Aesthetic and Production Theories as Enablers of Prefabricated Housing

Michael O'Brien
Texas A&M University

A.J. Downing's book "Cottage References" (1842) provided an expanding American population a vision of ideal houses and the means to achieve them. Downing's publication was both one of the least expensive to purchase, and one of the earliest to include plans and elevations needed by rural carpenters to bring this latest of fashions to homesteads in emerging hamlets across the Midwest.[1]

Downing further established his place as tastemaker in housing design with his follow-up publication "The Architecture of Country Houses"[2] in 1850. A brief consideration of the some of the titles in the table of contents helps us understand why.

- On the Real Meaning of Architecture
- What a Cottage Should Be
- Materials and Modes of Construction
- Designs for Cottages
- What a Farm-House Should Be
- Designs for Farm-Houses
- Miscellaneous Details
- Hints for Cottage and Farm Stables
- What a Country House or Villa Should Be
- Designs for Villas or Country Houses
- Interior Finishing of Country Houses
- Furniture
- Warming and Ventilating

Downing is writing from a position of authority in "Country Houses" when using titles like "What a Cottage Should Be." He supports this assertion of authority when he elaborates a range of concerns from functional and aesthetic to the technical construction of the roof edge treatments, mouldings and trim and includes the latest information on heating and ventilation. This broad range seems to have been intended to make "Country Houses" the only book a prospective homeowner, whether rural or urban, upscale or "workingman," would need to own. As Ruth and Schwarz assert, "Cottages" and "Country Houses" become one of the first mass-market pattern books in America.[3]

As the leading "taste-maker" in housing for America, Downing's illustrations, explanations and cost estimates promoted a rapid dissemination of the designs within "Country Houses." Fully 41%, or 13 of the 31 house designs Downing illustrates feature Board and Batten Siding. These houses are primarily the smaller type, named to give a workingman or farmer a design to aspire to: one made for their specific circumstances.

Housing prefabricators proliferated in the period from 1830-1870, riding the wave of the growth in population. Chicago alone grew over 380% in population during this timeframe.[4] Firms like the Richards, Norris and Clemens Millwork Company and the Lyman Bridges Company appear to have been leaders in the industry. In the East, firms like Derrom's and Hodgson appear to have been leaders in the production of sectional housing systems.

Lyman Bridges, also known as Major Lyman Bridges and Colonel Lyman Bridges at various times during and after his service as an artillery officer during the Civil War, arrived at a point of historical prominence in 1867 when he shipped and assembled two distinctly American structures to the Champ de Mars for the Paris Universal Exposition.[5] "The Western Farmer's House" designed by O.L. Wheelock and fabricated in sections for shipment through New York to Paris, was awarded one of 76 silver medals awarded to the United States exhibitors and accounted for by commissioner James Bowen of Chicago.

Part of the attraction for the simple farmhouse was its ordinary-ness. "The building did not conform to any special order of architecture," [6] but featured design and technical innovations like an unfinished second floor, and the sectionalized nature of its construction, associated with its affordable price of $300.00. The house is described as having been "a centre of attraction" for the thousands of European visitors.

Put in the context of typical conditions for European farmers housing, Blake writes "*But greater interest attaches to the exhibition of rural habitations, of whatever material, adapted to all classes of laborers and every grade of fortune, including the log-houses of remote settlers and those of the transitional condition, from a humbler to a higher state of prosperity and comfort corresponding with the use and development of condition and wealth in settlements of rapid growth, in which no country can compare with America. A row or group of this kind would speak strongly to the eye and the mind. It would contrast strongly with corresponding groups from different parts of Europe and the East, where characteristics are immobility and poverty-no growth, no change.*"[7] The "Western Farmhouse" by Wheelock and Bridges carried the American Dream into the heart of the first world.

In considering the prefabricated houses advertised by Lyman Bridges of Chicago, little is known of the details of their production, shipping and field assembly. But given that Bridges was operating in Chicago during the opening of the West, he most likely encountered and had to compete with other producers of "Sectionalized" homes.

One such producer was Richards, Norris and Clemens, a Chicago millwork firm that was advertising sectionalized housing for sale as late as 1872. If the Richards sectionalized house provided competition for Lyman Bridges, then the methods described by the Richards company's 1872 sales brochure might have been common to many producers of "Sectionalized" houses.

Key characteristics of the houses advertised by Richards, Norris and Clemens were:[8]

- Vertical board and batten siding
- Roof, floor and wall sections 3.5 feet wide
- Requiring only 2 or 3 persons to assemble
- Sections fit railroad car and farm wagon
- Doors and windows are pre-installed in wall sections
- Requires roof battens at section joints
- "Any man of ordinary intelligence" can put up the house following the directions
- All parts are fastened together with bolts
- Pay in cash
- Ships with tools, "screw-wrench, screw-driver, bolts, iron washers, corner and angle irons"
- Pre-mixed paints available.

Considering these characteristics in order, the first incongruity with light wood framing is the depiction of board and batten siding. The early advertisements by Col. Derrom, Lyman Bridges, as well as Richards, Norris and Clemens clearly show vertical board and batten siding.

As most builders know, light wood construction is approached in a layered manner, with each layer applied above being perpendicular to the layer below. In early light wood "balloon" frames, the wall studs that supported the siding ran vertically, meaning that the "balloon" frame did not offer a suitable nailing surface for the boards given the standard 12 or 16 inch on center stud spacing. Horizontal blocking would have had to have been added to the "balloon" frame between the studs to provide a nailer for the siding.[9] Jensen points out that Andrew Jackson Downing, Vincent Scully and Henry Russell Hitchcock all connected the formal aspects of the vertically framed studs with the vertical board and batten siding. But the "balloon" frame was not the product of the early 1800s design culture. It was the product of pragmatic carpenters struggling to keep up with the construction demands of a rapidly expanding population. As Blake's report says of Bridges "Western Farmers House:" "It is decidedly American in its construction—plain, substantial, and convenient—representing thrift and comfort without display." [10] The house and schoolhouse displayed by Bridges at the Paris Universal Exposition were not the products of a design culture.

The only published images of the "Western Farmers-House" and the "American Primary School House" appear in an article by John P. Reynolds titled "State of Illinois and the Universal Exposition at 1867 at Paris France" Blake records that these two buildings were "forwarded in sections by railway to New York."[11] Yet the images of these buildings published by Reynolds show none of the joining methods typical to Derrom (a 4-6 inch wide batten strip) or any vertical battens that could be used to conceal the joints between sections of the buildings. Both structures in Reynolds' article are shown with horizontal

siding and no indication of a batten to cover a section joint in either the wall or the roof.

Thinking about the "balloon" frame as a series of vertical studs, 12 to 16 inches on center, the horizontal siding makes perfect, pragmatic sense. There was a stud located every 12 to 16 inches: a stud to receive the nail from the siding.

So we may hesitantly conclude that the "Western Farmers-House and the "American Primary School House" were more likely to have been "balloon framed." But why does the Lyman Bridges catalog of 1870, included in the Iowa Railroad Land Company pamphlet titled "Choice Iowa Farming Lands," show 19 designs with vertical board and batten siding?

Perhaps it was the market. Bridges' firm was active between 1866 and 1875 as a material and readymade home supplier in Chicago.[12] A.J. Downing's "Cottage Residences," printed in 1845, began a fashion that favored the upright, picturesque, Carpenter Gothic and mostly vertical board and batten siding.

That Richards, Bridges and Derrom all featured (almost exclusively) the board and batten siding may be explained by the market segment they dealt with: the homesteader market, frugal but not without refinement as described in the Iowa Lands Catalog: "Of course in all these designs, economy rather than display, is the leading feature."[13] Carpenters would propose that the pattern of line and shadow produced by the vertical board and batten would mask the imprecision of the tall balloon stud walls. Horizontal patterns would tend to exaggerate the bowing and twisting of the tall, green studs.

The non-housing designs included in Bridges' 1879 catalog seem to support the market fashions as a reason for advertising the more difficult to install board and batten siding.

An alternative explanation, and the one I would underscore here is that the board and batten system offered the most flexibility in "hiding" the joints between sections of exterior wall. Given what we have learned about the Richards system, and an affirmation by "The Manufacturer and Builder:"[14] "*The sections are prepared, either with narrow matched boarding and a molded batten over the joint, formed as a battened door, or can be framed in panelized work to suit the fancy. At the principal joints of the siding sections it is advisable to have a wide batten molding both exterior and interior"* and "*All these sections are to be made interchangeable, so as to fit any similar compartment."*

So while Bridges' house and school exhibited in Paris have a close association between their balloon frame and horizontal siding, Bridge's contemporary "Sectional" product line had a similar close connection between its appearance and the process used to produce it.

Not quite a century after these early prefabs were being produced for the expanding Midwest, the Federal Government, under the auspices of the Farm Security administration turned to very similar sectionalized housing methods as a way to improve the housing and sanitary conditions of the sharecroppers in Pettis and New Madrid Counties, Missouri.[15] The "Southeast Missouri Farms Project" built hundreds of houses built or improved over 900 schools and 750 other buildings.[16]

The Farm Security Administration employed a team of distinguished photographers to document many aspects of the prefabrication, sanitary systems and community buildings built under its auspices. The photographers included:

- Russell Lee
- Arthur Rothenstein
- John Vachon
- Dorothea Lange

These photographs give us a rare and comprehensive look into prefabrication methods that appear very similar to those used by Derrom in 1876. The FSA program not only provided housing and sanitation but also jobs and training for the local population. Lumber was precut, assembled into standard wall, wall with door or window, and roof components which were pulled from the stocking yard per order for each house built, exactly as Col. Derrom had proposed and produced. In this project, prefabrication is driven by the need to centralize materials handling and tooling. This allowed the FSA to accomplish more with less "up front" investment in tooling and less diffusion of materials across the rural countryside to reduce pilferage.

Fig. 1. Southeast Missouri Farms Project 1938. Panel fabricating yard, photo Library of Congress, LC8a23013u.

Fig. 2. Southeast Missouri Farms Project 1938. Wall Panel Stockpile, Library of Congress LC8a23069u.

Fig. 3. Southeast Missouri Farms Project 1938. Wall Panels Loaded on "Toaster" style delivery truck. Library of Congress LC8a23061u

Fig. 4. Southeast Missouri Farms Project 1938. Wall Panel and Truss Installation showing seams for Battens. Library of Congress LC8a23019u

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[1] Brent, Ruth, Benyamin Schwarz, Popular American Housing. Greenwood Press, Westport, CT. p. 45.
[2] Downing, Andrew, J. The Architecture of Country Houses, New York, NY, Dover. 1969.
[3] Brent, Ruth, Benyamin Schwarz, Popular American Housing. Greenwood Press, Westport, CT. p. 45.
[4] Bancroft, Hubet, H. The Book of the Fair an Historical and Descriptive Presentation of the World's Science, Art, and Industry, as Viewed through the Columbian Exposition at Chicago in 1894 Bounty Books, New York, NY Ch. 2, p. 31.
[5] Blake, William P., Reports of the United States Commissioners to the Paris Universal Exposition, 1867. U.S.G.P.O. Washington, D.C., 1870. Pp. 310-311.
[6] Blake, ed. *Reports* I, p. 310.
[7] Blake, ed. *Reports*, I, p. 33.
[8] Peterson, Charles E., Prefabs for the Prairies The Journal of the Society of Architectural Historians, Vol. 11, No. 1 (Mar., 1952), pp. 28-30. Published by: Society of Architectural Historians
[9] Jensen, Robert, Board and Batten Siding and the Balloon Frame: Their Incompatibility in the Nineteenth Century, The Journal of the Society of Architectural Historians, Vol. 30, No. 1. (Mar., 1971), pp. 40-50.
[10] Blake, ed. *Reports*, I, p. 253.
[11] Ibid., p. 310.
[12] Weiss, Ellen, Americans in Paris: Two Buildings, The Journal of the Society of Architectural Historians, Vol. 30, No. 1. (Mar., 1971), footnote 8, p. 167.
[13] Iowa Railroad Land Company "Iowa Farming Lands, 1,000,000 Acres for Sale" Iowa Railroad Land Company, Cedar Rapids, Iowa, 1870, p. 37.
[14] Col. Andrew Derrom's Improved System of Sectional Construction. The Manufacturer and Builder, April, 1876 p. 92.
[15] Parker, Paul E. A Portrait of Missouri, 1935-1949: photographs from the Farm Security Administration, 2002, University of Missouri Press, Columbia, Mo, pp 12-15.
[16] Ibid., p. 6.