Additions, Extensions, Transformations: New Architecture to Old

by

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Architectural preservation in America has led to an increase in imitative architecture in many sectors of the profession and, as one architectural historian has pointed out, there is no historical precedent for imitative architecture. Fortunately, buildings can only rarely be preserved in a static form: they grow, evolve, and change in response to many circumstances.

Too often the form of an addition or extension is determined by aligning cornice lines, using the same building materials, the same window and doors, and a similar roof structure. Essential formal issues are often not addressed.

Four case studies are made, each being either an addition, an extension, or a transformation. Differing sizes and scales are explored. Accesses and circulation options are studied, as well as room sizes design decisions. Mostly drawings comprise the work, and they are additive form studies.

Thesis Supervisor: Maurice K. Smith
Title: Professor of Architecture
I gratefully acknowledge:

Professor Maurice Smith
for his special teaching

and

Mr. Frank Adams, of Perry, Dean, Stahl
and Rogers, for providing drawings of
his office's addition to the Peabody
Museum.
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Altering existing buildings is currently accounting for more than half of the work of the architectural profession; more alterations to older, existing buildings is being done than new work. The work is called renovation, restoration, rehabilitation, additions, extensions, transformations. Renovations, restorations, and rehabilitations are preservationist, in that they restore the existing building to a useful state. Additions, extensions and transformations can be defined as three different qualitative levels of intervention wherein the original building receives new pieces. Additions and extensions are interventions in the manner of the original building; transformations are also, but differ in that they introduce a new major element in addition to those in the manner of the original building. Additions, extensions, and transformations are the subject of this thesis.

Four designs comprise this thesis: a roof to protect a drive-in window
Figure 2.
at a bank in Hardwick, Vermont; an entry and additional space for a farmhouse in Sheffield, Vermont; the conversion into housing of a mill building in N.Billerica, Massachusetts; the design and implementation of a program of expansion for a unique museum in Salem, Massachusetts. The first three designs were to inform the fourth and major design. In fact, the second, the farmhouse addition, although smaller in scale, is the most developed of the four. Similar issues run through all four and, although one design may not address all the issues, 'collage', for example, the other three designs will. A list and key to the issues follows. Symbols appear on the drawings, and cross reference with the key.

The four projects were chosen for their differing and similar qualities. The sizes of the original buildings, the sizes of the new pieces, and the square footage ratios of new to old are as follows:

A. Hardwick Bank: ±5000 SF. New ±300 SF. Ratio ±0.5%.
B. N.Billerica Mill. ±25000 SF. New ±5000 SF. Ratio ±20%.
Figure 3.

Figure 4.
C. Sheffield Farmhouse: ±3500 SF. New ±800 SF. Ratio ±23%.
D. Salem Museum: ±85,000 SF. New ±60,000 SF. Ratio ±77%.

The Hardwick bank project is a minimal intervention. The building is masonry and of similar construction to those found in Salem. The building is of some historical interest, with some character of its own.

The farmhouse project was chosen for its residential scale. Although it is of little or no historical interest, it does have "character", qualities which should become more evident, not less, in any alteration. It is built of wood and framed in a post and beam system. It is situated in a rural setting.

The mill building is a large, masonry building which, for the purposes of the task, is currently unoccupied. Also, for the purposes of the exploration, the many "outbuildings" surrounding the oldest original buildings have been razed. The three original buildings are of similar construction type to the buildings found on the Salem site. The main mill building is of great-
Figure 5.
er mass and volume than either the bank building or the Salem buildings. The program of allocating living space in such a building was treated as one of defining zones of territoriality, usage, and of maximizing physical association with the building's various elements; its walls, its window and door openings and, as in the farmhouse project, its overall relationship to the landscape.

The Salem project, the Peabody Museum of Salem, was chosen for sundry reasons. The primary reason is that its major piece, a brick and granite, gable roofed building, is of historical interest, especially for a museum. Over the years a series of appendages had been attached to the building, having the effect of "suffocating" the building, of obscuring its character by covering it in layers of additions. Before the program of expansion could proceed, some archeology had to take place; some uncovering of the original building in order to arrange access to and around it in order to maximize association with it.
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<td>223</td>
<td>Karl Larsson</td>
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<td>225</td>
<td>C.R.Mackintosh</td>
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<td>227</td>
<td>Carlo Scarpa</td>
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<td>229</td>
<td>M.K.Smith</td>
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<td>231</td>
<td>Mies van der Rohe</td>
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<td>231</td>
<td>Greene &amp; Greene</td>
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<td>233</td>
<td>Frank Lloyd Wright</td>
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<td>235</td>
<td>Frank Lloyd Wright</td>
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<td>237</td>
<td>'Japanese Residential'</td>
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<td>239</td>
<td>'Shingle Style Additive'</td>
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<td>241</td>
<td>'Miscellaneous' #1</td>
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<td>243</td>
<td>'Miscellaneous' #2</td>
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<td>'Miscellaneous' #3</td>
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<td>247</td>
<td>'Miscellaneous' #4</td>
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</tbody>
</table>
KEY TO SYMBOLS:

a) SIZES

1 SITE
2 ACCESS
3 ROOM
4 ARM'S LENGTH

b) '4 Cs'

1 CONTINUITY
2 CONTAINMENT
3 COMPLETION
4 COLLAGE

c) ATTRIBUTES

1 territoriality
2 direction
3 change/option
4 slack
5 growth
6 definition
7 registration
8 edge
9 public/private
The Peabody Museum for many years has been primarily a museum of ethnological artifacts. As such, its appeal to the general public was limited: mostly it was a resource for academicians. As Salem changed, grew in population and became more of a bedroom community of Boston, so too did one of its major commercial streets, Essex Street, change. Essex Street became a pedestrian way from Liberty Street (at the corner where the museum is situated) to Washington Street 3 blocks to the west. The many visitors to the area had an impact on the museum, rendering its isolated, cloistered nature obsolete in the midst of such local activity. It was decided to make the museum more accessible to the public.

Although its ethnological collections were still of importance, the museum's Natural History and Marine Departments had a wider appeal both to the weekend visitor and to groups of school children during the week. Accomodations had to
be made for busloads of school children to see the exhibits and to hear talks and presentations. A spatial program was developed which included:

<table>
<thead>
<tr>
<th>Facility</th>
<th>Approximate Square Footage</th>
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<tr>
<td>A museum store.</td>
<td>2000 SF</td>
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<tr>
<td>Educational facilities.</td>
<td>2000 SF</td>
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<tr>
<td>A main lobby/ entrance.</td>
<td>3000 SF</td>
</tr>
<tr>
<td>A board room, with kitchen.</td>
<td>2000 SF</td>
</tr>
<tr>
<td>An audio-visual department.</td>
<td>2000 SF</td>
</tr>
<tr>
<td>Space to exhibit dioramas.</td>
<td>14,000 SF</td>
</tr>
<tr>
<td>Additional space for the Natural History Department.</td>
<td>3000 SF</td>
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<tr>
<td>Additional space to accommodate temporary exhibits.</td>
<td>10,000 SF</td>
</tr>
<tr>
<td>Space for future expansion of office and administration.</td>
<td>5000 SF</td>
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<tr>
<td>Additional space for the Ethnology Department.</td>
<td>4000 SF</td>
</tr>
<tr>
<td>Additional storage facilities.</td>
<td>10,000 SF</td>
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<tr>
<td>A workroom for repairing exhibits.</td>
<td>400 SF</td>
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<tr>
<td>A graphics/layout room.</td>
<td>300 SF</td>
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<tr>
<td>Expansion of the boiler plant.</td>
<td>300 SF</td>
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<tr>
<td>Restrooms.</td>
<td>2000 SF</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>60,000 SF Total</strong></td>
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In addition to the program above, the south edge of the site, along Charter Street, is to remain residential in scale, with the possibility of future conversion for further expansion.
Figures 6, 7, 8.
Clockwise from below:
Evolution of Essex St.,
Salem. 1825-1975.
Marine Hall and
Stahl Addition.
Plan of above.
The Peabody Museum has a history which goes back almost two centuries. It has undergone several changes throughout that time. The goals as stated in the 1799 charter were

"To assist the widows and children of deceased members, to collect such facts and observations as may tend to the improvement of navigation and to form a museum of Natural and Artificial curiosities, particularly such as are to be found beyond the Cape of Good Hope and Cape Horn..."

For almost seventy years the goals of this charter were upheld, but by 1867 the maritime activity in Salem had decreased, along with membership (which required a captain to have rounded either Cape) in the Society. Hence, support was lacking. George Peabody, in order to save the collections, donated $140,000 in 1867 to purchase East India Marine Hall and place the collections of the East India Marine Society and the Natural History collections of the Essex Institute on permanent display. The new society was to be called the Peabody Academy of Science.
From 1867 to 1942 the museum went through what its present director calls its 'adolescence', a tumultuous time of identity searching. During that time it was recommended that the museum, rather than compete with others in Natural History, instead "endeavor to perfect those departments which already give it preeminence above all other museums in the country". The ethnological collections were expanded during the years 1880 to the present. These collections are the most unique. The author recently saw an exhibit of 'netsuke', the small decorative Japanese sculptures from which are suspended pouches and storage boxes from the sash of the kimono.

It was not until the 20th C that the Marine collection experienced its tremendous growth. And "In 1921 John Robinson published The Marine Room of the Peabody Museum of Salem but it was not until 1942 that the Natural History collection and cases were removed and the Hall restored to its former elegance."

Since 1942 the museum has been in
its 'mature' phase of development. The departments have all grown and developed since then. The area surrounding the museum, particularly Essex Street, has changed substantially. In 1974 the Board of Directors, with the help of Mr. Tad Stahl, a Boston architect, designed and had built an addition to answer a need for increased space to accommodate increasingly larger groups of visitors.
Figure 9. Context plan. Salem. The Peabody Museum is in the upper left.
Figure 10. Catalogue of existing buildings. Salem site.
Figure 11. Elevation.
The site extends from the west wall of the tallest building ±300' west, encompassing the Marine Hall on the left.
Figures 12, 13. As is. Heights of buildings noted on right.
Figure 14. Site-plan. Access Study. Built up street edge, connecting existing out-buildings. 'P'=Parking.
Figure 15. Site Plan. Access Study. Building up east edge of site by putting back 'Ingram's Way', an 18C north/south connecting street. Making an inner street between the Museum buildings and a new built up street edge.
Figure 16. Site plan. Access study. Build up Liberty St. into commercial area, like Essex St.
Figure 17. '1'. Site plan. Access Study. Circulation 'loops'.
Figure 18. '2'. Early massing sketch separating 'private', more academic exhibition space from exhibitions with 'general audience' appeal.
Figure 19. '3'. Site plan. Access study. Massing. Retaining Ethnology building but removing connecting building between. Access around Marine Building.

Figure 20. '3A'. Site plan. Access study. Opening of cul de sac in '3'. 
Figure 21. Site plan. Access study. '4'. Numbers indicate existing buildings as in 'Catalogue...' (Fig.10). Partial replacement of 'Ingram's Way'. Access through to Liberty Street.

Figure 22. Access along east side of Marine Hall. Open space to west remains as is.
Figure 23. Site plan. Access Study.
A collage of rooms after Paul Klee.
Figure 27. Site plan. Access. Program study. 3 accesses; north, east, south. Commercial and education in northeast corner.
Figure 28. Site plan. Directional change/collector form for courtyard.
Figure 29. Courtyard studies. Inside/outside. Access.
Figure 30. Ground Floor Plan #1. 'Current Exhibit' space along east side of site. Ethnology Department along south and west. Education along northwest. Separate entrance from south for Ethnology.
Figure 31. Ground floor plan #2. Diminuation of commercial side (north) of courtyard. Spatial junction of street direction and museum direction becoming small garden between commercial and education areas.
Figure 32. Section AA.
Figure 33. Section BB. With direction of Marine Hall.
Figure 34. Elevation sketch. 1"=16'. 
Figure 35. Elevation sketch.
Low wall along Essex St.
Figure 36. Elevation along Essex St.
Figure 37. Ground floor plan #3. Inside/outside study.
Figure 38. 2nd floor plan.
Figure 39. Essex St. Elevation.
Figure 40. Elevation of new entrance to Marine Hall (Bldg. #1) from inner courtyard.
Figure 41. Elevation study of entrance to Marine Hall.
Figure 42. Elevation study of entrance to Marine Hall.
Figure 43. Ground floor plan #4.
Figure 44. Section CC.
Figures 45-48. Merchants Bank, Hardwick, Vermont
The bank project is simply to add a roof over the drive in window. Various types of additions were designed: minimal roofs hung from the walls to those which 'put feet down'.

The south facade of the building was used as a way to explore, at a scale larger than N.Billerica afforded, the type of wall extension which might work on the mill building. The program of the bank does not call for such an intervention.
Figure 49. (top) East elevation. As is.

Figure 50. (bottom) South elevation. As is.
Figure 51. Elevation sketches. '1': Continuation of same. '2': Roof goes up. Both are to show prevailing precedents.
Figure 52. Elevation. 'E'. A minimal 'solution'.
Figure 53. Section, sketches.
Figures 54 & 55. Section. elevation.
Figure 56. Elevation.
Figure 57. Elevation. East. Collage of wood, stainless steel, (or aluminum), and glass.

Figure 58. Elevation. East. Collage using tiles.
Figure 59. Elevation. Sketch. 1"=8'. Roof hung from steel cables attached to wall. Ground form gets up for some enclosure around openings.
FEB 21, 1981

marked from 3rd story
to wall back
being dig to drive

S & C
Figure 60. Plan (top), elevation (bottom). Supporting posts and ground form.
Figure 61. Plan and elevations. Roof plan showing covering for perambulatory (narrow) and vehicular access.
The following drawings were done to see how a masonry building might extend its upper floors, retaining most of the walls. (This is not part of the Hardwick program, but is part of the program following, N.Billerica.)

Using the glazing to create a continuity lacking in Fig. 62.
Figure 64. Elevation. South.
Final study.
Figures 65-67. The Faulkner Mills
N. Billerica, Mass.
The mill expansion incorporates a commercial greenhouse and private living space.

An exploration into the reuse of an old building must take into account the physical condition of the building, and make design decisions which are appropriate to the condition of the building. The Faulkner Mill in N.Billerica, like many mills of its vintage, has walls in need of repointing, while being structurally sound. The decision was made to extend the wall edge in order to cover the wall; to put an extra layer of protection over a major portion of the building. Examples of this were found in Western Spain, in Malta, and in Saudi Arabia.
Figure 68. Site plan, N.Billerica. As is, 1981.
Figure 69. Site plan, Faulkner Mills. Chronology of buildings according to 1947 survey plan (Figure 67).
Figures 70-72 (left to right).

Figure 70. Age of buildings. Figure 71. Site plan, as is. Figure 72. Site plan, with only 3 oldest buildings remaining. This is the version of the site plan to be used for the study.
Figure 73. Site plan sketch. Program study. Addition of commercial greenhouse and bedding gardens, and more housing.
Figure 74. Site plan, sections. Sketches. Program and massing study.
Figure 75. Site plan. Greenhouse located at western side of site, along river. Access to building along eastern and northern side.
Figure 76. Site plan. Amplification of Figure 75. Buildings numbered 1-3 are the old buildings. Others are the greenhouses. P = parking. A bridge spans the old sluiceway.
Figure 77. Plan study.
This study looks at accesses for 4 living quarters on the ground floor, and ways in which the various zones within the building might be used.
V= vestibule
GH= greenhouse
W= work spaces, studios.
S= slack, storage, room to expand.
Figure 78. Plan study. This study looks at 3 living spaces on a floor and the feasibility of diagonal entry to the middle space. Vertical circulation occurs on the northwest corner, and the northern side. Greenhouse area occurs on southern and southwestern sides.
Figure 79. Plan, section/elevation. Greenhouse becomes more attached/ incorporated into plan. Circulation tower / pavilion at junction of two directional fields.
Figure 80. Plan study. 2nd floor. The wall zone being treated for circulation and glazed/ greenhouse/ morning rooms.
Figure 81. Elevation, south. Various types of use spaces attached to the wall: greenhouse, sun porch, study porch, etc.
Figure 82. Elevation, south. Collage. Final.
The farmhouse expansion should re-define circulation to make winter access, including a mudroom, occur on the west side of the house.

On the first floor, the kitchen and dining areas must be larger than they now are, and less lineal. A small greenhouse and/or sleeping porch is to be added on the south side of the house. Wood storage space, minimally enclosed, is to be made around the periphery of the new extension.

A small vault should be incorporated into the design of the foundation system. It need be no larger than 35 SF.

On the second floor a small sleeping area, a bathroom and three bedrooms must be made out of the existing space. Only minor envelope extension will be permitted on the second floor.

The entire project should be buildable by two experienced carpenters over a four month period.

As much of the present building as
possible should be left untouched, including vertical circulation, the east facade, the ell to the north of the major living space.

History:
The house, the old Holbrook farm, is situated on a high ridge, the watershed ridge which separates waters flowing west to the Hudson River Valley and east to the Connecticut River Valley. The house was built shortly after the Civil War, around 1870. It was a "section farm", originally comprised of 750 acres. While scenically beautiful, it was the extreme exposure of the site which led to the decline of the buildings over the years. Two large cow barns and one small haybarn have been struck by lightening and burned to the ground over the last 75 years. After the land had been cleared, around 1880, the winter winds which blew unabated, made living there difficult. It became a "summer farm", a "tenant farm". One tenant set up a sawmill on the foundations of the old cow barn in the 1930s. The isolation of the setting, and the hostile environ-
Figure 83.
made his tenure short, and the house fell into disrepair.

Ten years ago the present owner began "restoration". The house is now structurally sound, with new foundations, plumbing, wiring, roofing, etc. Although the house is predominantly used in the summer, it is being made for winter use as well.
Figures 84, 85.
Figures 86-88.
Clockwise from below:
South Elevation.
1st Floor Plan.
West Elevation.

Sheffield: as is.
Figure 89. Plan, collage.
Kitchen no. 7 joint

circulation/pathways
no outside porch/verandah

bags etc.
workshop/gents' tractor, stores, vehicles

entrance? from West

extra bedroom above
inside circulation space

FEB 08 1981

FEB 09 1981
Figures 90-92. (Left to right)
Early sketches. Access along west side of building. Corner at southwest becomes pavilion.
Figure 93. Elevation, axonometric. East elevation showing maximum distance roof can come down. Sleeping porch/ dining area on southeast corner.
Figure 94. Inhabitable dormer extension from 2nd floor for bathroom. To north of kitchen is the mudroom, to the south is a screened in porch area.
Figure 95. Elevation, west. 'Building within the vernacular'. Corresponds to Fig. 94.
Figure 96. Plan. Alternative to Fig. 94.
Outside edge to be used in summer for circulation, in winter for wood storage.
Southwest corner becomes bigger, the sleeping porch/or greenhouse at end becomes 'lacier' than the corner room.
Figure 97. Elevation, west. Corresponds to Fig.96. The plate remains in tact in this 2nd story solution.
Figure 98. Plan, elevation (south).
Short extension of 2nd floor to the south. Pavilion on end.
W= wood storage.
LP= living room porch.
Figure 99. Plan, elevation. Same as Fig. 98, but reorganized pavilion/sleeping porch becomes lighter.
Figure 100. Elevation (west), section (east-west through stairwell).
Extending new roof from existing collar ties to explore kitchen/dining space below. Plate remains unsevered.
too dark too much wasted space too enclosed
short long
fixed & flexible occupation plan to show what happens
armchair
Figure 101. Plan, elevations (west, below; south, right) Small extension from south on 2nd floor, double shed roofs on sleeping porch on south end.
Figure 102. Plan
Figure 103-105. Elevations. (top to bottom: west, west, south).
Former extensions, within existing rafters.
South elevation showing a window seat/ small bed projecting from 2nd floor bedroom.
Figure 106. Axonometric from SW. Corresponds to Fig. 105.
Figure 107. Plan
Figure 108. Elevation, south.
Figure 109. Axonometric from SW.

Final sketches.
Figure 110. Elevation, west.
Corresponds to Figure 102.
Figure 111. Elevation, south.
Corresponds to Figure 102.
Clockwise from bottom right:
Figures 112-118. Aalto.

Figure 112. Plan, Saynatsalo Town Hall. Courtyard plan. See Figures 29, 73.

Figure 113. Site plan. Appendage to north becomes smaller, but still provides enclosure. See figure 99.

Figure 114, 115. Plan, elevations, Paataso. Compositional framing of the mid-19th C Town Hall with the new buildings. See Figures 14 et al.

Figure 116. Site plan. Response to landscape, topography. See figures 75, 76.

Figure 117. Detail. Collage. See Figures 57, 58.

Figure 118. Plan. Directional fields. See figure 30, 98.
Clockwise from below:
Plan, Saynatsalo.
Site plan, Aalto House in Helsinki.
Plan; sections of Theater and Concert Hall at Kuopio.
Site plan of Aalto summerhouse at Muuratsalo.
Detail of courtyard elevation showing use of bricks.
Plan Maison Carre.
Clockwise from right:
Figures 119-122. Aalto (2)

Figures 119, 120. Note the form continuity between door handle and roof section. Large scale and small scale design decisions should belong to the same family.

Figures 121, 122. Degrees of enclosure. See wall in figure 43.

Figures 112-122 from:
Top to bottom:
Figures 123-125. Atelier 5.


Figure 125. Brugg. The lookout window could have been a beginning of a formal organization to the end wall, as well as a means of inhabiting it. See figure 82.

Figures 123-125 from:
GA : (Global Architecture)
Atelier 5.
Halen Housing Estate near Bern, Switzerland.
[left]

Apartment in Brugg, Switzerland.
[below]
Top to bottom:
Figures 126-127.

Degrees of intensification of the corner, as shown by attitudes on glazing. Also continuity; while top part of windows stays the same, the bottom part can change. See figure 64.

Figures 126-127 from:
Nirwana-flats
Den Haag [left]

Zonnestral TB Sanatorium
Hilversum [below]
Figures 128-132. Frank Furness.

Top figure shows farmhouse before transformation, bottom figures after. The continuation of directions extant in the old and the introduction of a new design vocabulary (the gable end peaks, new siding materials, etc.) make the transformation. See figure 82.

Figures 128-132 from:
Transformation of Samuel Shipley House
left: before
below: after

22-2 Exterior of farmhouse from south. Before 1882. Courtesy Mr. and Mrs. Alexander Phillips
Top to bottom:

Benacerraf House: The plan introduces an exaggerated version of an existing form, the curved wall, while simply continuing the back wall, making no distinction (in plan) between new and old. The zones of usage between public (garden) and private (inside) in plan seem more transitional than in elevation.

Claghorn House: The original entry has been reorganized (as in fig. 90 et al). The lighter, screened addition provides transition. See fig. 102.

Figures 133-136 from:
Benacerraf House Addition

Claghorn House Addition
Figures 137-140. Greene & Greene, Gamble House.
The additive forms and levels of public/private space are shown in plan. The variety of application of the family of forms is shown in elevation. Compare with Shingle Style references.

Figures 141-144. Karl Larsson.

The studio was the first part, the rest was subsequently added /or converted. The plan shows the strong enclosure necessary in the northern climate, nevertheless articulation on the outside is not neglected, as the elevation shows. The small drawing on the bottom is of the window detail directly above it in the elevation. See figure 105.


Top figure showing MacKintosh's early elevation study above
a. a studio by Voysey, 1892.
b. Ricardo's competition design for Oxford Town Hall, 1892.
The windows in the Voysey design resemble strongly those in the Glasgow School of Art. The two towered corners and glazed 'infill' of Ricardo's Town Hall also resembles the Glasgow School of Art.
The small study of a bay window, done by MacKintosh in 1895, resembling Glasgow.
Drawings (below) of the Glasgow School of Art.
See figures 40-42.

Figures 145-147 from:
David Walker's chapter on MacKintosh in
Elevation Studies

22. Study by Mackintosh, published in 1888, of an old house at Lyme Regis, with a bay window resembling that used by him at Glasgow.

24. Palace Court, London, by J. M. Mackintosh, 1895, with a balcony window related to that used by Mackintosh in the Glasgow School of Art.
Figures 148,149. Carlo Scarpa.

The levels of containment, continuity, completion, and collage are best shown in Scarpa's Brion-Vega. The entry (above) shows Scarpa's affinity with Mackintosh, the space (below) with FLW. See figure 41.

Figures 148-149 from: GA (Global Architecture) #51 on Carlo Scarpa.
Cemetery
Brion-Vega,
S. Vito,
Treviso,
Italy
Figures 150-155. Maurice Smith.
The Blackman House, Groton, Mass.

Top left: The corner of the building is experienced from inside, by bringing the room edge back. The transition from inside to outside is more apparent, and softened. See fig. 95.
Top right: Looking down length of upstairs hallway, with entry/ greenhouse to right. The entry is a space between inside and outside, so has qualities of both. See fig. 102.
Middle left: Ground form goes up to give enclosure. See figs. 57,58.
Window/corner see fig. 64.
Middle right, lower left: Access along side of building. Perambulatory in association with building.
Lower right: Roof plane change in section (as in middle right, lower left). See fig. 101, south elevation.

Photographs by the author.
Figures 156-157. Mies van der Rohe. Figure 158. Greene & Greene.

Van der Rohe's directional fields (in plan) give partial containment while remaining orthogonal. Compare with Aalto references (plans). See fig. 43.

Greene & Greene's Pratt Residence places the entry at the spatial junction of the two directions, intensifying the junction. See fig. 28.

Figures 156-157 from:

Figure 158 from:
Current & Current. ibid.
Mies van der Rohe
Greene & Greene

House at Berlin Building Exposition 1931

Project for a Brick House

Pratt Residence
[G&G]
Figures 159-163. Frank Lloyd Wright.

While the Nakoma plan uses the directional change junction as a collector, the Taliesen West plan incorporates the direction change as perambulatory and transition zone.
See figs. 28, 77, 79.
As the Nakoma Country Club was to occupy the historic Winnebago Indian Camping Ground site, Wright echoed in the form of the main roof, as in some of the Tahoe cabins a few years before, the pitch of a wigwam. It is one of the rare instances of Wright's specific inspiration from an artistic form of the past.

Nakoma Country Club

Taliesien West
Taliesien III
The spatial junction here is special: a chicken coop. The variety of spaces within the additive form is quite unique, and the generative quality of the plan, although similar to the Little House in its expanse, is more complete.

It is possible to see the Little House as an embryonic version of Taliesien III.

The McCormick House plan shows the additive quality of Wright's work: it was a 'holograph' plan, where one could see roof, floor, ceiling, floor, ground at once. The privacies are naturally darker than the more public zones.

Figures 159-163 from:
Taliesin III

F.W. Little House

H. McCormick House
The perambulatory zone at the rear of the house serves as transition and collector. See fig.102. It is also shown in section. The difference of public to private is shown in the two views of a Tokyo dwelling. The additive bay window is shown on lower right. See fig.111.

Figures 164-169 from:
Morse, Edward F.: Japanese Homes and Their Surroundings, Charles Tuttle Co., Rutland, Vt., 1972. This was originally published through the Peabody Museum in Salem, where Morse was the director from 1880-1914.
Japanese Residential

Fig. 30. — Street View of Dwelling in Tokyo.

Fig. 31. — View of Dwelling from Garden, in Tokyo.

Fig. 32. — Section through Veranda and Guest-rooms.

Fig. 33. — Plan of Dwelling-house in Tokyo.

Fig. 34. — Elevation, Village of Osaka, House.
Figures 170-173. 'Shingle Style Additive'.
The generative aspects of Shingle Style form making went beyond envelope extensions. Peabody and Stearn's plan of 'Kragbyde' (lower right) shows this. Porches, verandahs, porte-cochères, bay windows, even turrets, towers and inhabitable chimneys were status quo.

235 Shingle Style Additive

Peabody & Stearns [below]
H.H. Richardson [lower left]
Bruce Price
W.A. Bates
Potter & Robertson [left]

(After V. Scully)
Figures 174-177. Miscellaneous References.

Courtyard organizer plan of A.M.Brown's East Farm. See fig. 29.
Screened porch within roof zone of Louisiana farmhouse.
Perambulatory/verandah within roofed zone of Newport Casino by McKim, Mead, White. See fig. 109.
The long wall behind the Vale Mansion (by Samuel MacIntyre) has several greenhouses attached to it. The wall is brick, ±10' tall, ±300' long. The greenhouses were looked at by the author in connection to the Billerica project. The greenhouse on the left, the 'grape house', has the least heat loss of the three because of the built zone behind it, which acts as an insulator. That is the condition proposed at the N.Billerica site.

Figure 174 from: Architectural Record, 1919.
Figure 175 from the author.
Figure 176 from V.Scully, ibid.
Figure 177 from The Vale Mansion.
Clockwise from top:
Plan: 'East Farm', Stoneybrook, L.I., by A.M. Brown.
Louisiana farmhouse, Vinton, Louisiana.
Site plan, The Vale, Waltham, Mass.
Verandah, Newport Casino, by McKim, Mead & White.
Figures 178-180. Miscellaneous References.
Kepes' 'Descending Light' suggests an organic transition from one condition to another.
Klee's 'Green-Orange Gradation...' suggests a similar additive quality to FLW's 'holograph' plan (fig.163).
The overlapping quality of the line drawing has an association to layered tiles, shingles or the like, where a perpendicular line cannot intercept another directly above it.
See figs. 24-26.

Figure 178 from:

Figure 179 from:

Figure 180 from:
A trace drawing by the author from the Praeger book above.
Clockwise from below:
'Descending Light' by Gyorgy Kepes.
'Green-Orange Gradation with Black Half Moon' by Paul Klee.
Line drawing after Paul Klee.
Figures 181-182. Miscellaneous References.
Palladio's addition to the Basilica in Vicenza was the addition of an extra layer (of 'order' over 'disorder'). See fig. 83.
The additive nature of Piazza San Marco is enriched rather than lessened by the multiplicity of architectural styles. Even 'fundamental' concerns like the alignment of cornice lines (see arrow) do not seem very important.

Figure 181 from: Ackerman, James: Palladio, Pelican Books, Baltimore, 1966.

Figure 182 from: Old and New Architecture, ibid.
Below:
Plan, Basilica, Vicenza, by Palladio.

Left:
View from Northeast corner of Piazza San Marco, Venice.
Figures 183-186. Miscellaneous References.
The work schedule is included to show that all four designs were carried on simultaneously; that they progressed together, rather than one being more or less completed before another began. A chronologically organized list of the drawings follows. The Shapiro House, designed and built by the author in 1978, is an earlier example of a concern for the ability of a house to 'contract' or 'expand' depending upon the season. Generative form making is a part of that concern.
Axonometric and plan of previous work done at MIT. A hypothetical extension of Holyoke Center to Harvard Yard and Lehman Hall.
Clockwise from below:
Thesis work schedule.
Axonometric, Shapiro House, E.Burke, Vt.
Axonometric, Holyoke Extension.
Plan, Holyoke Extension.
[by the author]
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<td>01.02-05</td>
<td>Access diagrams</td>
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<td>01.27-31</td>
<td>Elevations, collage, ground form</td>
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<td>02.02</td>
<td>Plan, collage of rooms</td>
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<td>02.08-09</td>
<td>Plans, Elevation #A</td>
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<td>Plan, Elevation #B</td>
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<td>Access studies, program studies</td>
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<td>Geometry of street, c.yard</td>
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<td>Roof plan, east elevation</td>
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<td>02.21</td>
<td>Plan, south elevation</td>
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<td>02.21</td>
<td>Plan</td>
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<td>02.22</td>
<td>East elevation, ground form</td>
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<td>02.22</td>
<td>Plan</td>
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<td>East elevation, collage</td>
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<td>Sketch, ground form</td>
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<td>Site plan</td>
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<td>Ground, 2nd floor plan, 3 apts.</td>
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<td>03.04</td>
<td>Plan, directional angles</td>
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<td>03.05</td>
<td>Ground floor plan</td>
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<td>03.06</td>
<td>Site plan, section</td>
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<td>Ground floor plan</td>
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<td>03.09</td>
<td>Section BB</td>
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<td>South elevation, east elevation, roof plan</td>
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<td>Elevation, Essex Street</td>
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<td>03.13</td>
<td>Elevation studies, sketches</td>
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<td>03.14</td>
<td>Elevation, Essex Street</td>
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<td>03.24-5</td>
<td>West elevation, amended 4.04</td>
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<td>Plan</td>
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<td>03.27</td>
<td>Plan #A, south elevation, west elevation</td>
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<td>03.27+31</td>
<td>2nd floor plan</td>
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03.30  Sh  South elevation, axonometric, west elevation  
       roof studies, axon.#2  1"=16'
03.31  Sh  Axonometric  1"=16'
04.04  Sh  South elevation  1"=16'
04.08  Sa  Elevation, entrance to Marine Hall  1"=8'
04.08-10 Sa  "  "  "  "  "  1"=8'
Aalto House; Helsinki. Plan.
Sumila Factory.
Sumila Rowhouses. landscape.
Varkhause Sawmill. Roof section.
MIT Dormitory. Diagonal orientation.
Kuopio Addition. Plan.
Maison Carre. Plan. Section.

Mechanics Hall

Parrish Art Museum.

Yale Dormitories. Reuse.

Bodegas Guell. Detail.

Monteleone Addition.

East Farm; Stoneybrook. Plan.
Harlem River Apts. Plan.

Exeter Towers. Fit.

Pazzi Chapel. Plan.

Singel Canal; Amsterdam. Plan.

Renwick Building; Vassar College

Faculty of Law; Urbino. Plan.

Cambridge High School Addition. Plan.

Carpenter Center. Plan.

Palau de la Musica Catalana. Construction.


Aalto, Alvar

Anderson, Notter.
Asplund, Gunnar
Atterbury, Grosvenor
Barnes, E.L.
Berenguer, Antonio
Bernard and Bernard
Brown, Arcibald Manning
[Peabody, Wilson, Brown]
Bradley, Stefian
Brunelleschi, Filippo
Cahan, Albert

Carlhian, Jean Paul

de Carlo, Giancarlo

Catalano, Eduardo

le Corbusier

Domenech, Luis

Duiker, Jan
Robert Hoe House; L.I. Plan.
Winsor House. Roof articulation.
Schulman House. Plan.
Appleton House. Additive qualities.
Richards Medical Center. Contextural fit.
Sterling H.S. Extension. Elevation.
Glasgow School of Art. Elevations.
Sherman Fairchild Center. Elevations. Fit.
Penn Mutual Tower. Plan. FAR.
5t Savings Bank; Salem, Mass. Street edge.
Basilica; Vicenza. Plan. Layering.
Kraghsyde; Manchester, Mass. Continuities.
Citicorp. Section. Pedestrian edge.
Sanctuary of Meritxell. Elevations. Continuities.

Emerson, William
Furness, Frank
Graves, Michael
Hunt, Richard
Kahn, Louis
Laurana, Luciana
MacLaren, J.M.
MacKintosh, C.R.
Mitchell, Giurgola
Moore, Charles
Padjen, Oscar
Palladio, Andrea
Peabody, Robert
Pietila, Reima
Rodia, Simon
Scarpa, Carlo
Sert, Jackson
Smith, M.K.
Stubbins & Assoc.
Taller de Arquitectura
Wright, F.L.
Unity Church. Plan. Enclosures.

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