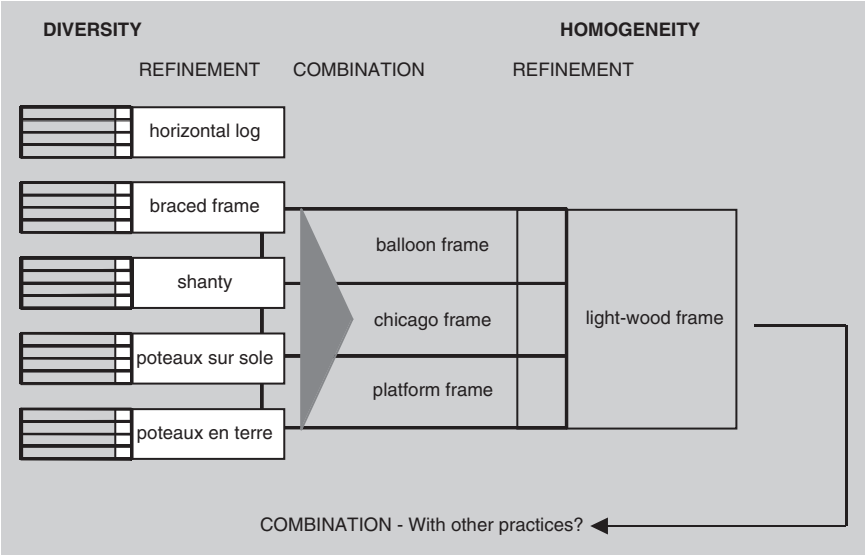

Fig. 1 The hybrid cycle applied to the development of the balloon frame construction system

Fig. 2 Raising the framed walls of the balloon frame. 1941. (Alfred T. Palmer, photographer, 1941, Library of Congress, Prints & Photographs Division, FSA/OWI Collection, LC-USE6-D-000861.)

wood construction practices like Japan and Norway. The method is linked to a distinctive type of lumber, a major export of North America. It has also been substantially unchanged for a century and a half suggesting that it is a uniquely qualified solution, showing resistance and resilience during a period of considerable technological change – it behaves like it has a thin notion of function displaying a reliable association between input and output. Over time, critical challenges to this technology has led to gradual adaptations that have added up to decreased functionality in favor of function, organized its usability into certain specific ranges of use, and displaced from the collectively intentioned practice flexibly described in multiple overlapped traditions to the equivocal intention to support a massive technological system. Thomas Hughes (1989) claimed that artifacts are socially malleable when industries are young, but resistant to social influence once they have matured. This description rings true for the history of wooden house construction.

In its early stages, North American light wood frame demonstrated a kind of democracy of design; everybody was an agent promoting a collective intent for innovation. Today, it tolerates local variation and limited appropriation, while binding the builder or consumer into a massive technological system of production. This system includes the unintended use of everything from plantation forestry using non-native species to the regularized experience of uniform ceiling heights in houses. The house construction system has combined the three aspects of design, production, appropriation, and consumption, in substantially different ways over the course of its development, currently embedding them into a large technological framework that integrates all aspects of production and consumption.

Balloon frame, a version of light wood frame, exhibited early in its development entirely different propensities. It was part of an assimilative design process, combining in a myriad of ways the diverse set of frontier construction practices. Frequently, first encounters between cultures create a vibrant middle ground. Builders' guides focused on the frontier, explaining to the settler these new ways and emphasizing utility, expediency, and efficiency. In the process, the technical code was gradually regularized and codified. These early variations tested their performance against the new utilitarian criteria of the frontier; a frontier that saw an estimated 827,000 new homes built between 1830 and 1850 and an associated redistribution of natural resources unprecedented in history. This was the nineteenth century equivalent of rapid prototyping.

2.1 Feenberg's Theory of Instrumentalization

Feenberg's analytical tool of primary and secondary instrumentalization can identify particular properties and/or effects of the construction system in both its historic and contemporary guises. Feenberg (1999) describes primary instrumentalization as aspects of the universal essence common to all technology; "…a historical concept