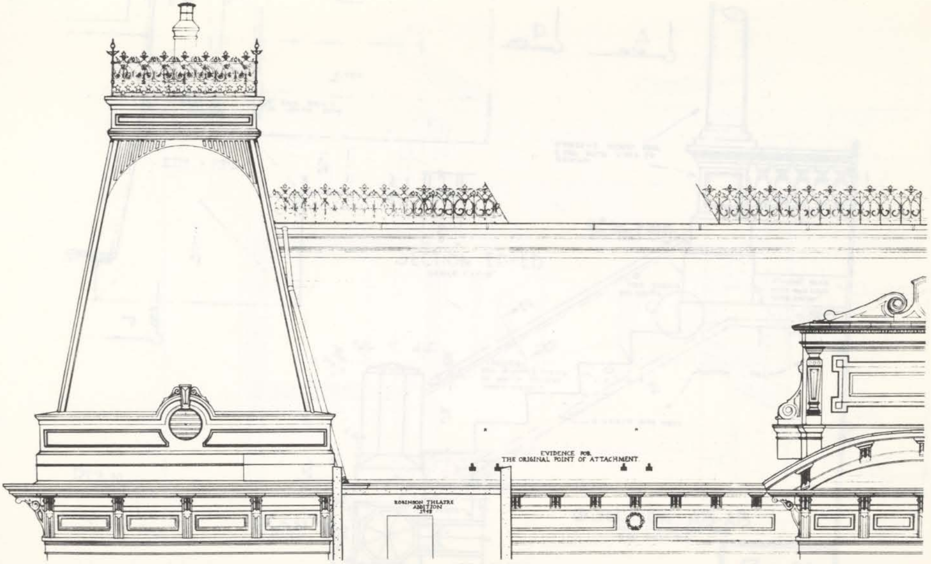
VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

EUGENE, OREGON

SCALE:
1"=1'-0"

NORTH BALUSTRADE ABOVE CORNICE
ELEVATION AND PLAN

SHEET 6
OF 9



WEST ELEVATION
EXISTING CONDITION MAY, 1988

DRAWN BY ANDREW R. CURTIS MAY 1988

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

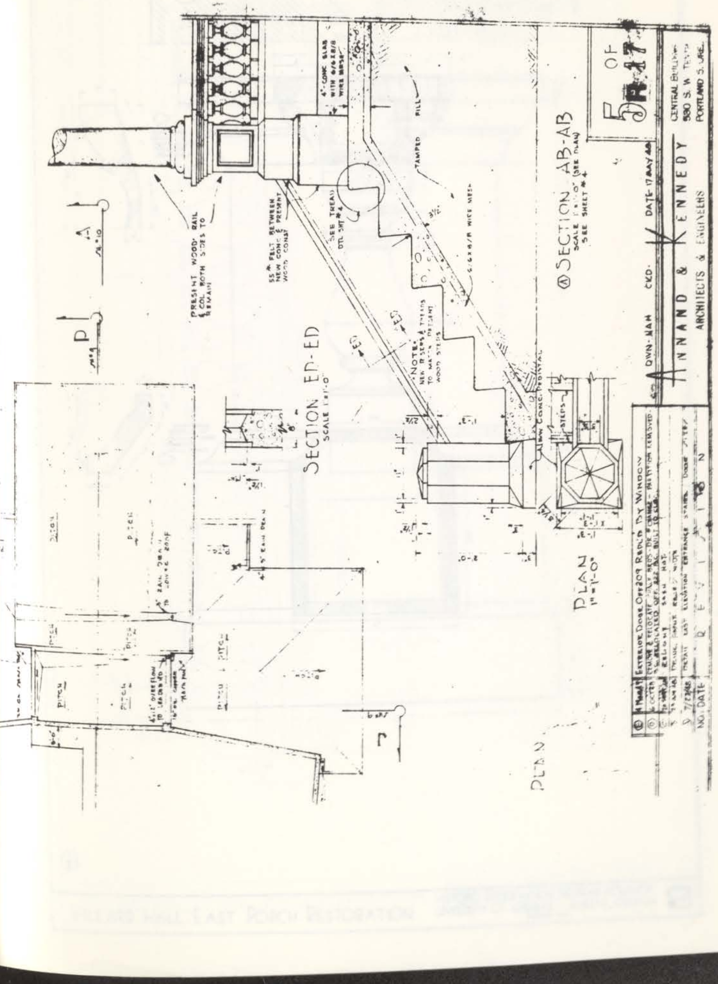
VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

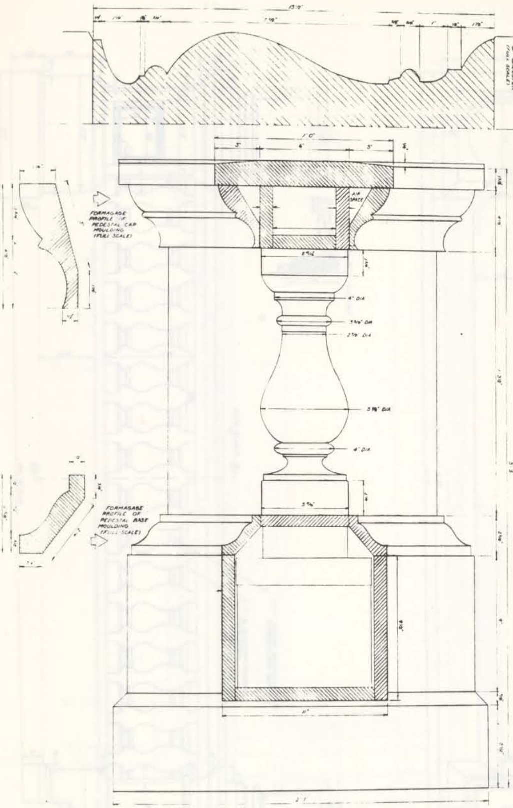
EUGENE, OREGON

SCALE:
1/2"=1'-0"

EXISTING CONDITION
WEST ELEVATION

SHEET 8
OF 9

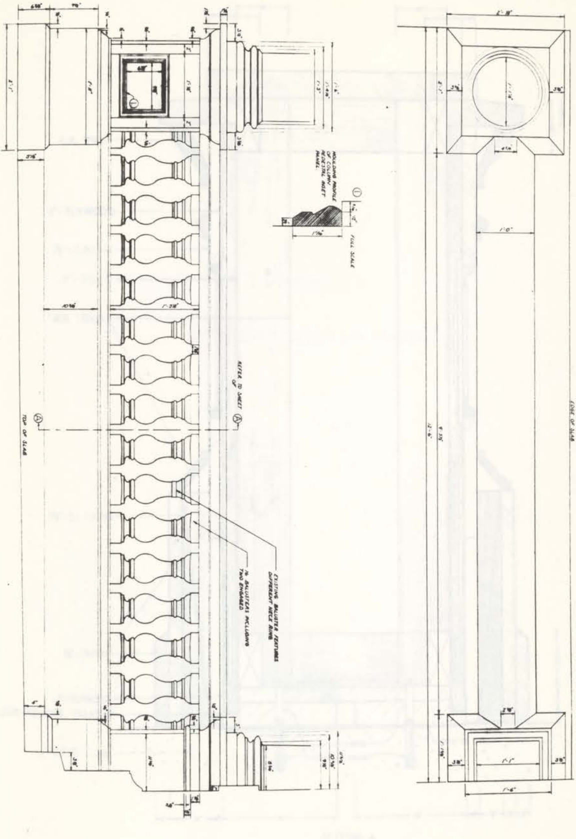

PRESENT WOOD RAIL & COL BOTH SIDES TO REMAIN
4" CONC SLAB WITH 6/6 x 8/8 WIRE MESH
TAMPED FILL
SEE TREAD DTL SHT #4
55# FELT BETWEEN NEW CONC & PRESENT WOOD CONST
6/6 x 8/8 WIRE MESH
NOTE: NEW RISERS & TREADS TO MATCH PRESENT WOOD STEPS
NEW CONC PEDISTAL
STEPS
SECTION ED-ED
SCALE 1"=1'-0"
SECTION AB-AB
SCALE 1"=1'-0" (SEE PLAN)
SEE SHEET #4
PLAN
1"=1'-0"
PLAN
PITCH
4 1/2" OVERFLOW TO LEADER
4" RAIN DRAIN TO LOWER ROOF
5" RAIN DRAIN
5 OF 17
DWN. NAM
CKD.
DATE 17 MAY 48
ANNAND & KENNEDY
ARCHITECTS & ENGINEERS
CENTRAL BUILDING
530 S. W. TENTH
PORTLAND 5, ORE.
EXTERIOR DOOR OFF 209 REPL'D BY WINDOW
REMOVE & RELOCATE ... PARTITION REMOVED
BALCONY
DETAIL EAST ELEVATION ENTRANCE STAIRS DOOR
NO. DATE
REVISION



VILLARD HALL EAST PORCH RESTORATION

HISTORIC PRESERVATION PROGRAM WORKSHOP
UNIVERSITY OF OREGON · EUGENE, OREGON
FEBRUARY 1987

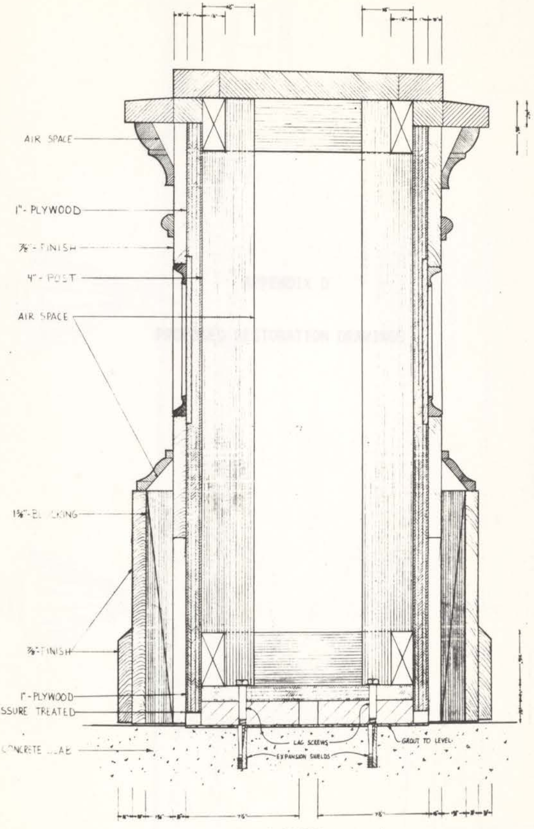
E-2



VILLARD HALL EAST PORCH RESTORATION

HISTORIC PRESERVATION PROGRAM WORKSHOP
UNIVERSITY OF OREGON EUGENE, OREGON
FEBRUARY [illegible]

E-3



SECTION A

COLUMN PEDESTAL

CONSTRUCTION DETAIL

SCALE: 0-6" • 1'-0"

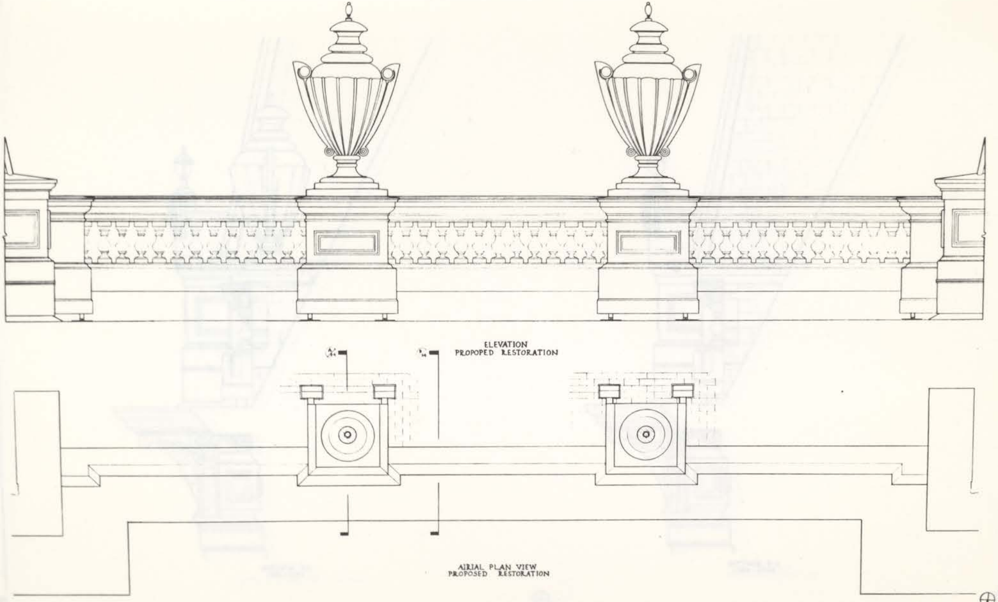
VILLARD HALL EAST PORCH RESTORATION

HISTORIC PRESERVATION PROGRAM WORKSHOP
UNIVERSITY OF OREGON · EUGENE, OREGON
DRAWN BY ANDREW CURTIS FEBRUARY 1987

P-3

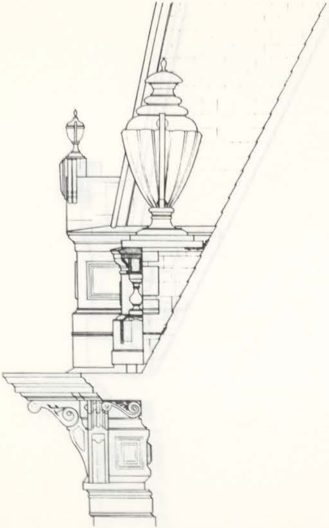
APPENDIX D

PROPOSED RESTORATION DRAWINGS

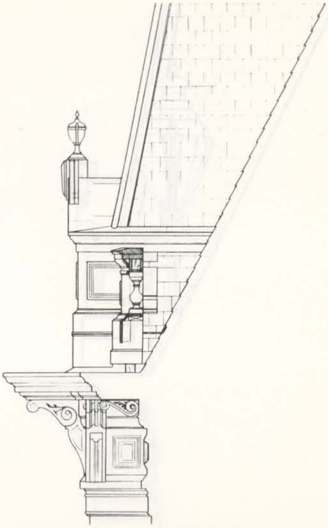


DRAWN BY ADRIAN R. CURTIS MAY 1988

TERMINAL PROJECT UNIVERSITY OF OREGON HISTORIC PRESERVATION PROGRAM	KINCAID STREET BETWEEN EAST 11TH + 12TH VILLARD HALL UNIVERSITY OF OREGON CAMPUS EUGENE, OREGON	SCALE: 1"=1'-0"	NORTH BALUSTRADE ABOVE CORNICE ELEVATION AND PLAN	SHEET 1 OF 3



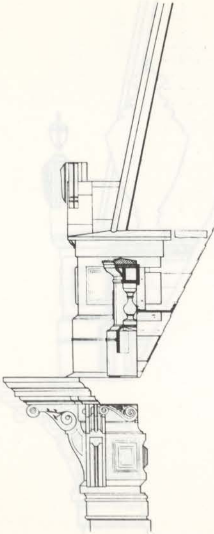
SECTION B-1
1885 - 1904



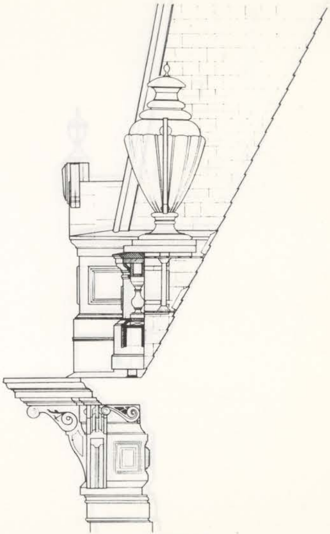
SECTION B-2
1904 - 1948

DRAWN BY ANDREW B. CURTIS MAY [illegible]

TERMINAL PROJECT UNIVERSITY OF OREGON HISTORIC PRESERVATION PROGRAM	VILLARD HALL KINCAID STREET BETWEEN EAST 11TH & 12TH UNIVERSITY OF OREGON CAMPUS EUGENE, OREGON	SCALE: 1"=1'-0"	MAIN CORNICE/BALUSTRADE SECTION NORTH ELEVATION	SHEET 2 OF 8



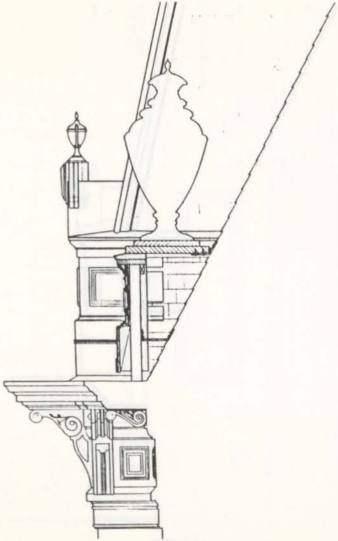
SECTION B-3
EXISTING CONDITION MAY, 1988



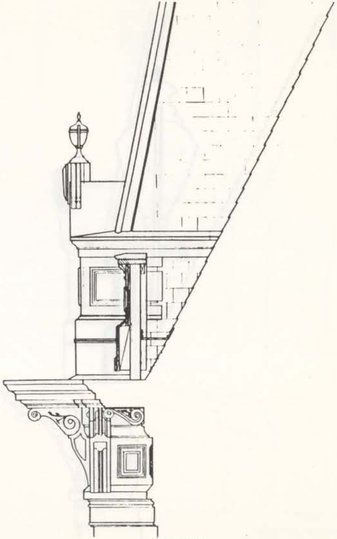
SECTION B-4
PROPOSED RESTORATION

DRAWN BY ANDREW R. CURTIS MAY 1988

TERMINAL PROJECT UNIVERSITY OF OREGON HISTORIC PRESERVATION PROGRAM	VILLARD HALL KINCAID STREET BETWEEN EAST 11TH & 12TH UNIVERSITY OF OREGON CAMPUS EUGENE, OREGON	SCALE: 1"=1'-0"	MAIN CORNICE/BALUSRADE SECTION NORTH ELEVATION	SHEET 3 OF 9



SECTION A-1
1885 - 1904
THRU PEDESTAL



SECTION A-2
1904 - 1948
THRU PEDESTAL

DRAWN BY ANDREW B. CURTIS MAY [illegible]

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

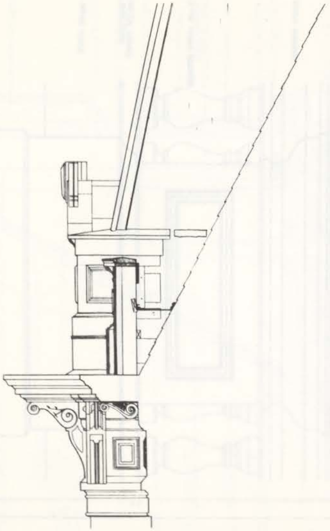
VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

EUGENE, OREGON

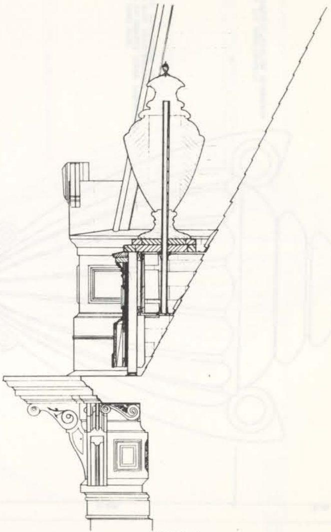
SCALE:
1"=1'-0"

MAIN CORNICE/BALUSTRADE SECTION
NORTH ELEVATION

SHEET 4
OF 8



SECTION A-3
EXISTING CONDITION MAY, 1988



SECTION A-4
PROPOSED RESTORATION

DRAWN BY ANDREW R. CURTIS MAY 1988

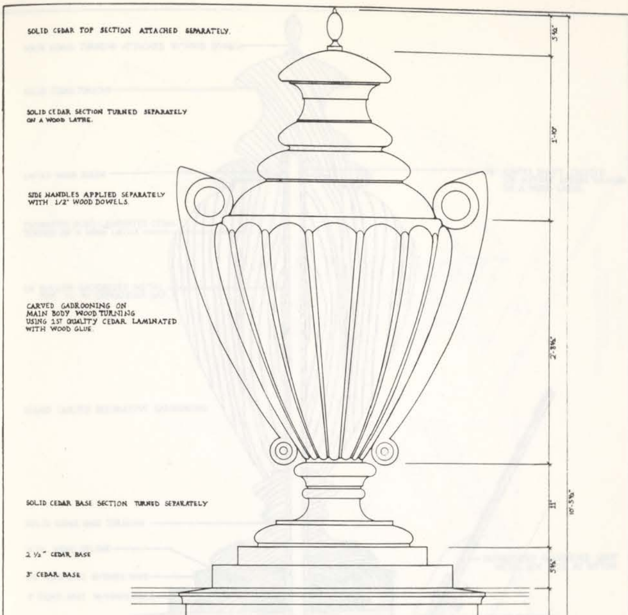
TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

VILLARD HALL
KINCAID STREET BETWEEN EAST 11TH & 12TH
UNIVERSITY OF OREGON CAMPUS
EUGENE, OREGON

SCALE:
1"=1'-0"

MAIN CORNICE/BALUSTRADE SECTION
NORTH ELEVATION

SHEET 5
OF 8



URN / BALUSTRADE ELEVATION
(PROPOSED)

TERMINAL PROJECT
UNIVERSITY OF OREGON
HISTORIC PRESERVATION PROGRAM

KINCAID STREET BETWEEN EAST 11TH & 12TH

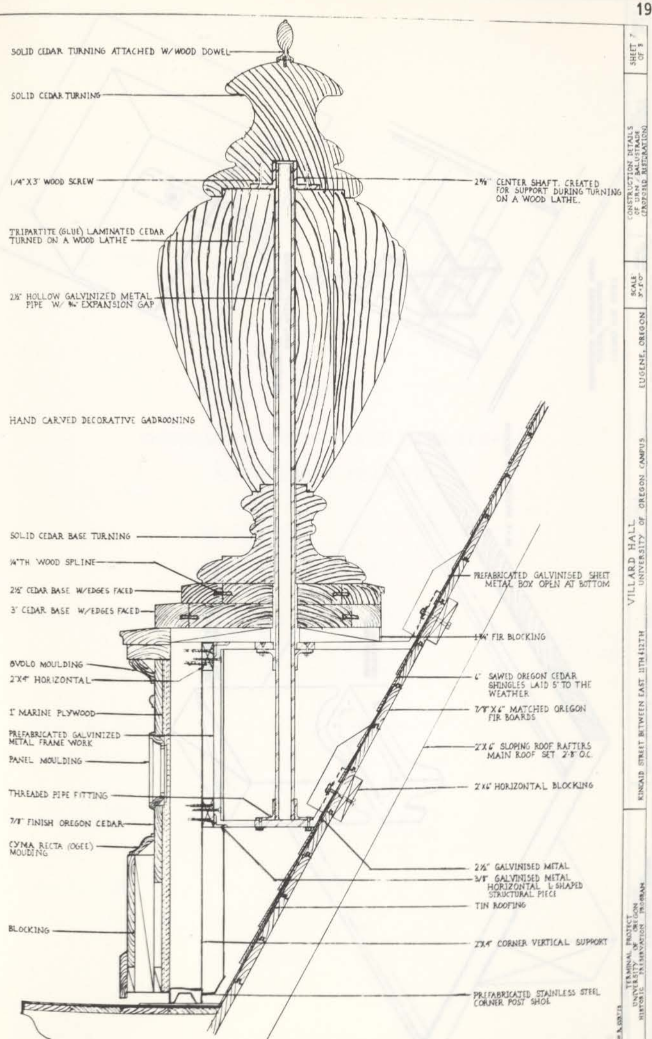
VILLARD HALL
UNIVERSITY OF OREGON CAMPUS

EUGENE, OREGON

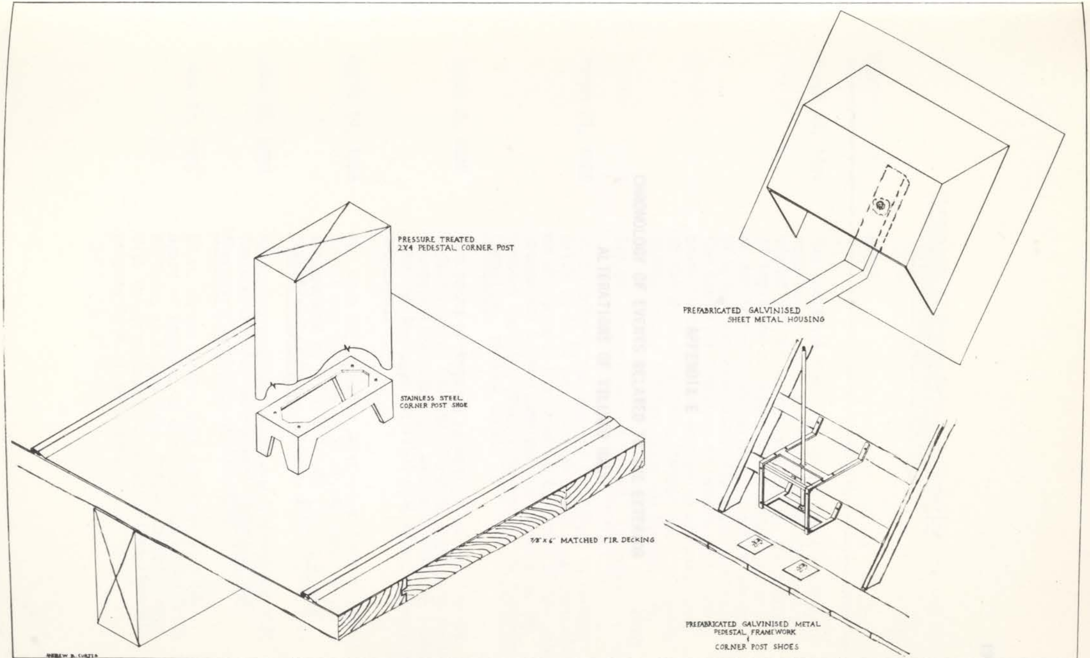
SCALE:
3"=1'-0"

URN / BALUSTRADE ELEVATION
(PROPOSED)

SHEET 6
OF 8



SECTION A-4
CONSTRUCTION DETAILS
OF URN / BALUSTRADE
(PROPOSED RESTORATION)



ANDREW B. CURTIS

TERMINAL PROJECT UNIVERSITY OF OREGON HISTORIC PRESERVATION PROGRAM	VILLARD HALL KINCAID STREET BETWEEN EAST 11TH & 12TH UNIVERSITY OF OREGON CAMPUS EUGENE, OREGON	SCALE SKETCHES	FRAMING DETAILS BALUSTRADE PEDESTALS (PROPOSED RESTORATION)	SHEET F OF 8

APPENDIX E

CHRONOLOGY OF EVENTS RELATED TO THE EXTERIOR ALTERATIONS OF VILLARD HALL

Chronology of Events Related to Exterior Alterations of Villard Hall

DATE	EVENT
March 13, 1884	The Executive Committee of the Board of Regents reported to the Board on 13 March 1884 that the sum of $30,000 appropriated by the Legislature of the State of Oregon for the construction of an additional brick building at the University of Oregon was available. The Board authorized the Executive Committee to receive plans for a brick building to be erected on the north side of the present building (Deady) which was to be approximately 120-feet long and 80-feet wide, two-stories high, with a basement--to cost about $25,000 (Regents Annual Report: 1885-1914).
March 25, 1885	J. S. McMurry was awarded a contract to furnish brick at $8.50 per thousand actual-count delivered on the ground, the brick to be burned on the same ground and by the same parties as those in the present building (Deady) (Report of the Executive Committee, 18 June 1885).
April 8, 1885	The Board of Regents approved plans for the new building which had been drawn by architects Justus Krumbein (1847-1907) and Warren H. Williams (1844-1888) of Portland ("Villard Hall File," University Archives).
April 14, 1885	Mr. Lord Nelson Roney selected as Superintendent of the new building at $4.00 per day. He was recommended by W. H. Williams (Report of the Executive Committee, 18 June 1885).
June 18, 1885	Plans and specifications were finished and bids for construction were opened (Report of the Executive Committee, 18 June 1885).
June 22, 1885	W. H. Abrams enters into agreement with the Board of Regents, to erect and complete a Brick Building at Eugene City, Oregon, in conformity with specifications and drawings made for this purpose by W. H. Williams.

It was further agreed that the brickwork should be performed by William Palmer of Portland, Oregon (Report of the Executive Committee, 18 June 1885).

July 16, 1885

The Regents awarded a $1,200 contract to Chase and Niles of Portland to install a heating system in the building (Report of the Executive Committee, 5 March 1886).

July 28, 1885

A metal casket (containing 82 items of historical interest) was deposited under the northeast cornerstone during an elaborate ceremony (Oregon State Journal, 1 August 1885).

September 20, 1885

John Barrett of Portland was employed to do all the necessary plumbing for the building (Report of the Executive Committee, 5 March 1886).

October 1, 1885

Benjamin F. Dorris was employed to construct a 500-gallon iron water tank in each of the north towers (Report of the Executive Committee, 5 March 1886).

Cherry and Parks of Albany were awarded the contract to supply $448 worth of iron crestings for the roof of the building.

P. H. Farrell, corner stone..............$	17.25
D. Mackey, ten brackets..................	25.00
J. B. Rinehart, extra painting...........	100.00
H. Perrin, sidewalk and yard.............	50.00
C. F. Johnson, sidewalk and yard.........	22.50
Pengra, Wheeler, and Company, lumber.....	205.00
Robinson and Church, nails...............	21.10

[Total Cost of Building = $2,536.35]

(Report of the Executive Committee, 5 March 1886).

March 15, 1888

The Board of Regents unanimously adopted a resolution to name the new building "Villard Hall" in honor of Henry Villard (railroad builder and philanthropist) in appreciation for his generous gifts to the University.

June 17, 1886

The Executive Committee agreed to pay the claim of W. H. Abrams' contracts for $250.00, for false works mistakenly omitted from the original bid (Report of the Executive Committee, 17 June 1886).

The recommendation was that the outside of Villard Hall be painted, if there were sufficient funds in the improvement fund to so do.

A further recommendation was made that the old building (Deady) be cemented or painted and sanded.

June 24, 1892

The Executive Committee reported to the Board of Regents that three coats of paint and two coats of sand had been applied to the exterior of the building ("Villard Hall File," University Archives).

The State Legislature appropriated the sum of $5,500 for repairs of the University building, pursuant to the report of a special committee.

Warrants amounting to $5,459 were drawn, and the sum was expended by the Executive Committee as follows:

D. M. McCready, painting.................	$1,396.75
Luckey and Company, paints...............	1,162.71
Starr and Griffin, tin roofing...........	975.00
Bigelow and Kirkpatrick, mill work.......	235.05
Upper Wallamet Company, lumber...........	397.04
J. M. Hendricks, cement and sand.........	381.20
W. S. Bucknell, cementing................	135.75
Starr and Griffin and others, Hardware...	193.76
Miscellaneous work on premises...........	454.67
W. H. Alexander, superintendent..........	127.50
	=========
Total.....................	$5,459.43

(Annual Report for the State University, 24 July 1892).

1903

Date of latest historic photograph showing the urns in place on the building. Photograph found on pages 18 and 40 of the 1903 Webfoot (the University of Oregon yearbook).

1905

Date of the earliest photograph showing the urns removed from the building. Photograph found on pages 22 and 32 of the 1905 Webfoot yearbook.

January 27, 1948

The Building Committee of the State Board of Higher Education reported to the Board that

President Newburn suggested that the original building-program fund be set up for a drama unit to be used to remodel Villard Hall and for an addition to the Hall. The Board approved, and Annand and Kennedy (architects) were directed to prepare plans ("Villard Hall File," University Archives).

April 27, 1948 Plans for the Villard Hall remodeling and the University Theatre project were presented to the State Board of Higher Education by architect Annand. The Board approved the plans and recommended the advertisement for bids. The allocation for the project was $450,000.

Exterior changes to Villard Hall called for in the plans included the replacement of the wooden east-porch stairs, deck, upper balustrade, and deteriorated portions of the lower pedestals. Two windows from the west elevation were relocated to the north entrance where they flanked the centrally-located main-entrance door. A door was added at the ground level in the center of the south elevation. Several of the engaged blind-dormer and corner-tower base pedestals were rebuilt with plywood. The original roof-line balustrading was removed completely--except for a section on the north elevation, which was replaced with historically inaccurate details similiar to those found on the east porch prior to the Historic Preservation Program Workshop's restoration during Spring Term 1987 (see "Existing-Condition Drawings" at the University of Oregon Physical Plant).

Additional changes included the addition of a visually obtrusive white metal box located at the top of the northeast corner tower, which houses a microwave dish, several inappropriate air ducts, and two radio towers.

The addition of the theatre has completely blocked off the view of the west elevation. Several wooden sculptural pieces were removed from the semicircular pediment on this elevation. The oak-leaf carvings were located in the prop room below the theatre workshop and the large oval

	Oregon State Seal was located in the University Archives.
1950	Period of major roof repairs on campus. It was possibly at this time that Villard Hall's main roof was covered with roofing tar and a cornice-gutter system relined with fiberglass matting and tar.
1910-1976	Growth of Virginia Creeper Ivy during this time period completely enshrouded the building.
January 8, 1976	Wegroup PC Architects and Planners brought the building up to fire-safety codes with a set of safety-deficiency correction drawings. The plans called for the installation of a sprinkler system and catwalk in the attic of Villard Hall (plans are available from the Physical Plant).
June 8, 1977	Villard and Deady Halls were designated as National Historic Landmarks during a special ceremony on campus.
November 2, 1985	Time capsule reopened by Ronald E. Sherriffs, Professor of Speech, and K. Keith Richard, University Archivist.
Spring 1987	Villard east-porch restored by students in the Historic Preservation Program Workshop under the direction of Adjunct Assistant Professor Greg Olson. Professors Philip H. Dole, Donald L. Peting, and Michael E. Shellenbarger critiqued the existing-condition drawings and proposed that restoration drawings be completed by Andrew R. Curtis and Neal Vogel during Winter Term (plans are available from the Physical Plant).
Winter 1988	Villard Hall Restoration Project: Special Project. Professor Donald L. Peting leads a group of Historic Preservation Program Workshop students in an investigation of the exterior condition of the building. Students produced a survey of architectural elements with recommendations for restoration (entitled "Fragments of Villard Hall").
Spring 1988	Andrew R. Curtis was employed by Professor Donald L. Peting to produce a complete set of

existing-condition drawings in conjunction with work in progress on a Terminal Project for the restoration of the urn/balustrade system on Villard Hall. The drawings will appear in the *Historic Structures Report* being produced by Professor Peting (in consultation with Wegroup PC Architects and Planners) and prepared for the University of Oregon Physical Plant.

APPENDIX F

EXCERPTS FROM THE ORIGINAL SPECIFICATIONS FOR VILLARD HALL

Excerpts From the Original Specifications for Villard Hall

Approved June 22, 1885

by

University of Oregon Board of Regents

Specifications of Materials and Labor required to erect and complete a two-story Brick Building, at Eugene, Oregon, for the Oregon State University.

General Remarks

Dimensions all to be in strict conformity with the drawings made for the purpose by W. H. Williams, Architect: together with the figures thereon presented. Figured dimensions to take precedence of the scale, whenever the same do not agree. The Regents will furnish all brick required for this work, the contractor to pay for the same at the rate of Eight and one-half ($8.50) dollars per thousand, kiln count, delivered on the premises. The Regents will also furnish, at their own expense, the iron cresting for the roofs, the contractor to set the same. Contractor will furnish the balance of material of whatsoever kinds, and perform all the various kinds of labor required to complete the work hereinafter specified. All of the materials of their several kinds to be of the best quality, and all of the work to be done in a good, substantial and workmanlike manner, and to the full and entire satisfaction of the aforesaid W. H. Williams. Upon completion, all floors and stairs to be left broom clean, and all refuse, implements, etc., to be removed from the premises, and every part and portion of the work to be completed and in perfect order upon delivery and acceptance.

Mason Work

Foundation walls, from the bottoms of the footing courses to the surface of the ground, as shown on the drawings, to be brick of rubble stone (Smith's Rock). The balance of the walls, as shown on the drawings, to be built of brick, thoroughly wetted, and laid up in the style termed shoved up, so that all joints are thoroughly filled with mortar. The two (2) furnace flues, built as shown on drawings, with smooth joints on the inside, and topped out as shown on drawings, with select burnt square brick, neatly pointed on the outsides. (See "Wrought Iron Work.") Ventilating flues to be 4" × 16" in clear, pargeted smooth inside, and to open out at tops, at back of parapet wood pedestals. Mortar for all. . . . The two (2) tablets of front parapets will be built of brick, the balance of the parapets will be of wood. Furnish and set thirty two (32) stone (Gully's Springfield Stone) blocks, 36" × 36" × 8"-square, hammered on the four (4) sides and bottoms, and patent hammered on the top faces. (See "General Remarks.")

Framework

Main roof formed with trusses, as shown on drawings. Deck and sloping rafters of main roof to be 2" × 6" set 2'-8" apart on centers. Tower roofs framed with 3" × 8" hip rafters and plates, and 2" × 6" jack rafters, set 2'-8" apart on centers. . . .

Outside Wood Finish

Porches to be floored over, on proper frames, with 1-3/8" × 4" edge-grained matched flooring, laid with white lead in the joints. Ceilings of the porches ceiled with 7/8" × 4" matched and beaded boards. Pedestals, columns, pilasters, cornice balustrades, etc., as per drawings. Outside steps built with 1-3/4" treads and 1-1/8" risers, on proper strings. Buttresses as per drawings. Top member of second-story belt, all of the main cornices of towers and center projections of two (2) main longitudinal fronts (Except architraves), the balance of the main cornices (Except friezes and architraves), parapets of the four (4) fronts (Except the two (2) tablets), and the second-story windows caps of the four (4) towers to be of wood. Coping, ornamental work, and figures of the two (2) tablets also to be of wood. Main cornices and second-story belts to be of wood. Main cornices and second-story belts to be secured to 1-1/2" rough brackets, built into the walls 2'-6" apart on centers. Woodwork of the parapets to be secured with wrought iron knees. Rough framing, flooring and ceiling of the above-specified work, to be of Fir. The balance of the above to be of Cedar. All of first-quality seasoned Oregon woods, planed smooth on all exposed faces, and mouldings fine run.

Roofing, Etc.

All of the roofs, including porches, and tops of the Main cornices and second-story belts, to be covered with second-quality seasoned 7/8" × 6" Matched Oregon fir boards, laid in courses and blind-nailed to each rafter and bracket. Heading courses properly broke, smoothed flush and through nailed, setting the nails. Decks of main and tower roofs, tops of main cornices, second-story belts and window caps and the porch roofs to be tinned over in the best manner. Tin flashings fixed around chimneys and scuttle well. Scuttle lid properly tinned over. Valleys of main roof properly lined with tin. Tin shingle flashings behind hip mouldings of tower roofs. All of the tin for the above to be of best quality I.L. Charcoal tin. All roofing properly cleated, nailed and soldered, using rosin and no acid, and the rosin to be thoroughly cleaned off before being painted. Valley linings to have two (2) good heavy coats of metallic red paint, on both sides, before being laid in. Slopes of the main and tower roofs to be shingled over with best-quality dimension (6" width) sawed Oregon cedar shingles, laid five (5) inches to the weather and thoroughly nailed. All of the fasciae and hip mouldings of the main and tower roofs to be of first-quality seasoned Oregon cedar, planed smooth on all exposed faces and mouldings fine run. Tops and sides of tablets and lower louver-board windows to be tinned over. Gutters formed on tops of main cornice as directed. One (1) 20" No. 16 galvanized iron ventilator, 3'-0" high, placed in the center of main roof. All of the above to be made perfectly watertight and warranted so for (1) year. Furnish and set four (4) 4" No. 20 galvanized-form leaders to lead water from main roof to ground. Furnish and set (1) 2" tin leader, to each porch, to lead water to the ground. (See "Stairs, Etc.")

APPENDIX G

EXCERPTS FROM THE ORIGINAL SPECIFICATIONS FOR A DWELLING HOUSE IN ALBANY

Excerpts From the Original Specifications for a Dwelling House in Albany

Specifications of Materials and Labor required to erect and complete a Dwelling House on the parcel of land situated on the northeast corner of Ferry and Seventh Streets, Albany, Oregon, for S. E. Young, Esquire.

Roofing, Etc.

Roofs to be sheathed with second-quality 7/8" × 6" matched boards, laid in courses and blind-nailed to each rafter and shingled over with best-quality 6" width dimensions sawed Oregon Cedar shingles laid 4-1/2" to the weather and thoroughly nailed. Hips and valleys and gutters all lined with tin flashing fixed around all chimney over the heads of all outside openings and where the . . . and roofs butt against. . . . Porch roofs sheathed and shingled (except balcony) same as main with tin-lined gutters.

Sheathing planed off smooth on top and to be covered with No. 6 Hydraulic canvas duck, oiled one (1) coat, stretched skintight over the roof sheathing, lapped 1-1/4" with white lead in the laps, tacked closely with "Shelton" 12-ounce tacks, oiled another coat and painted two (2) good coats of white lead oil. All oil to be raw linseed. All tin for the above work to be of best-quality I.C. Charcoal and to be painted with two coats of Princes metallic paint on both sides before being put on the building.

Cresting, saddleboard and beads, finials, cove, and gable finish all seasoned Oregon Cedar. All of the above to be made perfectly watertight and warranted so for one year.

APPENDIX H

PRESERVATION BRIEFS 16 ON SUBSTITUTE MATERIALS

16 PRESERVATION BRIEFS

The Use of Substitute Materials on Historic Building Exteriors

Sharon C. Park, AIA

U.S. Department of the Interior, National Park Service
Preservation Assistance Division, Technical Preservation Services

The Secretary of the Interior's *Standards for Rehabilitation* require that "deteriorated architectural features be repaired rather than replaced, wherever possible. In the event that replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual properties." Substitute materials should be used only on a limited basis and only when they will match the appearance and general properties of the historic material and will not damage the historic resource.

Introduction

When deteriorated, damaged, or lost features of a historic building need repair or replacement, it is almost always best to use historic materials. In limited circumstances substitute materials that imitate historic materials may be used if the appearance and properties of the historic materials can be matched closely and no damage to the remaining historic fabric will result.

Great care must be taken if substitute materials are used on the exteriors of historic buildings. Ultra-violet light, moisture penetration behind joints, and stresses caused by changing temperatures can greatly impair the performance of substitute materials over time. Only after consideration of all options, in consultation with qualified professionals, experienced fabricators and contractors, and development of carefully written specifications should this work be undertaken.

The practice of using substitute materials in architecture is not new, yet it continues to pose practical problems and to raise philosophical questions. On the practical level the inappropriate choice or improper installation of substitute materials can cause a radical change in a building's appearance and can cause extensive physical damage over time. On the more philosophical level, the wholesale use of substitute materials can raise questions concerning the integrity of historic buildings largely comprised of new materials. In both cases the integrity of the historic resource can be destroyed.

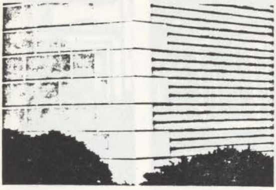
Some preservationists advocate that substitute materials should be avoided in all but the most limited cases. The fact is, however, that substitute materials are being used more frequently than ever in preservation projects, and in many cases with positive results. They can be cost-effective, can permit the accurate visual duplication of historic materials, and last a reasonable time. Growing evidence indicates that with proper planning, careful specifications and supervision, substitute materials can be used successfully in the process of restoring the visual appearance of historic resources.

This Brief provides general guidance on the use of substitute materials on the exteriors of historic buildings. While substitute materials are frequently used on interiors, these applications are not subject to weathering and moisture penetration, and will not be discussed in this Brief. Given the general nature of this publication, specifications for substitute materials are not provided. The guidance provided should not be used in place of consultations with qualified professionals. This Brief includes a discussion of when to use substitute materials, cautions regarding their expected performance, and descriptions of several substitute materials, their advantages and disadvantages. This review of materials is by no means comprehensive, and attitudes and findings will change as technology develops.

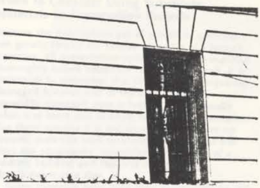
Historical Use of Substitute Materials

The tradition of using cheaper and more common materials in imitation of more expensive and less available materials is a long one. George Washington, for example, used wood painted with sand-impregnated paint at Mount Vernon to imitate cut ashlar stone. This technique along with scoring stucco into block patterns was fairly common in colonial America to imitate stone (see illus. 1, 2).

Molded or cast masonry substitutes, such as dry-tamp cast stone and poured concrete, became popular in place of quarried stone during the 19th century. These masonry units were fabricated locally, avoiding



Illus. 1. An early 18th-century technique for imitating carved or quarried stone was the use of sand-impregnated paint applied to wood. The facade stones and quoins are of wood. The Lindens (1754), Washington, D.C. Photo: Sharon C. Park, AIA.



Illus. 2. Stucco has for many centuries represented a number of building materials. Seen here is the ground floor of a Beaux Arts mansion, circa 1900, which represents a finely laid stone foundation wall executed in scored stucco. Photo: Sharon C. Park, AIA.

Illus. 3. Casting concrete to represent quarried stone was a popular late 19th-century technique seen in this circa 1910 mail-order house. While most components were delivered by rail, the foundations and exterior masonry were completed by local craftsmen. Photo: Sharon C. Park, AIA.

Illus. 4. The 19th-century also produced a variety of metal products used in imitation of other materials. In this case, the entire exterior of the Long Island Safety Deposit Company is cast-iron representing stone. Photo: Becket Logan, Friends of Cast Iron Architecture.

expensive quarrying and shipping costs, and were versatile in representing either ornately carved blocks, plain wall stones or rough cut textured surfaces. The end result depended on the type of patterned or textured mold used and was particularly popular in conjunction with mail order houses (see illus. 3). Later, panels of cementitious perma-stone or formstone and less expensive asphalt and sheet metal panels were used to imitate brick or stone.

Metal (cast, stamped, or brake-formed) was used for storefronts, canopies, railings, and other features, such as galvanized metal cornices substituting for wood or stone, stamped metal panels for Spanish clay roofing tiles, and cast-iron column capitals and even entire building fronts in imitation of building stone (see illus. no. 4).

Terra cotta, a molded fired clay product, was itself a substitute material and was very popular in the late 19th and early 20th centuries. It simulated the appearance of intricately carved stonework, which was expensive and time-consuming to produce. Terra cotta could be glazed to imitate a variety of natural stones, from brownstones to limestones, or could be colored for a polychrome effect.

Nineteenth century technology made a variety of materials readily available that not only were able to imitate more expensive materials but were also cheaper to fabricate and easier to use. Throughout the century, imitative materials continued to evolve. For example, ornamental window hoods were originally made of wood or carved stone. In an effort to find a cheaper substitute for carved stone and to speed fabrication time, cast stone, an early form of concrete, or cast-iron hoods often replaced stone. Toward the end of the century, even less expensive sheet metal hoods, imitating stone, also came into widespread use. All of these materials, stone, cast stone, cast-iron, and various pressed metals were in

Illus. 5. The four historic examples of various window hoods shown are: (a) stone; (b) cast stone; (c) cast iron, and (d) sheet metal. The criteria for selecting substitute materials today (availability, quality, delivery dates, cost) are not much different from the past. Photo: Sharon C. Park, AIA.

production at the same time and were selected on the basis of the availability of materials and local craftsmanship, as well as durability and cost (see illus. 5). The criteria for selection today are not much different.

Many of the materials used historically to imitate other materials are still available. These are often referred to as the traditional materials: wood, cast stone, concrete, terra cotta and cast metals. In the last few decades, however, and partly as a result of the historic preservation movement, new families of synthetic materials, such as fiberglass, acrylic polymers, and epoxy resins, have been developed and are being used as substitute materials in construction. In some respects these newer products (often referred to as high tech materials) show great promise; in others, they are less satisfactory, since they are often difficult to integrate physically with the porous historic materials and may be too new to have established solid performance records.

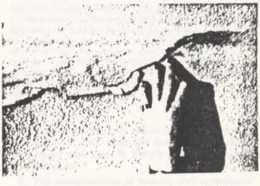
When to Consider Using Substitute Materials in Preservation Projects

Because the overzealous use of substitute materials can greatly impair the historic character of a historic structure, all preservation options should be explored thoroughly before substitute materials are used. It is important to remember that the purpose of repairing damaged features and of replacing lost and irreparably damaged ones is both to match visually what was there and to cause no further deterioration. For these reasons it is not appropriate to cover up historic materials with synthetic materials that will alter the appearance, proportions and details of a historic building and that will conceal future deterioration (see illus. 6).

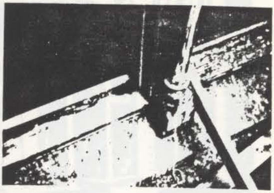
Some materials have been used successfully for the repair of damaged features such as epoxies for wood infilling, cementitious patching for sandstone repairs, or plastic stone for masonry repairs. Repairs are preferable to replacement whether or not the repairs are in kind or with a synthetic substitute material (see illus. 7).

In general, four circumstances warrant the consideration of substitute materials: 1) the unavailability of historic materials; 2) the unavailability of skilled craftsmen; 3) inherent flaws in the original materials; and 4) code-required changes (which in many cases can be extremely destructive of historic resources).

Cost may or may not be a determining factor in considering the use of substitute materials. Depending on the area of the country, the amount of material needed, and the projected life of less durable substitute materials, it may be cheaper in the long run to use the original material, even though it may be harder to find. Due to many early failures of substitute materials, some preservationist are looking abroad to find materials (especially stone) that match the historic materials in an effort to restore historic

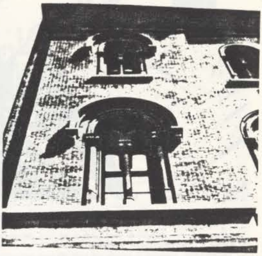


Illus. 6. Substitute materials should never be considered as a cosmetic cover-up for they can cause great physical damage and can alter the appearance of historic buildings. For example, a fiberglass coating was used at Ranchos de Taos, NM, in place of the historic adobe coating which had deteriorated. The waterproof coating sealed moisture in the walls and caused the spalling shown. It was subsequently removed and the walls were properly repaired with adobe. Photo: Lee H. Nelson, FAIA.

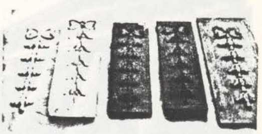


Illus. 7. Whenever possible, historic materials should be repaired rather than replaced. Epoxy, a synthetic resin, has been used to repair the wood window frame and sill at the Auditors Building (1878) Washington, DC. The cured resin is white in this photo and will be primed and painted. Photo: Lee H. Nelson, FAIA

Illus. 9. Simple solutions should not be overlooked when materials are no longer available. In the case of the Morse-Libby Mansion (1859), Portland, ME., the deteriorated brownstone porch beam was replaced with a carved wooden beam painted with sand impregnated paint. Photo: Stephen Sewall.



Illus. 8. Even when materials are not locally available, it may be possible and cost effective to find sources elsewhere. For example, the local sandstone was no longer available for the restoration of the New York Shakespeare Festival Public Theater. The deteriorated sandstone window hoods, were replaced with stone from Germany that closely matched the color and texture of the historic sandstone. Photo: John G. Waite.

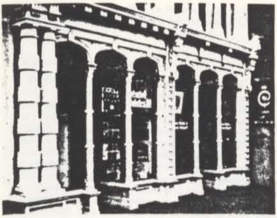


Illus. 10. The use of substitute materials is not necessarily cheaper or easier than using the original materials. The complex process of fabricating the polyester bronze reproduction pieces of the gilded wood molding for the clockcase at Independence Hall required talented artisans and substantial mold making time. From left to right is the final molded polyester bronze detail; the plaster casting mold; the positive and negative interim neoprene rubber molds; and the expertly carved wooden master. Photo: Courtesy of Independence National Historical Park

buildings accurately and to avoid many of the uncertainties that come with the use of substitute materials.

1. The unavailability of the historic material. The most common reason for considering substitute materials is the difficulty in finding a good match for the historic material (particularly a problem for masonry materials where the color and texture are derived from the material itself). This may be due to the actual unavailability of the material or to protracted delivery dates. For example, the local quarry that supplied the sandstone for a building may no longer be in operation. All efforts should be made to locate another quarry that could supply a satisfactory match (see illus. 8). If this approach fails, substitute materials such as dry-tamp cast stone or textured precast concrete may be a suitable substitute if care is taken to ensure that the detail, color and texture of the original stone are matched. In some cases, it may be possible to use a sand-impregnated paint on wood as a replacement section, achieved using readily available traditional materials, conventional tools and work skills (see illus. 9). Simple solutions should not be overlooked.

2. The unavailability of historic craft techniques and lack of skilled artisans. These two reasons complicate any preservation or rehabilitation project. This is particularly true for intricate ornamental work, such as carved wood, carved stone, wrought iron, cast iron, or molded terra cotta. However, a number of stone and wood cutters now employ sophisticated carving machines, some even computerized. It is also possible to cast substitute replacement pieces using



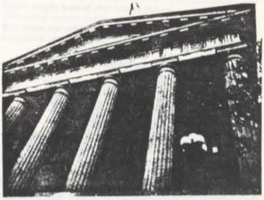
Illus. 11. The unavailability of historic craft techniques is another reason to consider substitute materials. The original first floor cast iron front of the Grand Opera House, Wilmington, DE, was missing; the expeditious reproduction in cast aluminum was possible because artisans working in this medium were available. Photo: John G. Waite.

aluminum, cast stone, fiberglass, polymer concretes, glass fiber reinforced concretes and terra cotta. Mold making and casting takes skill and craftsmen who can undertake this work are available. (see illus. 10, 11). Efforts should always be made, prior to replacement, to seek out artisans who might be able to repair ornamental elements and thereby save the historic features in place.

3. Poor original building materials. Some historic building materials were of inherently poor quality or their modern counterparts are inferior. In addition, some materials were naturally incompatible with other materials on the building, causing staining or galvanic corrosion. Examples of poor quality materials were the very soft sandstones which eroded quickly. An example of poor quality modern replacement material is the tin coated steel roofing which is much less durable than the historic tin or terne iron which is no longer available. In some cases, more durable natural stones or precast concrete might be available as substitutes for the soft stones and modern terne-coated stainless steel or lead-coated copper might produce a more durable yet visually compatible replacement roofing (see illus. 12).

4. Code-related changes. Sometimes referred to as life and safety codes, building codes often require changes to historic buildings. Many cities in earthquake zones, for example, have laws requiring that overhanging masonry parapets and cornices, or freestanding urns or finials be securely reanchored to new structural frames or be removed completely. In some cases, it may be acceptable to replace these heavy historic elements with light replicas (see illus. 13). In other cases, the extent of historic fabric removed may be so great as to diminish the integrity of the resource. This could affect the significance of the structure and jeopardize National Register status. In addition, removal of repairable historic materials could result in loss of Federal tax credits for rehabilitation. Department of the Interior regulations make clear that the Secretary of the Interior's Standards for Rehabilitation take precedence over other regulations and codes in determining whether a project is consistent with the historic character of the building undergoing rehabilitation.

Illus. 12. Substitute materials may be considered when the original materials have not performed well. For example, early sheet metals used for roofing, such as tinplate, were reasonably durable, but the modern equivalent, terne-coated steel, is subject to corrosion once the thin tin plating is damaged. Terne-coated stainless steel or lead-coated copper (shown here) are now used as substitutes. Photo: John G. Waite.



Illus. 13. Code-related changes are of concern in historic preservation projects because the integrity of the historic resource may be irretrievably affected. In the case of the Old San Francisco Mint, the fiberglass cornice was used to bring the building into seismic conformance. The original cornice was deteriorated, and the replacement (1982) was limited to the projecting pediment. The historic stone fascia was retained as were the stone columns. The limited replacement of deteriorated material did not jeopardize the integrity of the building. Photo: Walter M. Sontheimer.

Two secondary reasons for considering the use of substitute materials are their lighter weight and for some materials, a reduced need of maintenance. These reasons can become important if there is a need to keep dead loads to a minimum or if the feature being replaced is relatively inaccessible for routine maintenance.

Cautions and Concerns

In dealing with exterior features and materials, it must be remembered that moisture penetration, ultraviolet degradation, and differing thermal expansion and contraction rates of dissimilar materials make any repair or replacement problematic. To ensure that a repair or replacement will perform well over time, it is critical to understand fully the properties of both the original and the substitute materials, to install replacement materials correctly, to assess their impact on adjacent historic materials, and to have reasonable expectations of future performance.

Many high tech materials are too new to have been tested thoroughly. The differences in vapor permeability between some synthetic materials and the historic materials have in some cases caused unexpected further deterioration. It is therefore difficult to recommend substitute materials if the historic materials are still available. As previously mentioned, consideration should always be given first to using traditional materials and methods of repair or replacement before accepting unproven techniques, materials or applications.

Substitute materials must meet three basic criteria before being considered: they must be compatible with the historic materials in appearance; their physical properties must be similar to those of the historic materials, or be installed in a manner that tolerates differences; and they must meet certain basic performance expectations over an extended period of time.

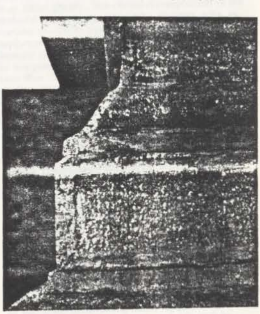
Matching the Appearance of the Historic Materials

In order to provide an appearance that is compatible with the historic material, the new material should match the details and craftsmanship of the original as well as the color, surface texture, surface reflectivity and finish of the original material (see illus. 14). The closer an element is to the viewer, the more closely the material and craftsmanship must match the original.

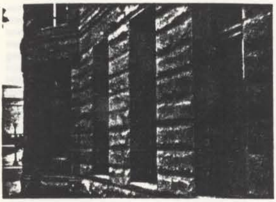
Matching the color and surface texture of the historic material with a substitute material is normally difficult. To enhance the chances of a good match, it is advisable to clean a portion of the building where new materials are to be used. If pigments are to be added to the substitute material, a specialist should determine the formulation of the mix, the natural aggregates and the types of pigments to be used. As all exposed material is subject to ultra-violet degradation, if possible, samples of the new materials made during the early planning phases should be tested or allowed to weather over several seasons to test for color stability.

Fabricators should supply a sufficient number of samples to permit on-site comparison of color, texture, detailing, and other critical qualities (see illus. 15, 16). In situations where there are subtle variations in color and texture within the original materials, the

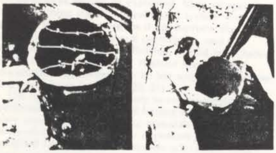
Illus. 14. The visual qualities of the historic feature must be matched when using substitute materials. In this illustration, the lighter weight mineral fiber cement shingles used to replace the deteriorated historic slate roof were detailed to match the color, size, shape and pattern of the original roofing and the historic snow birds were reattached. Photo: Sharon C. Park, AIA.



Illus. 15. Poor quality workmanship can be avoided. In this example, the crudely cast concrete entrance pier (shown) did not match the visual qualities of the remaining historic sandstone (not shown). The aggregate is too large and exposed; the casting is not crisp; the banded tooling edges are not articulated; and the color is too pale. Photo: Sharon C. Park, AIA.



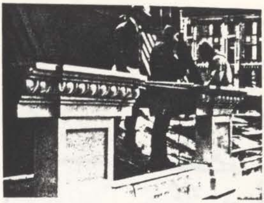
Illus. 16. The good quality substitute materials shown here do match the historic sandstone in color, texture, tooling and surface details. Dry-tamp cast stone was used to match the red sandstone that was no longer available. The reconstructed first floor incorporated both historic and substitute materials. Sufficient molds were made to avoid the problem of detecting the substitutes by their uniformity. Photo: Sharon C. Park, AIA.



Illus. 17. Care must be taken to ensure that the replacement materials will work within a predesigned system. At the Norris Museum, Yellowstone National Park, the 12-inch diameter log rafters, part of an intricate truss system, had rotted at the inner core from the exposed ends back to a depth of 48 inches. The exterior wooden shells remained intact. Fiberglass rods (left photo) and specially formulated structural epoxy were used to fill the cleaned out cores and a cast epoxy wafer end with all the detail of the original wood graining was laminated onto the log end (right photo). This treatment preserved the original feature with a combination of repair and replacement using substitute materials as part of a well thought out system. Photos: Courtesy of Harrison Goodall.

substitute materials should be similarly varied so that they are not conspicuous by their uniformity.

Substitute materials, notably the masonry ones, may be more water-absorbent than the historic material. If this is visually distracting, it may be appropriate to apply a protective vapor permeable coating on the substitute material. However, these clear coatings tend to alter the reflectivity of the material, must be reapplied periodically, and may trap salts and moisture, which can in turn produce spalling. For these reasons, they are *not* recommended for use on historic materials.



Illus. 18. Substitute materials must be properly installed to allow for expansion, contraction, and structural security. The new balustrade (a polymer concrete modified with glass fibers) at Carnegie Hall, New York City, was installed with steel structural supports to allow window-washing equipment to be suspended securely. In addition, the formulation of this predominantly epoxy material allowed for the natural expansion and contraction within the predesigned joints. Photo: Courtesy of MJM Studios.

Matching the Physical Properties

While substitute materials can closely match the appearance of historic ones, their physical properties may differ greatly. The chemical composition of the material (i.e., presence of acids, alkalines, salts, or metals) should be evaluated to ensure that the replacement materials will be compatible with the historic resource. Special care must therefore be taken to integrate and to anchor the new materials properly (see illus. 17). The thermal expansion and contraction coefficients of each adjacent material must be within tolerable limits. The function of joints must be understood and detailed either to eliminate moisture penetration or to allow vapor permeability. Materials that will cause galvanic corrosion or other chemical reactions must be isolated from one another.

To ensure proper attachment, surface preparation is critical. Deteriorated underlying material must be cleaned out. Non-corrosive anchoring devices or fasteners that are designed to carry the new material and to withstand wind, snow and other destructive elements should be used (see illus. 18). Properly chosen fasteners allow attached materials to expand and contract at their own rates. Caulking, flexible sealants or expansion joints between the historic material and the substitute material can absorb slight differences of movement. Since physical failures often result from poor anchorage or improper installation techniques, a structural engineer should be a member of any team undertaking major repairs.

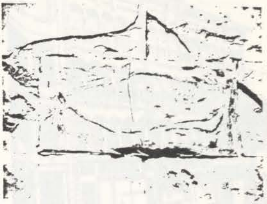
Some of the new high tech materials such as epoxies and polymers are much stronger than historic materials and generally impermeable to moisture. These differences can cause serious problems unless the new materials are modified to match the expansion and contraction properties of adjacent historic materials more closely, or unless the new materials are isolated from the historic ones altogether. When stronger or vapor impermeable new materials are used alongside historic ones, stresses from trapped moisture or differing expansion and contraction rates generally hasten deterioration of the weaker historic material. For this reason, a conservative approach to repair or replacement is recommended, one that uses more pliant materials rather than high-strength ones (see illus. 19). Since it is almost impossible for substitute materials to match the properties of historic materials perfectly, the new system incorporating new and historic materials should be designed so that if material failures occur, they occur within the new material rather than the historic material.

Performance Expectations

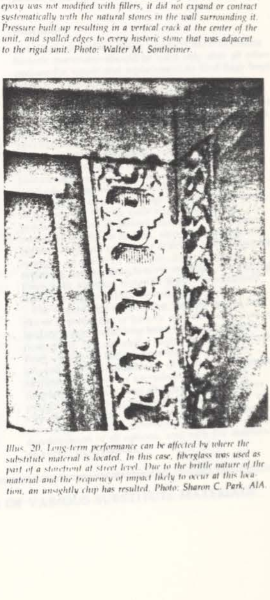
While a substitute material may appear to be acceptable at the time of installation, both its appearance and its performance may deteriorate rapidly. Some materials are so new that industry standards are not available, thus making it difficult to specify quality control in fabrication, or to predict maintenance requirements and long term performance. Where possible, projects involving substitute materials in similar circumstances should be examined. Material specifications outlining stability of color and texture; compressive or tensile strengths if appropriate; the acceptable range of thermal coefficients, and the durability of coatings and finishes should be included in the contract documents. Without these written documents, the owner may be left with little recourse if failure occurs (see illus. 20, 21).

The tight controls necessary to ensure long-term performance extend beyond having written performance standards and selecting materials that have a successful track record. It is important to select qualified fabricators and installers who know what they are doing and who can follow up if repairs are necessary. Installers and contractors unfamiliar with specific substitute materials and how they function in your local environmental conditions should be avoided.

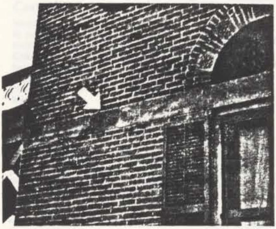
The surfaces of substitute materials may need special care once installed. For example, chemical residues or mold release agents should be removed completely prior to installation, since they attract pollutants and cause the replacement materials to appear dirtier than the adjacent historic materials. Furthermore, substitute materials may require more frequent cleaning, special cleaning products and protection from impact by hanging window-cleaning scaffolding. Finally, it is critical that the substitute materials be identified as part of the historical record of the building so that proper care and maintenance of all the building materials continue to ensure the life of the historic resource.



Illus. 19. When the physical properties are not matched, particularly thermal expansion and contraction properties, great damage can occur. In this case, an extremely rigid epoxy replacement unit was installed in a historic masonry wall. Because the epoxy was not modified with fillers, it did not expand or contract systematically with the natural stones in the wall surrounding it. Pressure built up resulting in a vertical crack at the center of the unit, and spalled edges to every historic stone that was adjacent to the rigid unit. Photo: Walter M. Sontheimer.



Illus. 20. Long-term performance can be affected by where the substitute material is located. In this case, fiberglass was used as part of a storefront at street level. Due to the brittle nature of the material and the frequency of impact likely to occur at this location, an unsightly chip has resulted. Photo: Sharon C. Park, AIA.



Illus. 21. Change of color over time is one of the greatest problems of synthetic substitute materials used outdoors. Ultra-violet light can cause materials to change color over time; some will lighten and others will darken. In this photograph, the synthetic patching material to the sandstone banding to the left of the window has aged to a darker color. Photos: Sharon C. Park, AIA.

Choosing an Appropriate Substitute Material

Once all reasonable options for repair or replacement in kind have been exhausted, the choice among a wide variety of substitute materials currently on the market must be made (see illus. 22). The charts at the end of this Brief describe a number of such materials, many of them in the family of modified concretes which are gaining greater use. The charts do not include wood, stamped metal, mineral fiber cement shingles and some other traditional imitative materials, since their properties and performance are better known. Nor do the charts include vinyls or molded urethanes which are sometimes used as cosmetic claddings or as substitutes for wooden millwork. Because millwork is still readily available, it should be replaced in kind.

The charts describe the properties and uses of several materials finding greater use in historic preservation projects, and outline advantages and disadvantages of each. It should not be read as an endorsement of any of these materials, but serves as a reminder that numerous materials must be studied carefully before selecting the appropriate treatment. Included are three predominantly masonry materials (cast stone, precast concrete, and glass fiber reinforced concrete); two predominantly resinous materials (epoxy and glass fiber reinforced polymers also known as fiberglass), and cast aluminum which has been used as a substitute for various metals and woods.

Illus. 22. A fiber reinforced polymer (fiberglass) cornice and precast concrete elements replaced deteriorated features on the 19th-century exterior. Photo: Sharon C. Park, AIA.

Summary

Substitute materials—those products used to imitate historic materials—should be used only after all other options for repair and replacement in kind have been ruled out. Because there are so many unknowns regarding the long-term performance of substitute materials, their use should not be considered without a thorough investigation into the proposed materials, the fabricator, the installer, the availability of specifications, and the use of that material in a similar situation in a similar environment.

Substitute materials are normally used when the historic materials or craftsmanship are no longer available, if the original materials are of a poor quality or are causing damage to adjacent materials, or if there are specific code requirements that preclude the use of historic materials. Use of these materials should be limited, since replacement of historic materials on a large scale may jeopardize the integrity of a historic resource. Every means of repairing deteriorating historic materials or replacing them with identical materials should be examined *before* turning to substitute materials.

The importance of matching the appearance and physical properties of historic materials and, thus, of finding a successful long-term solution cannot be overstated. The successful solutions illustrated in this Brief were from historic preservation projects involving professional teams of architects, engineers, fabricators, and other specialists. Cost was not necessarily a factor, and all agreed that whenever possible, the historic materials should be used. When substitute materials were selected, the solutions were often expensive and were reached only after careful consideration of all options, and with the assistance of expert professionals.

FOLLOWING ARE DESCRIPTIONS OF VARIOUS SUBSTITUTE MATERIALS

PROs and CONs of VARIOUS SUBSTITUTE MATERIALS

Cast Aluminum

Material: Cast aluminum is a molten aluminum alloy cast in permanent (metal) molds or one-time sand molds which must be adjusted for shrinkage during the curing process. Color is from paint applied to primed aluminum or from a factory finished coating. Small sections can be bolted together to achieve intricate or sculptural details. Unit castings are also available for items such as column plinth blocks.

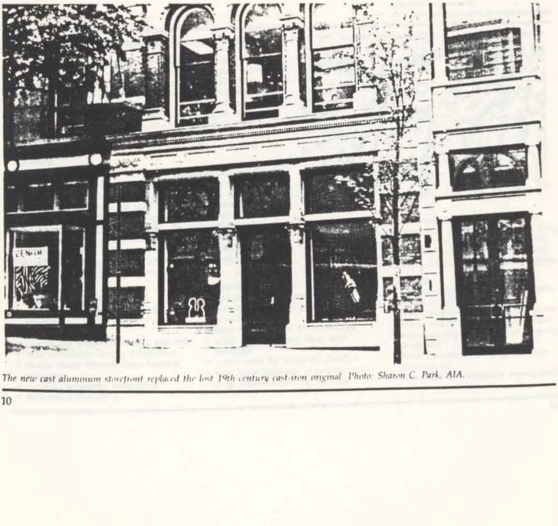
Application: Cast aluminum can be a substitute for cast-iron or other decorative elements. This would include grillwork, roof crestings, cornices, ornamental spandrels, storefront elements, columns, capitals, and column bases and plinth blocks. If not self-supporting, elements are generally screwed or bolted to a structural frame. As a result of galvanic corrosion problems with dissimilar metals, joint details are very important.

Close-up detail showing the crisp casting in aluminum of this 19th-century replica column and capital for a storefront. Photo: Sharon C. Park, AIA.

Advantages:
- light weight (1/2 of cast iron)
- corrosion-resistant, non-combustible
- intricate castings possible
- easily assembled, good delivery time
- can be prepared for a variety of colors
- long life, durable, less brittle than cast iron

Disadvantages:
- lower structural strength than cast iron
- difficult to prevent galvanic corrosion with other metals
- greater expansion and contraction than cast-iron; requires gaskets or caulked joints
- difficult to keep paint on aluminum

Checklist:
- Can existing be repaired or replaced in-kind?
- How is cast aluminum to be attached?
- Have full-size details been developed for each piece to be cast?
- How are expansion joints detailed?
- Will there be a galvanic corrosion problem?
- Have factory finishes been protected during installation?
- Are fabricators/installers experienced?



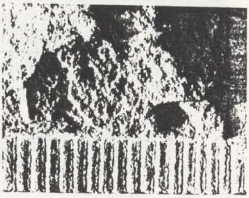
The new cast aluminum storefront replaced the lost 19th-century cast-iron original. Photo: Sharon C. Park, AIA.

PROs and CONs of VARIOUS SUBSTITUTE MATERIALS

Cast Stone *(dry-tamped)*:

Material: Cast stone is an almost-dry cement, lime and aggregate mixture which is dry-tamped into a mold to produce a dense stone-like unit. Confusion arises in the building industry as many refer to high quality precast concrete as cast stone. In fact, while it is a form of precast concrete, the dry-tamp fabrication method produces an outer surface ressembling a stone surface. The inner core can be either dry-tamped or poured full of concrete. Reinforcing bars and anchorage devices can be installed during fabrication.

Application: Cast stone is often the most visually similar material as a replacement for unveined deteriorated stone, such as brownstone or sandstone, or terra cotta in imitation of stone. It is used both for surface wall stones and for ornamental features such as window and door surrounds, voussoirs, brackets and hoods. Rubber-like molds can be taken of good stones on site or made up at the factory from shop drawings.



Dry-tamped cast stone can reproduce the sandy texture of some natural stones. Photo: Sharon C. Park, AIA.

Advantages:
- replicates stone texture with good molds (which can come from extant stone) and fabrication
- expansion/contraction similar to stone
- minimal shrinkage of material
- anchors and reinforcing bars can be built in
- material is fire-rated
- range of color available
- vapor permeable

Disadvantages:
- heavy units may require additional anchorage
- color can fade in sunlight
- may be more absorbent than natural stone
- replacement stones are obvious if too few models and molds are made

Checklist:
- Are the original or similar materials available?
- How are units to be installed and anchored?
- Have performance standards been developed to ensure color stability?
- Have large samples been delivered to site for color, finish and absorption testing?
- Has mortar been matched to adjacent historic mortar to achieve a good color/tooling match?
- Are fabricators/installers experienced?

Glass Fiber Reinforced Concretes (GFRC)

Material: Glass fiber reinforced concretes are lightweight concrete compounds modified with additives and reinforced with glass fibers. They are generally fabricated as thin shelled panels and applied to a separate structural frame or anchorage system. The GFRC is most commonly sprayed into forms although it can be poured. The glass must be alkaline resistant to avoid deteriorating effects caused by the cement mix. The color is derived from the natural aggregates and if necessary a small percentage of added pigments.

Application: Glass fiber reinforced concretes are used in place of features originally made of stone, terra cotta, metal or wood, such as cornices, projecting window and door trims, brackets, finials, or wall murals. As a molded product it can be produced in long sections of repetitive designs or as sculptural elements. Because of its low shrinkage, it can be produced from molds taken directly from the building. It is installed with a separate non-corrosive anchorage system. As a predominantly cementitious material, it is vapor permeable.

This glass fiber reinforced concrete sculptural wall panel will replace the seriously damaged resin and plaster original. A finely textured surface was achieved by spraying the GFRC mix into molds that were created from the historic panel and resculpted based on historic photographs. Photo: Courtesy of MJM Studios.

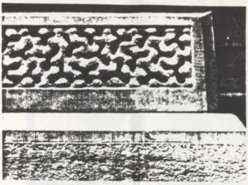
Advantages:
- lightweight, easily installed
- good molding ability, crisp detail possible
- weather resistant
- can be left uncoated or else painted
- little shrinkage during fabrication
- molds made directly from historic features
- cements generally breathable
- material is fire-rated

Disadvantages:
- non-loadbearing use only
- generally requires separate anchorage system
- large panels must be reinforced
- color additives may fade with sunlight
- joints must be properly detailed
- may have different absorption rate than adjacent historic material

Checklist:
- Are the original materials and craftsmanship still available?
- Have samples been inspected on the site to ensure detail/texture match?
- Has anchorage system been properly designed?
- Have performance standards been developed?
- Are fabricators/installers experienced?

PROs and CONs of VARIOUS SUBSTITUTE MATERIALS

Precast Concrete



Textured molds can produce a variety of high quality carved, quarried, and tooled surfaces in concrete.
Photo: Sharon C. Park, AIA

Material: Precast concrete is a wet mix of cement and aggregate poured into molds to create masonry units. Molds can be made from existing good surfaces on the building. Color is generally integral to the mix as a natural coloration of the sand or aggregate, or as a small percentage of pigment. To avoid unsightly air bubbles that result from the natural curing process, great care must be taken in the initial and long-term vibration of the mix. Because of its weight it is generally used to reproduce individual units of masonry and not thin shell panels.

Application: Precast concrete is generally used in place of masonry materials such as stone or terra cotta. It is used both for flat wall surfaces and for textured or ornamental elements. This includes wall stones, window and door surrounds, stair treads, paving pieces, parapets, urns, balusters and other decorative elements. It differs from cast stone in that the surface is more dependent on the textured mold than the hand tamping method of fabrication.

Advantages:
- easily fabricated, takes shape well
- rubber molds can be made from building stones
- minimal shrinkage of material
- can be load bearing or anchorage can be cast in
- expansion/contraction similar to stone
- material is fire-rated
- range of color and aggregate available
- vapor permeable

Disadvantages:
- may be more moisture absorbent than stone although coatings may be applied
- color fades in sunlight
- heavy units may require additional anchorage
- small air bubbles may disfigure units
- replacement stones are conspicuous if too few models and molds are made

Checklist:
- Is the historic material still available?
- What are the structural/anchorage requirements?
- Have samples been matched for color/texture/absorption?
- Have shop drawings been made for each shape?
- Are there performance standards?
- Has mortar been matched to adjacent historic mortar to achieve good color/tooling match?
- Are fabricators/installers experienced?

Fiber Reinforced Polymers—
Known as Fiberglass

A fiberglass cornice for the reconstruction of an 18th-century wooden clockcase is being lifted in pre-fabricated sections. The level of detail is intricate and of high quality. Photo: Courtesy of Independence National Historical Park.

Material: Fiberglass is the most well known of the FRP products generally produced as a thin rigid laminate shell formed by pouring a polyester or epoxy resin gel-coat into a mold. When tack-free, layers of chopped glass or glass fabric are added along with additional resins. Reinforcing rods and struts can be added if necessary; the gel coat can be pigmented or painted.

Application: Fiberglass, a non load-bearing material attached to a separate structural frame, is frequently used as a replacement where a lightweight element is needed or an inaccessible location makes frequent maintenance of historic materials difficult. Its good molding ability and versatility to represent stone, wood, metal and terra cotta make it an alternative to ornate or carved building elements such as column capitals, bases, spandrel panels, beltcourses, balustrades, window hoods or parapets. Its ability to reproduce bright colors is a great advantage.

Advantages:
- lightweight, long spans available with a separate structural frame
- high ratio of strength to weight
- good molding ability
- integral color with exposed high quality pigmented gel-coat or takes paint well
- easily installed, can be cut, patched, sanded
- non-corrosive, rot-resistant

Disadvantages:
- requires separate anchorage system
- combustible (fire retardants can be added); fragile to impact.
- high co-efficient of expansion and contraction requires frequently placed expansion joints
- ultra-violet sensitive unless surface is coated or pigments are in gel-coat
- vapor impermeability may require ventilation detail

Checklist:
- Can original materials be saved/used?
- Have expansion joints been designed to avoid unsightly appearance?
- Are there standards for color stability/durability?
- Have shop drawings been made for each piece?
- Have samples been matched for color and texture?
- Are fabricators/installers experience
- Do codes restrict use of FRP?

PROs and CONs of VARIOUS SUBSTITUTE MATERIALS

Epoxies *(Epoxy Concretes, Polymer Concretes)*:

Material: Epoxy is a resinous two-part thermo-setting material used as a consolidant, an adhesive, a patching compound, and as a molding resin. It can repair damaged material or recreate lost features. The resins which are poured into molds are usually mixed with fillers such as sand, or glass spheres, to lighten the mix and modify their expansion/contraction properties. When mixed with aggregates, such as sand or stone chips, they are often called epoxy concrete or polymer concrete, which is a misnomer as there are no cementitious materials contained within the mix. Epoxies are vapor impermeable, which makes detailing of the new elements extremely important so as to avoid trapping moisture behind the replacement material. It can be used with wood, stone, terra cotta, and various metals.

Application: Epoxy is one of the most versatile of the new materials. It can be used to bind together broken fragments of terra cotta; to build up or infill missing sections of ornamental metal; or to cast missing elements of wooden ornaments. Small cast elements can be attached to existing materials or entire new features can be cast. The resins are poured into molds and due to the rapid setting of the material and the need to avoid cracking, the molded units are generally small or hollow inside. Multiple molds can be combined for larger elements. With special rods, the epoxies can be structurally reinforced. Examples of epoxy replacement pieces include: finials, sculptural details, small column capitals, and medallions.

This replica column capital was made using epoxy resins poured into a mold taken from the building. The historic wooden column shaft was repaired during the restoration. Photo: Courtesy Dell Corporation.

Advantages:

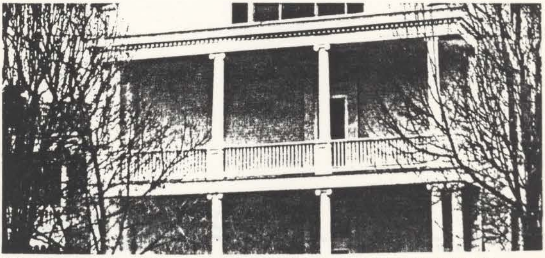
- can be used for repair/replacement
- lightweight, easily installed
- good casting ability; molds can be taken from building
- material can be sanded and carved
- color and ultra-violet screening can be added; takes paint well
- durable, rot and fungus resistant

Disadvantages:

- materials are flammable and generate heat as they cure and may be toxic when burned
- toxic materials require special protection for operator and adequate ventilation while curing
- material may be subject to ultra-violet deterioration unless coated or filters added
- rigidity of material often must be modified with fillers to match expansion coefficients
- vapor impermeable

Checklist:

- Are historic materials available for molds, or for splicing-in as a repair option?
- Has the epoxy resin been formulated within the expansion/contraction coefficients of adjacent materials?
- Have samples been matched for color/finish?
- Are fabricators/installers experienced?
- Is there a sound sub-strate of material to avoid deterioration behind new material?
- Are there performance standards?



Columns were repaired and a capital was replaced in epoxy on this 19th-century 2-story porch. Photo: Dell Corporation

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This publication has been prepared pursuant to Section 101(h) of the National Historic Preservation Act, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. The guidance provided in this Brief will also assist property owners in complying with the requirements of the Internal Revenue Code of 1986.

Preservation Briefs: 16 has been developed under the technical editorship of Lee H. Nelson, FAIA, Chief, Preservation Assistance Division, National Park Service, U.S. Department of the Interior, P.O. Box 37127, Washington, D.C. 20013-7127. Comments on the usefulness of this information are welcome and can be sent to Mr. Nelson at the above address.

Cover photograph: Independence Hall, Philadelphia, PA, the 1972 installation of a combination wood and fiberglass clockcase duplicating the lost 18th century original. Photo: Courtesy of Independence National Historical Park.

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APPENDIX I

LIST OF DOCUMENTATION AND ASSESSMENT TOOLS

List of Documentation and Assessment Tools

I. Camera Equipment

- 35 mm SLR camera and flash.
- Kodak Plus-X pan 125 ASA and Kodak Tmax 100 ASA film for exterior photography.
- Kodak Ektachrome (Tungsten) 160 ASA for light-stand photography. Use gray card for light measurements.
- Measuring Stick for inclusion in photographs to show scale.
- Tripod.
- Extension cord and light.
- Notebook.

II. Field-Measurement Tools

- 2-foot × 3-foot piece of particleboard and large paper clips.
- Graph paper.
- 25- and 100-foot metal tape measures.
- Several different types of pencils and colored-ink pens.
- 3-foot carpenter's level.
- Plumb bob and string.
- Whistle to wear around neck in case of emergency.
- Field-measurement notebook.
- Adhesive tape.
- Profile gage or aluminum foil.
- Flashlight and extra batteries.
- Mirror.

III. Investigation and Assessment Tools

- Thin flatbar or prybar.
- Several different sizes and types of screwdrivers.
- Knives, probes, and tweezers.
- Magnifying glass or lens.
- Sponge.
- Sample bags and containers.
- Sandpaper.
- Munsell color chart or Benjamin Moore Industrial Paint chart.
- Thermometer.
- Miniature microscope.
- Brush.
- First-aid kit.

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