A Survey of Nineteenth-Century Folk Housing in the Mormon Culture Region.

Leon Sidney Pitman
Louisiana State University and Agricultural & Mechanical College

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A SURVEY OF NINETEENTH-CENTURY FOLK HOUSING
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The Louisiana State University and Agricultural
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Geography

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A SURVEY OF NINETEENTH-CENTURY FOLK HOUSING
IN THE MORMON CULTURE REGION

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Geography-Anthropology

by
Leon Sidney Pitman
B.S., Brigham Young University, 1965
M.A., The University of Oklahoma, 1966
May 1973
DEDICATION

To my father,
George Howard Pitman,
son of a Mormon pioneer,
who was eager and willing
to discuss old Mormon houses

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I wish to express my deepest gratitude to Professor Milton Newton for his suggestions, criticisms, and scholarship. His sincere interest in my research topic and his constant encouragement have been of inestimable value. I also wish to thank Professors Miles Richardson, Donald Vermeer, Jay Edwards, John Loss, and Sam Hilliard for reading the text and making many helpful suggestions. A special thanks goes to Professor Fred Kniffen, whose research and teaching first led me to an interest in folk housing studies.

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ABSTRACT

The broad concern of this study was to investigate the nature of nineteenth-century Mormon folk housing in the Far West Mormon-settled area. The rationale for the study was based on the assumption that Mormon people, who were gathered from a wide diversity of cultural backgrounds, were assimilated under theocratic rule and frontier conditions, and the degree of that assimilation is evident in the uniformity of certain cultural landscape features. Some landscape features such as the village street-and-field patterns became common because of Church policy or direct promotion by Church leaders, but folk housing forms were never prescribed or consciously promoted by officialdom. The depth of cultural assimilation and homogeneity can be better appreciated by an analysis of folk housing, for the perpetuation of standard housing types appears due more to an unconscious acceptance at the "grass roots" level of Mormon society than to direct policies set by Church hierarchy.

Two major aspects of folk housing are discussed in this study--the preparation and use of building materials, and the forms of the buildings. The pioneers' learning to prepare and use adobe, log, lumber, brick, and stone was an important stage in the common acquisition of folk skills, though the predominance of each of the materials varied in time and place. Variation in the predominance of building materials was due to accessibility and cost rather than to
cultural preference or assimilation processes. The use of specific building materials had no bearing on the basic form (floor plan) of the house.

New settlers founding the initial frontier settlements built temporary dugouts, cabins, and forts. These dwellings exhibited similarities in form throughout the Mormon region despite ethnic differences among the pioneer communities. Areal uniformity in temporary housing emerged in part because of the Church's practice of sending experienced frontiersmen with the novices when founding new settlements. In instructing newcomers in the methods of building cabins or dugouts, the experienced colonists relied on their own backgrounds and thereby disseminated their own folk skills and values.

In replacing temporary shelters with permanent housing, Mormons throughout the culture region adhered to a standard set of morphologically related house forms. Floor plans consisted of nearly square rooms joined to form one- and two-story rectangles which, when intersected or juxtaposed, achieved house plans here designated as "T," "L," cruciform, and "H." Similarities also occurred in roof structures, facade elements, and appendages, and in the arrangements of doors, chimneys, and stairways. Despite ethnic differences, the same set of house form concepts was disseminated in every Mormon community because of mobility within the Mormon area, cultural isolation from the world beyond Mormondom, and a willingness among all converts to achieve a self-sustaining
theocratic commonwealth through conformity to economic practices, social customs, and religious beliefs.

Barns, granaries, and other outbuildings exhibited similarities in every Mormon West community in the nineteenth century and thereby offer further evidence of the existence of commonly shared material folkways. Folk housing was patterned after the New England-Midwest hearth of Mormon culture and perpetuated in the Mormon Far West, creating a distinctive and really uniform Mormon culture region.

This study contributes significantly to a knowledge of Mormon folk architecture with a description and identification of the prevailing types of houses, barns, and other outbuildings built in the Mormon culture region in the nineteenth century. It contains an in-depth discussion of the origin, use, and significance of adobe among the Mormons and is the first comprehensive treatment of the procurement and preparation of the domestic building materials. Finally, it is the first analysis of folk housing patterns relative to material cultural assimilation among the Mormons.
CHAPTER I

INTRODUCTION

A human dwelling is more than a shelter; it is a physical expression of cultural traditions. In its form and structural details a dwelling preserves economic and technologic conditions, building practices, and clues to social status, mores, customs, values, and myths. The house, when systematically studied, yields valuable insights into the processes and patterns of human settlement. Thus, no geographical treatise on the settlement of any culture is complete without an in-depth look at its housing. Folk housing studies (including dwellings, barns, and outbuildings) may be used to establish the geographical origin of a culture, to demarcate cultural regions, to indicate the routes or areas of cultural migration and diffusion, and, especially in terms of the Mormon experience, to demonstrate the degree of cultural homogeneity and assimilation within the Mormon-settled Far West.

In 1847 the Mormons planted the nucleus of what eventually became a highly distinctive region in the Great Basin area of the West. Essentially a refugee population, the Mormons were united by persecution, by faith in a Zionist theology, and by strong charismatic leadership, and were continually strengthened in numbers by a steady influx of new converts. The goal of the Mormon movement under the powerful and practical leadership of Brigham Young was to establish
a self-sustaining commonwealth—isolated and free from harassment and the "corrupting" influence of others.

Because of the uniqueness and the unusual impact of the Mormon movement, scholars freely refer to the movement as a "culture" or "subculture" and the area which Mormons occupied a "culture region."\(^1\) (Meinig). The use of these terms when applied to any group or area implies not only a degree of distinctiveness from others but also a degree of unity or homogeneity as a result of the culture's adherence to a commonly-shared value system. The Mormon culture, as a highly cohesive agrarian theocracy, epitomized unity and conformity to religious principles as well as civic and social mores, customs, and values. Moreover, the relative isolation of Mormondom offered its members a measure of independence and freedom in which to consolidate their institutions and further heighten conformity.

The broad aim of this study is to investigate the degree of areal unity in the Mormon cultural landscape. With so much emphasis in Mormondom on conformity to established norms of behavior, it is important to investigate the degree to which the resulting cultural assimilation and homogeneity have been physically implanted on the land. More specifically, to what extent do the various Mormon communities

\(^1\)"Culture region" in this study is defined as a geographical area made distinctive by a culture's physical implant on the land. The material culture traits or elements that give a culture region its distinctiveness include building types, roads or other lines of communication, fences, fields, and all land use patterns.
resemble one another in terms of their folk housing patterns, and what processes have been responsible for fostering the recognizable likenesses and differences? There are at least two important reasons why an investigation of areal homogeneity in housing patterns is an especially worthy goal in the Mormon culture region:

1. The diverse ethnic origins of Mormons. The Mormon culture, unlike most old world societies, did not evolve from a single ethnic group in the distant past, nor from a single set of traditions; rather, it comprised peoples from many diverse cultures brought together and united under theocratic rule. To be sure, most of the original Mormon leaders and converts came from the nineteenth-century New England frontier and midwestern states, but to that original population base were added, before the turn of the century, more than 85,000 Mormon immigrants from Europe (Cannon, 893) and additional thousands from all over America, Canada, Australia, and other parts of the world. In fact, before the year 1900, 65 percent of the population of Utah was of foreign parentage (having at least one parent of foreign birth) and fully 35 percent were foreign born (Olson, 191). These various peoples were not evenly distributed throughout the Mormon area; many were concentrated in certain areas and "ethnic" communities--some predominantly Danish, others Swiss or English.

Organized groups of settlers in a new land usually reproduce the kinds of housing with which they are most
familiar. Because the Mormon-settled area is defined as a "culture region" (Meinig), implying areal uniformity in the cultural landscape, it is necessary to compare the housing of several Mormon communities in order to establish if indeed there is a noticeable areal uniformity. An areal survey of housing types in Mormondom could strengthen or weaken the notion that the Mormon area be identified as a culture region, and would shed much light on the degree to which the originally diverse cultures were assimilated under theocratic rule.

2. **The lack of official Church prescription in folk housing patterns.** Previous studies of Mormon settlement patterns show that strong similarities exist in village street plans, field patterns, cropping and irrigation practices, and general land use throughout the areas settled by Mormons (Nelson; Spencer, 1940; Francaviglia, 1970). The similarity of these occupancy patterns occurs primarily because of direct action or encouragement on the part of the Church hierarchy. The surveying of a proposed village site, for example, was much more subject to regulation from Church leaders than was the building of particular types of houses. In fact, specific pioneers who moved onto a newly designated settlement site often had little or nothing to do with the survey; a survey commonly preceded actual settlement. With respect to housing, however, Church leaders merely admonished the members to build substantial and attractive houses and sometimes suggested a preference for a particular building material; they apparently never designated specific floor
plans or overtly encouraged the construction of a particular house form or shape. Thus, folk housing patterns were much less subject to official prescription than were the more general aspects of settlement, and they could, therefore, theoretically differ considerably from one Mormon community to another in relation to the differences in the ethnic backgrounds of the occupants.

This study shows that, while building materials differed from place to place in Mormondom, the elements of house form or shape became similar throughout the culture region, indicating that an assimilation process occurred in folk housing concepts and that a common material folk trait complex emerged. The processes fostering the evolution of areal similarity in folk housing are only indirectly related to the settlement policies of the hierarchy of the Mormon Church, and resulted directly from the diffusion of concepts and folk skills under frontier conditions.

**Scope and Definitions**

Two major aspects of folk housing are discussed in this study: building mode and building form. Building mode, the principal subject of Chapter II, has reference to the preparation and use of construction materials. Implicit in all folk housing is the fact that the basic building materials are obtained from a local source and are prepared mainly by hand labor. A discussion of the Mormon methods of preparing and using the various building materials serves the aim of
this study by providing a more thorough understanding of the
diffusion of folk skills within Mormondom's diverse popula-
tion, and by explaining the spatial and temporal patterns in
the use of building materials in the Mormon West. In short,
a thorough account of the use of building materials must
precede any attempt at explaining the areal unity and diver-
sity in Mormon folk housing patterns.

A thorough examination of housing forms is the primary
subject of chapters III, IV, and V. "Form" as used here
refers to the basic shapes of the dwellings and other home-
stead buildings. The predominant elements of house form
within a particular society are expressions of that society's
concepts and values with respect to housing needs and prefer-
ences. Form analysis, therefore, further provides a basis
for judging the degree to which folk housing concepts and
values became accepted and perpetuated in the various Mormon
communities.

The term "folk housing" in this study refers to the
dwellings as well as the buildings normally erected on the
homestead, such as barns, granaries, and other outbuildings.
In the preindustrial agrarian society the house and out-
buildings are usually constructed, at least in part, by the
occupant family, the consumer; hence, the methods employed
in house building are generally common knowledge based on
deep-seated traditions. However, some degree of labor
specialization exists in the building trades in every pre-
industrial society, and tradesmen are widely employed in both
domestic as well as public construction projects. Nevertheless, with respect to house form and housing needs, the building tradesmen share the same concepts, traditions, and values as others and, in fact, they differ only in their degree of skill and experience at executing building tasks. In the preindustrial folk society, therefore, professional designers or architects are unnecessary in domestic construction, for the housing plans or designs as well as the skills applied remain in the hands of the consumers and tradesmen—the people at large—who perpetuate values and concepts handed them by local tradition.

For the first several decades after their establishment in the West, Mormons were isolated from an industrial economy, could carry on only a limited amount of trade with the states, and were thereby handicapped by an acute shortage of tools and equipment commonly used in the building trades. Their homes were necessarily built of native materials obtained from within a few miles of the building site and were often put together with only the crudest tools. The bulk of the houses built by the Mormons in the nineteenth century are therefore classified as folk types.

Not all of the houses built by the early Mormons qualify as folk types, however. Some large and rather elegant mansions appeared in Utah as early as the 1850s; by the 1880s several historic houses were built, especially in Salt Lake City where the most famous include Brigham Young's mansions and the Gardo and the Devcreaux houses (Goeldner, 31-33).
Such mansions are here referred to as high design. All folk societies are aware of, or coexist with, a high design tradition, are usually influenced by it, and in turn sometimes provide inspiration for the high design. But since most high design traditions cut across cultural lines, they are usually unrepresentative of the local culture. Most mansions in Utah have plans and designs totally unlike those of local folk tradition and are, therefore, eliminated from this study.

Also eliminated are houses of the nineteenth century which are here considered to be modern. The modern house is a product of a time in which the individual family is merely the consumer and not the designer and builder of the home. The modern house is typically designed and constructed by trained specialists capable of drawing and following formalized plans or blueprints, the product of which is not necessarily representative of local traditions. Frequently the consumer or occupant of the modern house is not personally acquainted with the builder and may not even share the same value system with respect to housing needs. The lack of a commonly-shared value system in the complex modern society is in part responsible for the multiplicity of new designs and styles introduced into domestic architecture. With respect to the building materials, again the modern house occupant is merely a consumer unaware of the origin of the materials (which is usually far beyond his own locality) or the techniques used in preparing these materials for construction.
Modern housing, though generally associated with the twentieth century in the rural areas, began earlier in the larger cities of Utah when the rise of national architectural styles followed the expansion of the railroads into Mormon country. By rail came building materials not previously available locally, and nationally distributed magazines and catalogues brought new ideas in house design. The selection of 1900 as the upper time limit in this study is suitable and convenient, for it generally marks the end of the folk building phases and the beginning of the more rapid influx of modern house types into the rural areas. Further, it marks the transition to modern designs in the larger cities.

The Study Area and Field Methods

Most of the fieldwork for this study was confined to the contiguous zone and Snake River zone of the Mormon culture region (Meinig, 201-204) (see Fig. 1, p. 10). The contiguous zone is the heart of the Mormon settlement in the West, a region which during the nineteenth century was almost completely dominated by Mormons, having been settled and developed under Church direction before the federal government finally succeeded in breaking the secular and political authority of the Church in the 1890s.² Settlements within

²For further reading on the relationships between the Mormon Church and the U.S. Federal Government before 1900, see Gustive O. Larson, The "Americanization" of Utah for Statehood (San Marino, Ca.: The Huntington Library, 1971), and Leonard Arrington, Great Basin Kingdom (Lincoln: Univ. of Nebraska Press, 1958).
Fig. 1. The contiguous and Snake River zones of Mormon settlement--1847-1890 (Based on Meinig, 202)

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the contiguous zone are, therefore, most typical of those developed under the theocracy, and the bulk of all nineteenth-century housing remaining in the zone today is the product of Mormons significantly isolated from Gentiles (non-Mormons). The fieldworker in the contiguous zone thus has a rather complete assurance of "cultural purity" in the traits selected for observation (Francaviglia, 1970).

The area has a north-south alignment extending from southeastern Idaho to southwestern Utah and adjacent parts of Arizona, Nevada, and Wyoming. Its eastern and western boundaries generally follow the crests of mountain ranges, but limitations in the expansion of the settled region were determined more by difficult terrain lying beyond the mountains than by the mountains themselves. Largely uninhabited deserts of the Great Basin lay westward, while eastward and southward the Colorado plateau likewise offered few settlement prospects. Better settlement potential lay to the north, but, until the 1880s, that area was believed to be too cold for successful agriculture. By 1880 essentially all of the arable valleys within the contiguous zone were settled; thus, post-1880 Mormon settlement expanded beyond the contiguous zone forming several island-like outliers of Mormon culture in Gentile territory. Outliers were established in all states surrounding Utah as well as in Alberta and Chihuahua, but by far the largest outlier is the Upper Snake River Valley of Idaho (Meinig, 205). Field work in the Upper Snake River Valley produced data consistent with Mormon folk
housing in the contiguous zone and thus that area has been included in this study.

Fieldwork procedures for the contiguous zone were planned in order to test the house type uniformity and diversity in all parts of the study area. A list of all Mormon contiguous zone communities having a population between 300 and 2,000 in 1900 was compiled. Eliminated from the list were all mining towns (which were usually non-Mormon) and the communities in the continuous urban strip between Ogden and Provo where few folk houses remain today. After these eliminations, 76 communities comprised the list, all of which are believed to be representative of rural Mormon agricultural villages established in the nineteenth century. By employing a stratified random sampling technique, eight communities were selected for a survey of house types (see Fig. 1, p. 10, and Table 1, p. 13). Two of the eight communities were settled primarily by European Mormons: Elsinore, a Danish settlement, and Mt. Pleasant, composed of Danes, Swedes, and Americans. The other six communities—Parowan, Kanosh, Coalville, Willard, Hyrum, and Paris—were settled primarily by American Mormons but each contained many foreign born residents skilled in the building trades. In Willard, for example, there remain today at least ten stone houses built in the nineteenth century by a Mormon immigrant from Wales (Giroux).

In each of the surveyed communities, attempts were made to locate all houses constructed before 1900 and to note
TABLE 1

STATISTICS OF POPULATION AND DATE OF FOUNDING
OF RANDOMLY SELECTED MORMON COMMUNITIES
IN THE CONTIGUOUS ZONE

<table>
<thead>
<tr>
<th>Community</th>
<th>Population 1900</th>
<th>Population 1960</th>
<th>Year Founded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parowan, Utah</td>
<td>1,039</td>
<td>1,486</td>
<td>1851</td>
</tr>
<tr>
<td>Kanosh, Utah</td>
<td>665</td>
<td>499</td>
<td>1859</td>
</tr>
<tr>
<td>Elsinore, Utah</td>
<td>625</td>
<td>483</td>
<td>1864</td>
</tr>
<tr>
<td>Mt. Pleasant, Utah</td>
<td>2,372</td>
<td>1,572</td>
<td>1852</td>
</tr>
<tr>
<td>Coalville, Utah</td>
<td>808</td>
<td>907</td>
<td>1858</td>
</tr>
<tr>
<td>Willard, Utah</td>
<td>580</td>
<td>814</td>
<td>1851</td>
</tr>
<tr>
<td>Hyrum, Utah</td>
<td>1,652</td>
<td>1,728</td>
<td>1860</td>
</tr>
<tr>
<td>Paris, Idaho</td>
<td>906</td>
<td>746</td>
<td>1863</td>
</tr>
</tbody>
</table>

floor plans, construction materials, facade characteristics, roof structures, chimney and door placements, and other details; much of this information was codified in the field. Additionally, detailed sketches and photographs were made of a large number of the 370 houses recorded in the eight communities. Interviews were conducted among scores of individuals including the occupants of the houses themselves, elderly residents, and learned individuals. It is believed that these procedures provided a reliable cross section of the relative importance of each of the major building materials and each of the most common house type patterns occurring in all parts of the contiguous settlement zone.

Fieldwork was not confined to the surveying of these eight communities. Observations, photographs, and interviews
were taken in numerous settlements throughout the zone of contiguous Mormon settlement and beyond (Fig. 2, p. 15), including the outlying area of the Snake River Valley. Observations also were made of housing in non-Mormon settlements in Nevada and Idaho to verify the uniqueness of Mormon house types in the West (Francaviglia, 1970, 1971; Spencer, 1945).

Archival research also yielded valuable data. Mormons are renown record keepers. Most of the earliest pioneers kept diaries in which they recorded not only their important spiritual and social experiences but also the mundane and trite happenings of daily life. These primary source materials contain many short, casual comments about pioneer homes, building practices, and materials procurement. Many of these original pioneer comments on housing have been extracted from various diaries and compiled by the Daughters of the Utah Pioneers, some material has been published (Carter, Carr), and other portions are in manuscript form usually available in library archives in the larger cities or college communities of Utah and Idaho.

**Contributions of This Study**

The description and the classification of folk house types undertaken here is an important addition to the growing body of information on the settlement and cultural geography of the Mormon culture region and makes the following contributions: (1) the first comprehensive area-wide survey of
Fig. 2. All communities in which folk-housing observations were made for this study.
Mormon folk housing, and the most thorough classification of Mormon folk house types; (2) the first systematic and comprehensive treatment of the procurement and preparation of the major construction materials in the Mormon area and the building practices associated with each material in folk construction; (3) the first comprehensive discussion of the origin, adaptation, uses, and significance of adobe among the Mormons, a material heretofore largely ignored in writing; (4) the first preliminary classification of Mormon barns and other outbuildings, and the first area-wide survey of homestead outbuildings; and (5) the first analysis of folk housing patterns relative to material cultural assimilation among the Mormons.
CHAPTER II

ACQUISITION, PREPARATION, AND USE
OF FOLK BUILDING MATERIALS

In a folk society, building materials are obtained from a local source and are prepared largely by hand labor and locally-fashioned implements. The knowledge of preparing and using the materials is generally shared in common, though the degree of skill employed in executing the tasks varies considerably among individuals. Most cultures exhibit a traditional preference for certain materials, but this preference tends to vary between cultures. For instance, brick and stone are most familiar to the British, log and lumber to the frontier Eastern American. But Mormon culture, as previously stated, consisted of peoples originally from many different cultural backgrounds. Indeed, the whole dramatic scene of Mormon settlement in the Far West required some social and material adjustments by virtually all participants. Some immigrants, especially the British, were generally ignorant of log working methods, other newly arrived pioneers were unfamiliar with stone masonry or brickmaking, and certainly not any of the Mormons were well acquainted with adobe before the Utah experience. But all of these materials became widely spread throughout the Mormon-settled region because of several factors fostering an assimilation and diffusion of folkways under frontier conditions. Thus, one of the goals of this chapter is to identify and discuss the
methods by which Mormons prepared the various building materials and continually passed on these skills to newly arriving pioneers.

Another aim in this chapter is to explain and account for the time and space variations in the predominance of each building material. As previously pointed out, it is important to the thesis of this study to determine the nature and degree of unity and diversity in the Mormon cultural landscape. Thus, all important areal and temporal differences in the use of building materials must be accounted for. To that end, a "building materials phase" concept is employed here. "Phase" refers mainly to the conditions under which the building materials are prepared and also indicates factors relating to the quality and use of the material.

"Initial phase" refers to the production of materials during the founding and early stages of a settlement on the frontier. During initial phase the production of building materials was mainly in the hands of the individual consumers handicapped by limited tools, supplies, and frontier conditions.

"Second phase" supersedes initial when the production of materials falls primarily into the hands of full-time businessmen or tradesmen who prepare the materials locally for sale or trade. This activity takes place in a community adobe yard, brick yard, lumber yard, or stone quarry and brings about improvements in building materials and changes in the predominant use of certain materials.
"Third phase" began late in the nineteenth century when certain materials such as lumber were imported from distant points beyond Mormon settlement and when mass production methods for making fired brick were established. The third phase marks the beginning of the end of the folk production of materials.

Generally, there was no specific time period associated with any one building materials phase unless the concept is applied to a specific place. For instance, in the Salt Lake Valley the initial phase began in 1847 and diffused outward with the advancing frontier so that by 1885, when initial phase had reached the Upper Snake River Valley, Salt Lake City had passed through a second and was undergoing a third phase in building materials utilization. A phase can be graphically conceived as a wave radiating outward from the Salt Lake Valley hearth to the fringe of the frontier, carrying with it certain conditions and factors which influence the acquisition and preparation of building materials. In any specific place, this wave or phase may last from five to fifteen years or more.

The spirit of the times and circumstances under which the initial phase pioneers learned and labored are excellently illustrated by Merriner W. Merrill (Carter, 1941, 39):

After getting the land matter settled and having a place to build a house, I set to with my wife and we made our calculations as to how we could best accomplish this object, that is—to get a home of our own. I arranged with Samuel Henrie to work in the Canyon with him on shares in getting out some lumber with which to build a house. I cut and slid the logs from
the side of the mountain, and he hauled them to the mill, about one mile. The mill got one-third for sawing, Brother Henrie, one-third for hauling and I, one-third for cutting and sliding. Thus I soon got lumber to build my small house and some to spare. After securing my lumber, I went to work and made adobes on the spot where I was going to build my house, afterward using the pit from which I took the clay, or material for the adobes, for a cellar. The adobe size was then four inches thick, six inches wide, and twelve inches long. I made 500 of these adobes each day, commencing as soon as I could see in the morning and working as long as I could see at night.

After getting my adobes all made and piled up nicely, there came a very heavy rain which was very unusual in those days, and the force of the flood coming against the ricks of adobes melted the lower ones. This tilted the ricks over and exposed the whole to the running water, which spoiled the most of them. Thus several hard days' work was lost in the short space of one or two hours of the night. I, however, went to work again with a will and a determination to have a home of my own and I soon repaired the loss and again had my adobes ready for the walls. [Then] . . . I exchanged work with my father-in-law for the use of his team, and hauled my timber from the mill and rocks and sand from the hills for the foundation for my home. I now commenced to build my home. It was in the dimensions 16 by 24.

In order to avoid confusion in dealing with the significance of the various construction materials--adobe, log, lumber, brick, and stone--each one is discussed separately in terms of its place in the material folk culture, the factors influencing its selection, the techniques used in its preparation, and the regions where it was most predominant. Because of the importance of adobe among the Utah Mormons and because of its significance in terms of culture change, adobe is discussed first and at the greatest length.
Mormon Adobecraft

The Importance of Adobe in Mormon Folk Culture

Popular images of peoples and places in the past commonly link certain customs with specific peoples. The rodeo and roundup are as much a part of the image of the American cowboy as missions and padres are of Old California. Log cabins are to the American frontier what squat adobe shacks are to the Mexican Southwest. But folk customs are seldom as exclusively confined to one group as popular images suggest. In truth, log construction was more common among some Mexicans than was adobe (Gritzner), and adobe construction became a standard for some Anglo-Americans, especially the Mormons. In the popular mind, however, "adobe" and "Mormon" do not commonly go together. It seems that the romantic image of an ax-wielding Mormon pioneer with his log cabin prevails. This is ironic in view of the widespread use and in some places complete dominance of adobe over log in early Utah.

Travelers in Utah villages today often search in vain for the remains of the ubiquitous log cabins which supposedly once prevailed. Indeed, in most Utah communities today, if there is one true pioneer log cabin visible it is most likely to be found in the city park carefully restored and preserved by the Daughters of the Utah Pioneers. The formal preservation of these cabins helps to perpetuate their popular romantic image. It is true that the Mormons, having originated...
in the sylvan East, brought to the West all the skills of a woodlands culture and did build a great many log cabins. But with the woods limited in Utah, the pioneers wisely practiced conservation of the scattered forests and turned to the soil as a source for their primary building materials. In so doing, the Mormons became the first Anglo-American subculture to incorporate fully the use of adobe as a favored and important element in their own material culture.¹

The descriptions by the early travelers passing through the Mormon territory give us a notion of the importance of adobe work in early Utah. One of the earliest travelers, Jacob Heinrich Schiel, a German geologist working for the Gunnison geological expedition in 1853, reported that in Salt Lake City "everything bears the mark of poverty and makeshift. . . . The houses are constructed chiefly of so-called adobe (air dried brick), one-story high and covered with shingles. Log cabins are relatively scarce since wood must be brought a distance of thirty to forty miles from the Wasatch Mountains and consequently must be used sparingly" (Schiel, 73). In 1859 the well known journalist-traveler,

¹Anglo-Americans preceding Mormons to the Far West were the Western Oregon immigrants, mountain men, and fur trappers. The latter occasionally had adobe structures built but usually with the aid of Indian or Mexican labor. Examples are Fort Pueblo in Colorado and Fort Laramie in Wyoming. Other Anglos, especially in Old California, often had "Yankee type" houses built with adobe using local Indian labor (Kirker, 20-21). But, apparently, few if any of these Anglos actually performed the adobe labor themselves. Before the Mormon Period, Anglos in the West were merely the consumers, not the producers, of adobe structures.
Horace Greeley, visited the Salt Lake Valley and commented that "the houses generally small and of one story—"are all built of adobe (sun hardened brick), and have a neat and quiet look" (Greeley, 174). An even better known traveler was the famous British explorer and scholar, Sir Richard Burton. While visiting the Salt Lake Valley in 1860, Burton noted that the "thick sundried adobe" in Utah was "common to all parts of the Eastern World" so that "at a distance the aspect was somewhat oriental" (Burton, 196-197).

References to and descriptions of Mormon adobe work are numerous, especially in the personal diaries and histories written by the pioneers themselves. The best diaries have been published, and many of the lesser known histories have been collected and published by the Daughters of the Utah Pioneers and other groups. Most of the county histories and centennials also describe in varying detail both the methods of making adobe and many specifics about various adobe houses. References to Utah adobe are also common in the general Utah histories widely available to scholars and the public within and outside Utah. Nevertheless, ignorance of Mormon adobe work prevails and reveals itself in unexpected sources. For instance, in 1965 the USDA published a map depicting areas of the United States in which adobe and earth blocks had been used; within Utah only a small part of the Salt Lake Valley and a strip across southern Utah inhabited largely by Indians are marked. This ignorance is by no means confined to the producers of that map or to the general

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public. Even most Mormons today would be surprised to learn that the log cabin most frequently was not the commonest pioneer home in a very large part of the Mormon West.

Few items in early pioneer material folklore were better understood or more widely disseminated than the knowledge of making or using "dobies." Initially, the work was not confined to full-time tradesmen. Nearly everyone, including women and children, had the opportunity to tramp with bare feet the wet clay and straw, or mold the brick in home-fashioned molds, or carry and lay the mud bricks in place in the walls. This is quite well expressed in the words of Venna A. Reese:

Most of the people tried to build their own homes, but when necessary they would exchange work and materials with others in order to get their homes built. After their regular day's work was done they would go to the clay beds and work the clay, or mould it, or would bring a team and wagon and load the adobes which had been thoroughly hardened and take them to their home site. Very often young couples would spend their evenings in this way, before and after they were married. (Carter, 1958, p. 163)

Each family was, of course, concerned about its own house construction, but adobe was by no means confined to the dwelling houses. Barns, granaries, coops, sheds, and all other outbuildings on the homestead also were constructed of this inexpensive material. Labor was pooled to produce adobe for schools, church houses, workshops, meeting houses, and the walls of early forts and other public buildings. Bishop J. W. Sylvester, in charge of building a church in San Pete County, gives us a hint of the pooling of labor and the extent

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to which the folk techniques of adobe making were common knowledge, when he said to his people, "If every man, woman and child will work hard, we can accomplish this task and we will be blessed," and then reported that "a great many took their own adobe molds and went to work. The adobes were soon made and dried and the building started" (Carter, 1958, p. 150). This spirit of cooperation and the selection of adobe as the chief building material enabled the Mormon settlers to construct their houses and public buildings in their new communities rapidly without an initial cash outlay.

As a folk craft, Mormon adobe work was by no means confined to a specific social class. Indeed, its complete cultural acceptance can in part by attributed to the fact that Brigham Young and other Church leaders favored its use and occasionally occupied themselves in making adobe bricks to be used on their own homesteads. The homes of most of the highest Church officials and all of Brigham Young's mansions are either built mainly of adobe or utilize them in various parts of their construction (Goeldner, 61). Brigham Young so favored adobe that he at one time proposed that adobe be used to build the temple at Lit Lake City (Markham, 11), a structure intended to survive a millenium after the second coming of Christ. In that particular case, it seems wise that he settled for granite.

Likewise, there was no ethnic discrimination against adobe. In San Pete County, for instance, settled initially by large groups from Denmark, adobe houses were ubiquitous.
in all settlements from the beginning. Pioneer writings frequently tell of the adobe houses built by a given family from Germany, Switzerland, England, or Norway. Invariably such families solicited help from their experienced neighbors. In Tooele, Utah, most of the early homes were made of adobe manufactured by a family of Swedes who set up an adobe business, in addition to carrying on their original trade of tailoring (Carter, 1958, pp. 159-161).

Adobe-Making Methods and Adobe Building Phases

The early methods of making adobe were much the same throughout the arid West, but the sizes and quality of the bricks varied from region to region, depending on the skill of the workmen and the nature of the clay from which the bricks were made. The first adobes made by the Mormons were of a rather poor quality, owing principally to inexperience in selecting and mixing the soil; and, perhaps because of their demand on housing, the Mormons used the adobes before the bricks had been thoroughly cured. Early Mormon failures with adobe suggest that a change from making fired brick to making adobe is not a simple changeover to be taken for granted.

Suitable adobes can be made from most loam or clay-loam soil, but where that is not available the experienced workman can mix clay and sand in the proper proportions. Soils having high clay content will cause the bricks to shrink or crack badly when drying, while those made with too much
sand will crumple and fail to bond properly. There are occasional references in the Mormon literature to the mixing of sand brought from a river bed with residual clays found near the adobe yard. But in most of the settlements of Utah, good to excellent clay loam soils were available, making the transport of these basic ingredients unnecessary. Indeed, quite frequently the newly arrived settlers used the soil found on their homesites and subsequently made cellars from the holes where the clays had been excavated (Carr, 403).

Two phases of adobecraft and utilization occur in Mormon country. Termed here "initial phase" and "second phase," each phase differed from the other in the methods of adobe-making, adobe quality, availability, and importance of adobe relative to other materials.

The initial phase of adobe use accompanied initial frontier settlement and was a time when nearly every settler learned to make his own adobes. After selecting the best or most accessible soils, the pioneer prepared the soil by wetting a small area quite thoroughly and trampling it with bare feet until it was mixed to a thick, pasty consistency. He usually added some chaff or straw, weeds, or manure in varying proportions and mixed it with the mud. This work, in

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2For a thorough discussion of the results of tests performed on adobes made from a wide variety of soil mixtures, see Richard H. Clough, "A Qualitative Comparison of Rammed Earth and Sun-dried Adobe Brick," Univ. of New Mexico Publications in Engineering, No. 4, 1950.

3The mixing of straw or weeds with the mud has been a universal folk practice in all parts of the world where adobe or sundried bricks have been made, dating back to
characteristic pioneer fashion, was indeed a family affair, with bare feet tramping the straw or dry grass into the mud and many hands scooping the mud and placing it into home-fashioned, wooden molds. The molds were simple wood frames without tops or bottoms (Fig. 3) but made with some care to assure a neat brick of uniform size and shape. Once the mold was filled, the mud was carefully tamped and smoothed and placed on a leveled sandy surface, whereupon the mold was removed, leaving the newly-formed mud brick to dry in the sun. Most molds contained forms for molding more than one brick at a time, the double form being common throughout the Southwest (Miller, 3) and used early in the Salt Lake Valley (Burton, 345). Later, however, molds with three to six forms were used in southern Utah.

The second phase of adobe use occurred once a new community became well established. Each pioneer had by that time assumed his chosen lifetime occupation, and the making of adobes became less a family effort and more a commercial activity. Such business establishments were common to nearly all Mormon communities and they were usually located on the soils best suited for adobe making and near a source of fresh water. The overall effect of the yards was the production of ancient Egypt and Mesopotamia. The only positive function of straw is to promote uniform drying and reduce the amount of shrinkage during the drying process, but only small quantities are recommended (Clough, 8, and Miller, 6). Recent tests have shown that the addition of any organic material with the mud actually weakens the brick in direct proportion to the amount added, and that the use of manure is "functionally indefensible and only exists due to misguided custom" (Eyre, 29).
Fig. 3. Homemade adobe molds of a type used by early Utah Mormons

Fig. 4. Pug mills in the Salt Lake Valley (Photo, courtesy of Utah State Historical Society)
a constant supply of superior adobes quite uniform in size, shape, and color. It is largely these commercially produced adobes that remain in numerous adobe buildings still in use in the majority of Utah towns. In any specific town, the uniformity of the remaining adobes is striking; for example, in St. George all adobe, whether in a lowly pioneer outhouse or the Brigham Young winter mansion, measure 12" x 6" by 4" and are all a yellow-buff color. In Parowan, however, the mud bricks are a reddish-brown and measure 10" x 5" x 3".

This variation in size occurred between communities but not within a settlement except in instances where there was more than one yard in the community (Hunter, 361-362). The adobe yard in each community usually standardized the size of its own product. Some communities, for example, American Fork, passed an ordinance to standardize the size of all adobe bricks made there (Carter, 1958, 166).

Improvements in mixing and preparing the adobes accompanied the establishment of adobe yards. The early method of tramping the mud with bare feet was abandoned at the yard in favor of a simple "pug mill" which utilized a horse or mule for power (Fig. 4, p. 29):

In the beginning, the clay was mixed by hand or by tramping with the feet. Later an adobe mill was fashioned. It was made of a strong lumber four feet square and four feet deep, with a pine log eight feet long and one foot in diameter placed upright in the center of it, in which spokes were transversely inserted sixteen inches long and a foot apart. On the top of this log a pole was securely attached, at the end of which a horse was hitched, the animal going around in circles. The clay was fed in the mill at the top where it was ground or pulverized, enough water added to make it the proper consistency for moulding. (Carter, 1958, 165)
The mixer was widely used in the Mormon country and elsewhere with only slight variations. Most pug mills had an extruding spout through which the mixed mud was forced and then immediately placed in a mold.

Upon its release from the mold, the adobe was left on the ground for a day or two, and could then be turned on edge without danger of losing its shape. Several days later, the adobes were stacked in piles for the final drying which in summer took about two weeks. In winter freezing weather prohibited the making of new adobes, but stockpiles left from the summer work were usually available for purchase during the winter months.

In a community where adobe was widely used, adobe remained the dominant building material for 20 to 30 or more years, then gradually was displaced by other materials. However, the founding of new settlements by Mormons in the West covered a period of over 50 years, and the adobe phases of construction varied in the different regions. In the Salt Lake Valley adobe dominated from 1847 through the 1860s, but in the 1870s Salt Lake Valley and Weber Valley were the first regions to replace adobe construction with other kinds of building. This replacement began with public and business construction and finally included even the simplest dwellings and outbuildings.

While Salt Lake City, Ogden, and others of the oldest central and northern Utah cities were replacing adobe, new settlements were being founded elsewhere—hence the continuing
of the adobe phase cycle. Pioneers settling in Emery and Carbon counties, for instance, as late as the 1890s, report in their journals and histories the same methods of cooperative adobe preparation found in the 1847 diaries of the original Salt Lake Valley pioneers. The first permanent houses, schools, churches, and businesses were commonly made of adobe or log by the families or groups working together. Buildings added later to the new settlement were then constructed of adobes made by full-time tradesmen at one or more of the adobe yards inevitably established in the community.

The adobe building phases together lasted up to three decades in central Utah and up to five decades in the southern Utah area, and then gradually died as the frontier was thoroughly past—that is, when imported materials originating from a distant point could be purchased at a locally competitive price. But long after adobe ceased to be utilized for new construction, it remained as a strong vestige of the past in the structures that are still standing. The 1920s and early 1930s saw the end of the its use in some southern Utah communities, while in the older, less isolated settlements of the north, the 1870s to 1890s were marked by its end.

Areal Occurrence of Second Phase
Mormon Adobe Construction

The degree to which adobe was used during second phase varied in different parts of the Mormon culture region. In no area was there a total absence of adobe but in northern Utah east of the Wasatch and in Idaho, log predominated over
adobe in second phase construction. Nearly every community
in the Mormon area had a few dwellings of stone and fired
brick but these materials were prominent in but a few com-
munities.

During the second phase the areas in which adobe emerged as the predominant building material for dwellings were contiguous and can be generally delineated from those areas in which log came to predominance (see Fig. 5 and Table 2). Utah communities west of the Wasatch Mountains and virtually all areas south of the Heber Valley in the cen-
tral Wasatch were the predominant adobe regions.

In the Virgin River Valley of southernmost Utah adobe was used almost to the complete exclusion of log; in fact, no record of a log cabin construction exists for St. George, the main Mormon city in the Virgin River Valley (Spencer, 1945, 447). Even frame houses in the Virgin River Valley occur in considerably smaller numbers than in northern Utah valleys and Idaho. Pioneers in southern Utah were much less inclined or able to protect the walls of their adobe struc-
tures with lumber or plaster than pioneers farther north. Another striking difference between the two areas is in the use of adobe versus log or lumber for barns, granaries, and other outbuildings. Adobe was by far the predominant material used for outbuildings in the extreme south, but its use seems to diminish gradually in central Utah, giving way to lumber and log. No adobe barns, granaries, or sheds of any kind were observed in Idaho or in northeast Utah in 1971; nearly
Fig. 5. Areas of adobe and log predominance during second-phase construction in the Mormon culture region.
TABLE 2

NUMBER AND PERCENT OF 19TH-CENTURY HOUSES WITH ADOBE WALLS IN RANDOMLY SELECTED MORMON COMMUNITIES IN 1971

<table>
<thead>
<tr>
<th>Community</th>
<th>Year Founded</th>
<th>Approx. No. Houses Built</th>
<th>Pre-1900 Houses with Adobe Walls Remaining 1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parowan, Utah</td>
<td>1851</td>
<td>60</td>
<td>17</td>
</tr>
<tr>
<td>Kanosh, Utah</td>
<td>1859</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Elsinore, Utah</td>
<td>1864</td>
<td>38</td>
<td>9</td>
</tr>
<tr>
<td>Mt. Pleasant, Utah</td>
<td>1852</td>
<td>82</td>
<td>42</td>
</tr>
<tr>
<td>Coalville, Utah</td>
<td>1858</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Willard, Utah</td>
<td>1851</td>
<td>44</td>
<td>0</td>
</tr>
<tr>
<td>Hyrum, Utah</td>
<td>1860</td>
<td>65</td>
<td>0</td>
</tr>
<tr>
<td>Paris, Idaho</td>
<td>1863</td>
<td>38</td>
<td>0</td>
</tr>
</tbody>
</table>

all were of lumber or log, with an occasional one of stone.

Though adobe was used in Heber, Cache, and Bear Lake valleys and communities east of the Wasatch and all Mormon areas in eastern Idaho, log and lumber predominated in these areas and lumber is now the primary material for dwelling houses. Today in these northern parts of the Mormon region, one looks in vain for building of any kind containing the exposed adobe walls so common in southern Utah. Houses of adobe do remain in the north, but the walls are always covered with plaster or clapboards.

The occurrence of adobe in Mormondom appears, at first, to correlate with some elements of climate but the only weather element particularly damaging to adobe is precipitation. Statistics covering precipitation averages over a 30-year to 40-year period throughout the Mormon area show no consistent correlation between a predominant areal use of
adobe and low rainfall, or a predominant use of lumber with higher precipitation averages (USDA, 1941, 829-839, 1147-1157). Thus, the regional variations in precipitation rates in the Mountain West apparently had no effect on pioneers' decisions concerning the use of adobe.

A rather strong correlation does, however, exist between the supply of timber and the declining use of adobe. Forests of useful timber were found within 40 miles of nearly every pioneer village, with resources generally greater in the north than the south. Conservation of wood in the north was of less concern, so the northern settlements could better afford the use of log and lumber (Young, Vol. 8, 79).

The Advantages and Disadvantages of Adobe

In considering the basic reasons for the predominance of adobe in so many Mormon areas, it is necessary to weigh its advantages and disadvantages as seen by the Mormons.

One of the chief advantages of using adobe brick is that skilled labor is not required in its manufacture. Hence, with a little advice on selecting and mixing soils and on the molding and curing processes, any man, with a little help from his family or a neighbor, could make and stockpile his own adobes. With adequate soils for adobes nearly ubiquitous, the initial settlers seldom needed to look beyond their own home lots or found it necessary to haul the adobes very far. These factors gave each pioneer family
an important measure of independence of skilled tradesmen and required little or no cash outlay. The same statement could, of course, be made of log, if one lived near the source of good trees. But in areas where logs were in limited supply, adobe was cheaper than log, as was noted by the Mormons from the very beginning. An original pioneer, William Clayton, stated in 1847, "A log house 16 by 15 would cost 40 dollars and one of adobe half as much" (Clayton, 337). With the rise of the adobe yards in the new settlements, adobes made at the yards continued to be in greater supply than wood and at lower prices, especially if the logs had to be hauled for long distances. This seemingly endless supply of low-cost adobes permitted a rapid erection of dwellings and buildings, and because of adobe newly founded settlements quickly took on the air of permanency.

The cost of building with adobe is reduced further by the fact that the laying of the brick does not require the use of a special lime or cement mortar. The bricks are simply laid in the same mud from which they are made, except that straw is excluded. Winburn points out that adobe requires simple treatment:

Adobe was a simple, natural material and lent itself most appropriately to simple treatments. [Fired] brick may be set into fancy lintels and cornices and laid into various bonds, English, Flemish, stack etc. This is not true of adobe. Because adobe has poor resistance to weathering it endures best when the minimum of its surface is exposed, i.e., laid in a flat wall. With little or no color or textural difference between the adobe brick and the mortar, little use could be made of any unusual bond. (Winburn, 21)
Adobes are structurally much weaker than fired brick, so the most important considerations in laying the adobes are to stagger the joints in each course and to assure that corners are solidly bonded. But little skill is required to lay adobes and most men could do it; housewives often laid adobe bricks while their husbands were away at work (Carter, 1958, 118-187).

To compensate for comparatively poor structural qualities of adobe bricks, walls of great thickness were necessary; seldom were they less than 16 inches--two or three thicknesses of adobe brick. But such thick walls have their advantages, namely, providing effective insulation from cold or hot weather. The numerous comments about this factor by Mormons indicate that they considered these insulation qualities important. In fact, the pioneers who built wood frame houses quite frequently placed adobes between vertical stud-ding behind the clapboards for the purpose of insulating and adding strength to the house. A pioneer woman in Duchesne County in northern Utah illustrates her method of insulating frame walls with adobe:

When the boys had enough lumber on hand to begin building our house, my brother-in-law, James Gilbert, a carpenter, planned our home and began erecting the frame work. When that was completed, he built the roof. The next job was to make adobes to line the house, so with the help of my son-in-law, James Moore, my brother brother Curt, my three sons and my three youngest daughters, I began carrying adobes to lay them out in the sun to dry... The adobes dried quickly so by late summer we were anxious to get them into the walls.

The men folks were very busy getting in the crops and building sheds and granaries and corrals. I decided I could lay the adobes up between the 2x4's in the walls
so we could have our home livable before winter set in.
. . . My girls carried the adobes to me and I laid them up. When three layers had been laid, . . . I would drive a spike nail in the two-by-four on each side then bend them down so the adobes would be held in place good and solid. . . . We kept warm that winter. (Carter, 1958, 141)

The fireproof qualities of the adobe walls were considered a further advantage of adobe over log. References to houses catching fire are rare in Utah pioneer literature, though families living in log or frame houses certainly had this added worry (Young, Vol. 8, 79), especially in winter when the hearths were ablaze. An escaped fire in an adobe home might result in considerable damage to the inside trimmings and the roof but would not completely destroy the walls.

But adobe is by no means entirely free of problems to the pioneer. The most obvious of its drawbacks is its tendency to weather when exposed to rain. The rate of weathering on unprotected adobe walls is about 1 inch per 20 years (Eyre, 7). This rate differs on each wall of any specific house; walls facing windward deteriorate much more rapidly than those in the lee.

Naturally, the deterioration of the walls is greatly retarded if given a coat of plaster or covered with tile. In the early periods of Mormon adobe, however, tile was not available and plastering was at first limited because no successful way could be found to bond the plaster to the wall (Figs. 6 and 7). Crude laths of small willow sticks were sometimes nailed to the walls when nails became available, but that proved only marginally successful; the plaster
Fig. 6. The plaster, perhaps years ago, fell from most of the adobe walls on this house in Elsinore, Utah, a common sight on adobe walls in Mormon country.

Fig. 7. A bright red brick-face tile once covered these badly weathered adobes in Spring City, Utah.
peeled off after a few years or decades at the most. It was not until wire mesh became locally available that plastering became a practical solution to the problem of protecting the adobe walls (Winburn, 22). Plastered adobe homes are numerous in Utah today, as are adobes with tile or clapboard fastened to the outside walls (Fig. 8). This veneer added to the cost of the house but was generally not part of the original pioneer effort or expense. Furthermore, veneer work was by no means confined to adobe walls; fired brick, stone, and log were plastered with adobe mud on willow strips nailed to the walls as bonding material (Fig. 9) or with a lime plaster made from local lime kilns and mixed with sand and hair from cow or pig hides.

In comparing the advantages of one building material to another and the reasons for the pioneers' preference of one over another vis-à-vis time in construction, cost, and labor, the practice of veneering with plaster or lumber should not be included. Veneering was most commonly applied long after the time of initial construction and was used rather equally on permanent houses built of any of the local materials. The cost of the foundation should also be excluded inasmuch as it was virtually the same for all permanent houses—that is, dry or mortared stone masonry.

The Origin of Mormon Adobe

Prior to coming to Utah the Mormons in Eastern America had had a long tradition of molding brick from local clays
Fig. 8. Lumber was recently removed from this adobe wall in St. George, Utah, leaving the adobes in a good state of preservation.

Fig. 9. Willow strips attached to this log wall in Spring City, Utah, illustrate a common method of binding the plaster.
and firing them in kilns erected in the neighborhood brickyards (Flanders, 156-157). Though the knowledge of this manufacturing process was generally shared in common, the work, as among Anglo-Americans generally, was done full time by a few masons or brick tradesmen who operated the brickyards. The methods of making adobe or unburned brick, however, are not identical to those used for preparing brick for the kiln. Even the most skilled brick manufacturer would not be successful at making durable adobe without advice on how to mix the materials, what sizes adobe should be for a specific size of building, or what methods were to be used to set the mud brick out for sun drying. It seems likely, therefore, that a group of settlers even in dire need could not or would not make a sudden conversion from the making of fired brick to making adobe without first acquiring some knowledge of the techniques involved from a neighboring culture. Cultural diffusion—the borrowing of ideas from neighbors—is believed to be a more important cause of culture change than independent invention.

The reasons for acceptance of new building methods are relevant here in view of the Mormons' apparently rapid conversion from the use of log and fired brick to the use of adobe; indeed, within one week after the first pioneers entered the Salt Lake Valley they were making large quantities of sun-dried brick, apparently for the first time. Was this change a simple one based merely on a decision to dry their bricks in the sun in the absence of a kiln? If so, one might
theorize that such a decision could be made as a matter of logic and need not be based upon a prior knowledge of any kind concerning the use and manufacture of unburnt bricks. Documents show, however, that the Mormons, prior to their entrance into the Salt Lake Valley, had had opportunities to see, hear about, and read about sun-dried bricks.

Historical research reveals that the prior knowledge about adobe demonstrated by Mormons upon arriving in the arid West was critical to their making a rapid adjustment to their new environment, and that the immediate use of adobe in Utah represented a significant and beneficial change in Mormon material folk culture.

Most historians, architects, and others who have mentioned adobe work among the Mormons have stated that Mormons learned the art from contacts with the Spanish (Mexicans) after or during the pioneers' migration to the Far West. While contacts with the Mexicans and their adobe have never been disputed, some scholars have had reservations about the importance of such contacts. The architect Fred Markham, for instance, states: "There is reason to believe that this method of construction [sundried bricks] was known to the pioneers even without this direct source of information [from the Mexicans]" (Markham, 11). But the only evidence Markham offers is a partially correct assertion that Mormons made much smaller adobes than either the Mexicans of the Southwest or of California. Apparently, no one has made an attempt to supply documentary evidence to verify whether
the Mormons could have been acquainted with the technique of making sun-dried brick before they left Nauvoo, Illinois, or from where that information might have come to them.

Because of climatic conditions and cultural preferences for wood and fired brick in Eastern America, the use of sun-dried or unburnt bricks in the East was almost unknown. Experimentation with sun-dried bricks, however, occasionally did take place in the humid East, even in heavily forested areas where good wood was inexpensive and easily obtainable (Long, 5). When successful, these experiments were occasionally given favorable reports in some detail in newspapers and magazines, and in various bulletins distributed especially to masons and bricklayers (Nauvoo Neighbor, Feb. 19, 1845).

There is no proof that the Mormons in the eastern United States ever tried making sun-dried bricks, but they did indeed have opportunity to receive information on the methods of making and using them. For instance, when the Church headquarters was at Nauvoo, Illinois, the main Mormon newspaper, Nauvoo Neighbor, published two articles dealing with the use and manufacture of sun-dried bricks. The first, titled "Unburnt Brick Houses," appeared in the July 31, 1844, issue as a report given to a group of Ohio masons, inviting them to visit some houses in Washington, D.C., that had been successfully constructed of such bricks, and to seek advice there on the process used to manufacture them. The second article appeared in the February 19, 1845, issue of the

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4The article implies that even skilled masons should not try to make unburnt brick without advice.
Neighbor and is a rather long clipping taken from the Michigan State Gazette. It provides precise information on "the process of making sun-dried bricks in this country [Michigan]," advice on the various sizes the bricks should be relative to the size of house to be constructed, and a glowing report of success in Michigan, Canada, and England where such bricks had been used. The article also urges brickmakers and builders to experiment with unburnt brick by following the precise instructions provided and promises a substantial savings in money as well as an attractive, durable home.

It is certainly significant that these reports should appear in Nauvoo at a time when the Mormons there were considering a possible move to the Far West. That they recognized the utility of sun-dried bricks in an arid climate is indicated by the editor of the Neighbor when he stated in the July 31, 1844, article that "This subject [unburnt bricks] is important to settlers on the prairie lands where timber is scarce and clay abundant." But is it not known whether anyone at Nauvoo or any other Mormon settlement at the time took the advice given in their newspapers to experiment with unburnt

5There is no reference to adobe in the Spanish American Southwest. It seems likely that if a change from making fired brick to unburnt brick could be done simply by withholding the newly molded clay from the kiln, setting it instead in the sun, all the data in the article discussed under "process of making sun-dried bricks" would have been unnecessary. In truth, even the best brickmakers must learn the unburnt process for success. The ingredients differ in their proportions in the two kinds of brick, as do sizes and other details.
brick, for nothing that remains of Nauvoo buildings indicates that the residents tried their luck with the new material.\(^6\)

There are other possible avenues through which information on sun-dried bricks might have come to the Mormons in the East. For more than a decade prior to the Mormon exodus, the headquarters of the Church was in Missouri on the edge of the American frontier, where opportunities were exceptional for receiving news and information about the Far West. Independence, Missouri, the Mormon Zion of the late 1830s, was an important outfitting center for the Santa Fe trade and for expeditions to the Rocky Mountains, and was a rendezvous point for fur trappers and adventurers in from the West. Under these circumstances the Mormons could hardly fail to hear stories about the Far West. Some Mormon men may have even served as teamsters on the route to Santa Fe, a city built almost entirely of adobe.

In the 1840s, with Church headquarters moved to Nauvoo, Illinois, and violent opposition against the Mormons running high, Mormon interest in the West became intensified. Their leader, Joseph Smith, even stated in an official prophecy in 1842 that the Saints one day would establish themselves in the Rocky Mountains in order to find asylum from their enemies (Roberts, Vol. 2, 181). When the Nauvoo leaders seriously began considering the migration west, they began acquiring all the available government reports of official

\(^6\)Confirmed by personal correspondence with Dr. T. Edgar Lyon, Director of the Nauvoo Restoration Society, Feb. 7, 1972.
expeditions to the West, and many diaries and descriptions written by travelers and residents in Oregon, the Great Basin, and California. A few of these writings mention adobe in California. John C. Fremont's reports on California, known to have been in the possession of Church officials (Neff, 33-37), casually mention a house of "adobe" without any elaboration. However, the description of California by L. W. Hastings, also known to have been studied by Church leaders (Creer, 220), provides a full description of the California adobes and explains why the Mexicans there preferred the adobe to fired brick, stone, or wood when settling in an arid land (Hastings, 110-111).

An attempt to determine whether Brigham Young and key Church leaders seriously studied or ignored Hastings' pages on adobe would lead to endless and fruitless speculation. The purpose of pointing this out here is merely to show evidence that the Mormon leaders who adopted the use of adobe less than two years later in Utah had access to information about its use and advantages before they left Nauvoo. How well such information might have been disseminated to the general Mormon population will probably never be known, but an indication can be had from a study of Mormon newspapers. Between May 1843 and October 1845, the Nauvoo Neighbor published over fifty articles dealing with the Far West; none of them make any direct reference to Mexican adobe or its practical advantages in the arid Far West, nor do similar reports on the West in The Wasp, the Mormon paper antedating
the Neighbor. The two articles in the Neighbor dealing with unburnt brick building in the East are timely in that they coincide with an era of interest in collecting data helpful to the founding of settlements in the arid West. But speculation about the impact of these two articles in this regard should be cautious, for there is no real evidence that unburnt bricks were used prior to the Salt Lake Valley occasion in 1847.

On the Great Plains opportunities for the Saints to use adobe were abundant. In 1846 (one year before entering Utah) the Mormons during their western migration established migrant way stations in areas on the Great Plains where weathering of adobe would not have been excessive. Indeed, near one temporary Mormon settlement in Nebraska, an adobe fort later built by non-Mormons survived for many decades. But probably nowhere on the Plains would adobe have been more useful to the Mormons than at Winter Quarters near what is now Omaha. Founded in 1846 by Brigham Young, Winter Quarters served for many years as a temporary haven for Mormon pioneers en route to the Salt Lake Valley. There are frequent references in the early diaries to the building of dugouts and log houses, but none mention adobe or sun-dried brick. One early resident at Winter Quarters took a census and reported "538 log houses, and 83 sod [dugouts] were inhabited by 3483

7Fort Niobrara, built of adobe (Miller, 3) in 1880 near an abandoned Mormon camp earlier established by Newell K. Knight (American Guide Series, Nebraska, 398).
soils" (Bancroft, 1889, 249). The official Church historian likewise makes no reference to sun-dried brick (Jenson, 1899, 65).

Another temporary migrant settlement established on the Plains was built within one mile of an existing adobe structure, Fort Pueblo in what is now Colorado. Non-Mormons visiting at the Fort in 1846 were impressed by the skill with which the Mormons nearby constructed their log shelters, stating that they were experienced woodsmen from the western states (specifically, Mississippi) (Hafen and Young, 133). Not even there in the shadow of an existing adobe structure did the Mormons themselves use sun-dried brick.

Less than one year after the founding of settlements on the Great Plains where adobe had not been used, the Mormons reached the Salt Lake Valley and shortly afterward were molding thousands of adobe bricks for use in houses, fences, and the walls of their fort. And appearing for the first time in Mormon diaries are the words "adobe," "Spanish brick," and "bricks built in Spanish fashion" (Isaac C. Haight in Jenson, 1934, Oct. 8). Why the change?

Before this adobe work began in Salt Lake, however, two groups of influential Mormons who had spent the previous months in various Mexican communities arrived in the Salt Lake Valley. One group was the soldiers of the "sick detachment" of the Mormon Battalion who had arrived from Santa Fe
and Fort Pueblo. Though most of the Battalion members were not favorably impressed with the Mexican living conditions in Santa Fe, some of them comment on the adobe and must have become aware of its utility. The official Battalion recorder dispassionately noted that "the houses [of Santa Fe] . . . were generally small and squatty. They were built of adobies or unburned brick of a very large size" (Tyler, 164).

Another small group that had joined the vanguard band of Mormons in the Salt Lake Valley had arrived from California with Samuel Brannan. After spending the previous year in California, Brannan was probably better acquainted with the Mexican adobe than anyone else who arrived in the Salt Lake Valley.

While at Winter Quarters, Nebraska, the Mormons were asked by the U.S. Army to aid in the struggle against Mexico by submitting 500 troops for enlistment. The troops which Church officials agreed to send were known as the Mormon Battalion. During the fall and winter of 1846-47 the Battalion marched from Fort Leavenworth to Santa Fe and ultimately to San Diego. The sick detachment was a group of about fifty unable to continue the march and was therefore mustered out of duty at Santa Fe; they spent the winter of 1846-47 at the Mormon settlement near Fort Pueblo and joined the first companies of Saints in Wyoming en route to Salt Lake Valley.

Samuel Brannan in 1845 was assigned to lead a group of Mormons from Nauvoo to New York and thence to San Francisco by ship around Cape Horn. Brannan's group arrived at San Francisco Bay on July 31, 1846, and remained for more than a year awaiting an order from Brigham Young to join the main body of Saints in the Salt Lake Valley. It is interesting to note that this group of Mormons was among the first settlers in California to build houses mainly of log and lumber and was very influential in setting a "yankee and western" pattern of folk architecture which subsequently became important in California (Kirker, 26-28). But there was an exchange of ideas, as well. Mormons there not only contributed to a new folk building knowledge in California, but they learned the old Mexican methods of making and building with adobe.
Valley by that time. He had hired local labor to construct for him an adobe building at San Francisco to house his printing press used for the publication of California's first English newspaper (Bancroft, 1886, 552).

The influence that Brannan and the members of the sick detachment of the Mormon Battalion returned from Santa Fe had upon the adoption of adobe by the Mormons is indicated by the deliberations of a meeting held August 1, 1847—-one week after the arrival of the Mormons at Salt Lake. When proposals for adopting the various available building materials were under discussion at the meeting, Brannan and members of the sick detachment of the Mormon Battalion strongly favored adobe:

Colonel Rockwood [of the Santa Fe sick detachment] remarked that a log house 16 by 15 would cost 40 dollars and one of adobe half as much. Captain Brown [of the sick detachment] was in favor of setting men to work building both log and adobe houses to hasten the work. Captain Lewis [of the sick detachment] said that inasmuch as timber is scarce and we have spades and shovels and tools enough, as many as can be used, he is in favor of building adobe houses and saving the timber. Lieutenant Willis [of the sick detachment] said you can put up an adobe house before a man could get the logs for a log house. Adobe houses are healthy and are the best for equinoxial gales. Elder Brannan has a man in California who will take three men and make adobes for a thirty foot house, build the house and put a family in it in a week. His printing office was put up in fourteen days and a paper printed . . . . It was voted to put up a stockade of adobe houses. (Clayton, 337)

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10Titled the Yerba Buena California Star, the paper was for general circulation, not restricted to Mormon interests.
Subsequent to this meeting, for the next several months and years many people continued to arrive in the valley who had had contact with Mexicans and who could have contributed to the skill of making adobe. Most significant among the first of these were the remaining members of the Mormon Battalion discharged at San Diego. Some of these soldiers had even been employed for a time in San Diego clearing a yard for the making of bricks (Jenson, 1899, 33). Mention should also be made of the fact that by the time Mormons traveling overland reached Salt Lake Valley, adobe would not have been totally new to any of them. Ft. Laramie, a way station used by all Mormons crossing overland from the East, was built in part of adobe by Indian labor from New Mexico (American Guide Series, Wyoming, 162).

In summary, it appears that information about the practice of building with sun-dried bricks was occasionally available to the Mormons in the East but that it was never taken seriously enough to become a common folk practice. It is perhaps significant too that sun-dried brick in the Eastern United States was not referred to by the Spanish term "adobe," nor were the Spanish or Mexicans cited as examples of peoples utilizing sun-dried brick except in the later reports of western travelers. In the early western journals the term "adobe" is usually italicized and often defined for American readers. It also appears that even when the first westward migration was in progress, the Mormons in 1846 were still unfamiliar with making adobes, a material which certainly
would have facilitated the construction of their much used way stations on the Great Plains. Had these way stations been constructed some years after the Salt Lake Valley settlements, they most assuredly would have contained warm and comfortable adobe buildings.

Thus, it was direct contact with the Mexicans, after all, that resulted in the Mormon decision to use adobe. Documents favoring this argument are rather explicit. Mormon practices of making adobe were exactly like those of the Mexicans, and even the Mormon term, "dobie," derived from the Spanish and completely replaced the Eastern terms "sun-dried brick" and "unburnt brick."

The mass conversion to adobe by Mormons in large part accounts for the rapidity with which they established themselves in the numerous mountain valleys and basins of the West. Mormons became the first of the Anglo-American subcultures to incorporate adobe as a fully integral part of their material folk culture.

**Mud Concrete**

Closely related to adobe brick is "poured adobe" or what was locally called "concrete." In some areas of the Mormon West where a high lime content occurred in the clay, the lime clay was mixed with water, local gravels, and small quantities of straw. The mushy concrete mixture was then poured or shoveled into a plank wall form. Unlike the pouring of modern Portland cement concrete (not available in
early Utah), the mud concrete was poured one course at a
time, that is, after the newly poured material was relatively
dry, the form (which was about 12 inches deep) was removed
and placed above in preparation for the next course. After
several days one could build a solid self-buttressing con-
crete wall high enough for a two-story house (Fig. 10). Mud
concrete was also used as a "filling" material between the
vertical studding of frame wall houses (Fig. 11). This prac-
tice was common in the American Southwest where in Old Cali-
ifornia it was known as "cajón" walling (Long, 11).

The use of mud concrete in folk housing was widespread
in early Utah, occurring in Cache Valley in the north, to
Parowan and Paragonah in the south. But nowhere was it pre-
dominant or even important relative to log and sun-dried
adobes.

Log Work Among the Mormons

The Place of Log in Mormon Material
Culture

Mormons acquired their adobecraft while in the dry
Mountain West, but log work they had known from their begin-
nings in the East. During the first two decades of their
history the Mormons were forced to relocate en masse several
times, each move taking them farther into the West--to the
vanguard of the migrating frontier. Each move meant reclaim-
ing virgin lands, felling trees, and building with logs.
The Mormon pioneers were, above all, skilled woodsmen, and
log was the predominant material of initial construction,
Fig. 10. The exposed mud-concrete walls on this house in Paragonah, Utah, exhibit the courses as they were poured one at a time.
Fig. 11. This cajón walling in Parowan, Utah, utilizes the mud-concrete between the 2 x 4 studs but the concrete itself serves no stress or load-bearing function.
especially while in the sylvan East. Even the leaders, Joseph Smith and Brigham Young, lived for a time in log cabins (Flanders, 156), and every member of the new Church who participated in founding the new settlements must at one time or another have lived in or worked on a log structure.

It should be emphasized, however, that log buildings (especially log houses) were seldom intended to be permanent and were most characteristic of the early phases of settlement. Log public buildings such as schools, churches, and businesses were usually rather quickly replaced by those of more durable materials. Log dwellings tended to persist longer than log public buildings, but not because the individual families preferred it that way. The goal of virtually every family was either to move eventually into a permanent house of frame or brick construction or to enlarge and improve the original log cabin. The emphasis in Mormon culture, even while in the forested East, was to make homes and villages attractive by improving the interiors and exteriors of the houses and by surrounding the homes with gardens and trees. Walls formed of rough or hewn logs chinked with mud may now be romanticized, but Mormon pioneers themselves hardly considered such walls attractive or permanent, nor was log, in spite of its initial importance, considered the most desirable construction material for dwellings or public buildings. Log was mainly an expedient material immediately accessible and inexpensive. Brigham Young expressed public sentiment when he stated, "Log buildings do not make a sightly city.
We should like to see buildings that are ornamental and pleasing to the eye, as well as commodious" (Young, Vol. 8, 79). This negative attitude toward log as a building material and the rapid replacement of logs in most of the Mormon West were fostered by at least two factors: the post-frontier New England heritage of the earliest Mormons, and the short supply of timber in much of the Mountain West.

The founders of the new Church and its earliest converts were mainly New Englanders reared in neat and attractive villages or in well-built frame homes in the New York countryside. They were not originally toughened frontiersmen accustomed to living in log cabins. Thus, when they did finally make full use of logs upon moving to the frontier, they regarded log work as makeshift and expedient, until they could again reproduce quality frame and brick homes to which they had earlier been accustomed. It was characteristic of the Mormons to emulate group success by creating handsome and attractive villages—showplaces to the world. For not only were such villages typical of their New England background, but beauty and sturdiness in the village enhanced the image that Mormonism was a correct, wholesome, and successful way of life.

Upon entering the dry Mountain West, Brigham Young recognized an additional reason to discourage an unlimited use of logs: the limited supply of timber and the need to conserve it. Accordingly, he warned the people in Cache Valley, Utah (Young, Vol. 8, 79):
I do not wish the brethren to cut all the timber to put it into log houses. . . . We have no timber to waste, we should save our timber, and make buildings that will look better than log-houses and at the same time be easier and quicker built.

Under these circumstances, log work for houses in a large part of the Mormon West was as much confined to temporary and immediate needs as had been true in the East. Nevertheless, the place of log work in Mormon culture was crucial, its limited period of predominance notwithstanding. Log was a familiar and inexpensive accessible material perfectly suited to the settlers' urgent shelter and outbuilding needs.

There were actually two phases of log construction in the Mormon West, termed here the "initial phase" and the "second phase." The validity of this two-phase concept depends upon three facts: first, each phase was marked by the utilization of different qualities of timber; second, there were differences between the two phases in the general types of buildings constructed—the initial being characterized by temporary makeshift structures, while the second with a predominance of more permanent housing; and third, there were regional and temporal differences in the importance of log during the two phases.

Timber Quality and Log Building Phases

In the Rocky Mountain West the forests used by Mormons can be placed into two general categories: the coniferous forests which occur above 6,000 feet on the higher north-facing slopes of mountains, and the gallery forests made up
of deciduous species confined to the banks of the larger rivers and streams in the valleys which nearly everywhere in Mormondom are 2,000 to 3,000 feet below the coniferous tree line. Almost all Mormon settlements were situated near a stream on a valley floor or a deltaic fan some 10 to 40 miles from the coniferous forests. Thus, the deciduous gallery forests, though frequently limited in quantity and quality, were significantly more accessible to the new settlers than were the mountain evergreens and were therefore the major (though not exclusive) source of building materials for the vast majority of new settlements in the initial phase.

The usable trees of the gallery forest included several species of cottonwood (Populus angustifolia, P. trichocarpa, and P. fremontii), willows (Salix sp.), and in a few places a scrub alder (Alnus tenuifolia) and big tooth maple (Acer grandidentatum), and in the higher elevations quaking aspen (Populus tremuloides) (Foster, 56-57; Preston, 99-103). Cottonwoods, by far the most important to the Mormons, were a major source of logs in numerous settlements in nearly every part of the Mormon culture region. A relatively large tree, the cottonwood has rather soft wood and can be felled easily with an ax, but its branches tend to be crooked and knotty and the wood has a tendency to decay rapidly when in contact with moist ground. Walls made of cottonwood logs looked shabby and uneven, being composed of logs varying greatly in size and shape and requiring considerable chinking between the wide and uneven interstices.
(Figs. 12 and 13). For these reasons the use of cottonwood was almost exclusively confined to the initial phase of settlement and for expediency when nothing better was immediately available. Quaking aspen was also commonly used during initial settlement but was considered to be of even poorer quality than was cottonwood; hence, its use lay mainly for outbuildings and fences. Willows and rushes were used extensively as roof thatching material. A good example of the use of gallery forest resources is illustrated by Annie C. Hansen (Carter, 1958, 164-165):

Father took one of the yokes of oxen and the running gears and proceeded to Provo River bottoms where the necessary logs for a one-room log house were secured. Farther up the river smaller timber [probably aspen] was obtained for rafters. This timber, together with willows from along the American Fork Creek and rushes from near the lake and a dirt covering for a roof, together with some chips and mud to fill the crevices between the logs, provided the material for his family home. . . . This was not an easy task as the timbers from which the houses were to be built were taken from the cottonwood trees and were very crooked. By considerable trimming and patching they were made to answer the purpose for which they were intended. . . .

Much preferred over the river bottom woods were the various evergreens found above the 6,500-foot contour on the moist north-facing mountain slopes. Ponderosa pine (Pinus ponderosa) and Douglas fir (Pseudotsuga taxifolia) were the two most widespread and desired species, but also important were white fir (Abies concolor), Engelmann spruce (Picea engelmanni), and especially in Idaho the lodgepole pine (Pinus murrayana) (Preston, 19, 25, 43, 53). All of these evergreens were used to some extent in the initial phase of many settlements but were obtained with considerable effort and difficulty.
Fig. 12. This cottonwood log cabin in Lorenzo, Idaho, more rustic than was typical, illustrates the use of poor quality logs varying greatly in size and badly cracked (checked). The widest joints between the logs are chinked with slabs of wood two to three inches thick.

Fig. 13. This cottonwood log cabin in Lorenzo, Idaho, exhibits dovetail corner notching superior to the above and contains a modern portland cement chinking; the logs, however, are typically rugged, cracked, and are rapidly decaying.
Logs from the coniferous forests were generally not harvested in large quantities until a road was constructed from the settlement to the nearest canyons, a feat usually not accomplished until after the initial phase was well underway or had passed. The initial log building phase was therefore most characteristically associated with the exploitation of the gallery forest, and the second log phase with the superior, more remote coniferous forest.

The second log building phase was characterized by the replacement of earlier makeshift structures and the construction of better quality and more durable housing. The continued use of logs, however, did not take place with equal magnitude in all parts of the Mormon West; in fact, adobe was the predominant sequential replacement material in most communities of central and southern Utah. But communities in which log continued to be more important than adobe after the initial building phase are more or less contiguous and therefore form a general region of second-phase log building that contrasts with the adobe region (Fig. 5, p. 34). Most communities north and east of the Wasatch Mountain Range, including northeast Utah and southeast Idaho, comprised the area of important second-phase log construction, and nearly all were located within 15 miles of coniferous forests which sustained a fairly high yield of timber for about two or more decades after the initial period of settlement. Logs were used for all kinds of structures but were especially important for the house and outbuildings on the homestead, less important for public buildings. After a community was 10 or 20 years old,
log work generally gave way to lumber and brick, but in Idaho some construction of log farm buildings persisted into the depression years of the 1930s.

**Mormon Log Preparation and Building Practices**

The methods by which logs were prepared and secured in walls are all traceable to Eastern America and ancient Europe. However, the Mormons did not employ all of the log building traditions ever common in Eastern America. For instance, **vertical-log construction** was completely absent in the Mormon West. All log walls in Mormondom consisted of horizontal members but exhibited considerable variety in terms of log walling techniques. Much of this variety was the result of differences in the principal tools utilized at different times.

Of the tools available during the initial log building phase, the ax was by far the most important; in fact, a skilled workman could prepare the logs and build a cabin with an ax as his only tool. The best ax for all-purpose log work was a felling ax, used to fell the trees and notch each end of the log for tight-fitting corners. But, in addition, many pioneers possessed a broad-ax or an adz by which the logs could be hewn along two or more sides to form a more even wall surface. Tools of less importance, but available to some,

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were hand saws used to cut the ends off the logs overlapping on the corners and small augers for making dowel holes into which dowels or wooden pegs were driven in order to better "tie" the logs together. Such wooden pegs were observed in Idaho, and references to them occur in pioneer literature, but most log structures were built without them.

Most remaining log work dating from the initial phase settlement indicates that logs were ordinarily left unhewn (in the round) but peeled of bark. Bark left on the logs (especially cottonwood) was not only considered unattractive, it also provided a niche for harboring ants, termites, and other such vermin, thus increasing the decay rate (Mason, 17) and making life in the cabin miserable. Building with hewn logs required more labor but offered the pioneer many advantages and possibly a little prestige. Hewn logs exhibited skilled axmanship, but more importantly, they formed a more-or-less plumb wall surface with tight-fitting logs requiring only a small amount of chinking. They easily lent themselves to the subsequent application of plaster or weatherboarding. Hewn log walls were common on houses and a few public buildings but rarely occurred in the farm yard.

During the second log building phase additional tools became available, especially water- or steam-powered saws and iron nails. Power saws appeared typically within five or ten years of initial settlement, beginning in the 1850s in the oldest communities (Hunter, 355). They were erected on rivers or creeks in the canyons as close as possible to the coniferous
forests primarily for the purpose of sawing lumber, but such sawmills also prepared logs brought to the mill by individuals who simply wanted to have the logs squared or to have two sides of the log cut smooth. Power saws replaced the broad-ax and adz, but there was really little difference between a log that had been hand-hewn and one squared or otherwise prepared by a saw. Numerous log structures in the second-phase area contained logs cut flat on two opposing sides with cut surfaces placed horizontally forming the joints between logs laid in the wall, leaving the round uncut surface exposed outward. So well did these logs fit that no chinking at all was required though it was sometimes used. Yet other log walls were composed of logs with the sawn edges facing outward vertically, forming even cut surfaces both inside and outside the building, and joints consisting of the two uncut round sides (Fig. 14). Chinking was necessary on the latter but most such walls are now disguised by siding or veneering of some kind. Nails were also liberally used in later years to further secure the logs in the wall.

Chinking material was almost universally clay or adobe mud mixed with dry grass or straw. Before the clay or mud was applied, slabs of wood split from logs were frequently used to fill the largest crevices between poorly fit, uneven cottonwood logs (Fig. 15). In the early twentieth century portland cement mortar became common chinking material. Fresh barnyard manure, confined to barns and sheds, also achieved common usage.
Fig. 14. The logs on this house in Oakley, Idaho, reveal the marks of a circular saw, common only during the second log-building phase. A saw was used to execute a slight dovetail notch, but only two sides of the log were sawn.

Fig. 15. Chinking of mud mixed with dry grass is plastered over wood slabs on this house near Rexburg, Idaho, and corners are saddle notched.
An important aspect of horizontal-log building techniques was the manner in which logs were notched and joined at the corners. If properly notched, all log members in the wall were securely locked in place without the assistance of nails or pegs, and all timbers in one wall lay half a log thickness above or below those of the corresponding tiers in the adjoining walls. Five different methods of corner notching were observed on log structures of all kinds built by Mormons:

1. Full dovetail\(^{12}\) notch (Figs. 16a and 17). Dovetailing is a practice familiar to every joiner of wood but difficult to execute on logs, requiring considerable skill with an ax. Each edge or face of the notch slopes downward, interlocking the two joined logs in both directions and also permitting the downward drainage of rainwater. Full dovetailing most frequently accompanied ax-hewn logs and was found mainly on dwellings exhibiting skilled workmanship. Dovetailed corners could easily be trimmed square with a saw and flush to the two joined walls permitting the easy application of siding or plaster. Undoubtedly this method was considered superior to the others in Mormondom, and there was apparently some effort on the part of the experienced frontiersmen to teach the method to newcomers (Carter, 1958, 149-150).

\(^{12}\)The terminology and much of the inspiration for this section on log notching are borrowed from Kniffen and Glassie, 53-57, and Weslager, 336-340.
Fig. 16. Corner timbering methods observed on log buildings in the Mormon culture region.
2. Half dovetail notch (Figs. 16b, 18). Somewhat easier to construct than the full dovetail, the half dovetail was executed by sloping only the top half of the notch downward and leaving the bottom half flat. The half dovetail contained all of the advantages of the full and was also primarily confined to hewn logs and on structures built with some care.

3. Saddle notch (Figs. 16c, 15). One of the simplest notches to achieve was the saddle notch of which there were two principal types: a single "U"-shaped notch was made at the top or the bottom of a log into which the adjoined log was fit, or two such notches were made, one at the top and one at the bottom of each log. The saddle notch was almost completely confined to unhewn logs left round and was by far the most common type of notching on farm buildings and structures built for temporary use. In 1970 a sample survey of notching on remaining log buildings of every type near Rexburg, Idaho (Table 3), revealed that more than 60 percent contained saddle notching, and less than 5 percent had dovetailed corners. The vast majority of these saddle-notch structures were farm outbuildings. While the chief advantage of saddle notching was the ease with which it could be executed, its chief disadvantage lay in the necessity of leaving the ends of the logs overlapping beyond the corners making the application of siding impractical.

4. "V" notch (Figs. 16d, 19). This type of notching was accomplished by forming a sharp "V" in the bottom of the
Fig. 17. Full dovetail notching, Gunnison, Utah

Fig. 18. Ax-hewn logs and half-dovetail notching, Spring City, Utah
Fig. 19. "V" corner notching near Rexburg, Idaho
TABLE 3

RELATIVE OCCURRENCE OF VARIOUS CORNER TIMBERING METHODS ON LOG BUILDINGS IN PARTS OF
UPPER SNAKE RIVER VALLEY, 1970

<table>
<thead>
<tr>
<th>Corner Timbering Method</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saddle notch</td>
<td>43</td>
<td>61</td>
</tr>
<tr>
<td>Dovetail (half and full)</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>&quot;V&quot; notch</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Square notch</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Corner post</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td><strong>Sample total</strong></td>
<td><strong>71</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

log and a chamfered point on the top permitting the logs to interlock tightly. The "V" notch was found on both hewn and unhewn logs which were either cut off flush with the wall or left overhanging. Despite the commonness of "V" notching in all midwestern areas inhabited by Mormons before they settled in the Mountain West (Kniffen and Glassie, 61), relatively few "V"-notched log structures were found in Mormon country. In the Rexburg sample only about 7 percent of remaining log buildings were "V" notched.

5. Square notching (Figs. 16e, 20). The square notch is the simplest of all to construct and may be a form degenerated from the half dovetail (Kniffen and Glassie, 56). It was frequently executed with a saw by cutting a right angle notch at the top and the bottom of the log, leaving a squared centerpiece which fit between the notches of the logs above and below. Square notching lacked the structure to resist outward thrust in the wall and therefore required the use of nails or pegs. It was a very common method used by Mormons.
Fig. 20. Square notching on the Deuel cabin built in 1847. Now on Temple Square, Salt Lake City.

Fig. 21. Logs nailed to corner posts, near Rexburg, Idaho
in both the initial and second building phases, and on hewn, round, or sawn logs. About 25 percent of the Rexburg sample were square notched.

Another method of securing logs in four walls was achieved by nailing the ends of each log to a post or plank (Figs. 16f, 21), set vertically at each corner. Corner-post construction is not a type of notching; hence, the log tiers in the corresponding four walls are even. Nevertheless, this method was rather popular during the later second building phase when sawn planks for corner posts and large steel spikes were available. In the Rexburg area sample about 15 percent of the structures contained logs fastened to corner planks; most of these were lowly chicken coops and other sheds on the farmstead, though this method was also observed on some log houses.

All five varieties of notching must have been understood by Mormons throughout the Far West, for all five methods seem to have been employed in all log building communities, though much evidence has disappeared. Individuals building with logs seldom used the same preparation methods on all buildings on the farm or village lot. Full or half dovetail notching was largely confined to the better built log houses, while the barns and sheds exhibited mainly saddle notching. Quite frequently the log addition to a log house or structure was put together with logs prepared differently from those for the original building; one section with carefully hewn or sawn logs fitted tightly together with corners joined.
neatly by full dovetail notching, while the new section might contain round logs of different sizes chinked with large wood slabs and clay and saddle-notched on the corners. Occasionally a single corner on one building might even contain logs with more than one type of notching employed. It seems clear that any Mormon familiar with log working could employ several notching methods at will.

In the so-called Mormon "ethnic" towns, log work did not differ from that in other Mormon towns, for the vast majority of European immigrants learned the techniques after coming to Utah. Those from England (nearly half of all European immigrants) were completely ignorant of log working for there was apparently never a log working tradition in England (Kniffen and Glassie, 58). Nineteenth-century immigrants from Ireland and Scotland and Wales came mainly from the slums and labor communities of industrial towns (Olson, 193-194) and were equally ignorant of log working. Of the Continental immigrants to Mormondom, Danish farmers from Jutland, totaling over 12,000 by 1905 (Mulder, 104), made up the majority. In the 1800s Jutland had long since been deforested and log work belonged to the distant past. Nevertheless, the Danes learned log work quickly in Utah. Myrtle C. Marquardson reports that the settlers of Elsinore, Utah, were of Danish nationality all united whole-heartedly in the common enterprise of building up the community which became their home. . . . It was not long before the men learned to dovetail the logs and fit them into place, chinking where it was necessary to keep out the cold. . . . Niels C. Lee was an expert at dovetailing logs, Peter Larson was an expert at weaving roofs and both these men taught others how to do the work. (Carter, 1958, 149, 150)
Other immigrants came from Sweden, Norway, Germany, and Switzerland, and though many of these families were familiar with log construction, they added nothing significantly new to the Mormon practices already fully developed before the Utah period. They did no doubt add quantity to the folk log building inventory by bringing both tools and experience, as indicated by a Wilford, Idaho, pioneer who stated that the pioneers of Wilford

got their logs in the timbers country, some were sawed and some hewed with a broad axe or else adz. Some of the broad axes were brought from the old country, in this case Switzerland, with specific pioneers who used them and built their own log homes. (L. E. Johnson, Vol. 1, 27)

Other experienced log workers came to the Mormon West from Eastern America and further reinforced the prevailing log practices. Grant Campbell, for instance,

. . . who came to Salt Lake City in 1852 . . . was a skilled woodsman. He worked for years, when a young man, in the timber areas of Minnesota and was known as an expert in the use of the broad axe. After he and his little family arrived in Salt Lake City, President Young sent Grant to help construct homes for the families in the new colonies. He built or helped to build many homes of rough new logs in North Ogden, Providence, Utah; Downington and Montpelier, Idaho; and Auburn and Fairview, Wyoming. There may have been others but the records have been lost. . . . (Carter, 1958, 185)

This one man represents the type of pioneer who possessed valuable skills and was called on frequently by Church officials to move and assist newly arrived Mormons in getting established on virgin lands. Experienced frontiersmen were primarily responsible for the rapid dissemination of valuable knowledge and skills to those pioneers originally ignorant of American-Mormon frontier building practices.
Lumber in Mormon Country

The early Mormons in the West had a bias against building frame houses; nevertheless, much lumber was milled and a few frame structures were built. Brigham Young revealed the early Mormon attitudes about lumber when he advised the settlers in Cache Valley, Utah:

I have an objection to frame houses in this country, and always have had, on account of our very dry weather's rendering wood so very inflammable (I consider them dangerous), whereas an adobie, stone, or brick house may have a room or part of a room burnt, with far less danger of setting the whole house on fire... Still I am going to recommend that you use timber in building in this valley... to erect saw mills and prepare to build with lumber. They are the cheapest and best houses I can think of, under your circumstances... [since] I have not discovered in this valley any soil fit for making adobies. (Young, Vol. 8, 79)

Clearly the Utah Mormons were aware of the fire hazards of lumber, but lumber was also relatively inexpensive, easy to work with, and its use in place of logs conserved forest resources. But because of slow and laborious production methods, only a small supply of lumber could be made available within the first several years of settlement. Lumber was first used for roofing, furniture, flooring, and for the framing of doors and windows, interior finish work, and improvements on the farmstead. But very few frame houses were constructed until the 1880s. There are three lumber building phases recognized here, each differing in production methods, lumber usage, and lumber supply.

The initial lumber phase is associated primarily with the use of the pit-saw (whip-saw), a long straightedge blade
operated by manpower. A pit was dug in the earth and a frame platform built over it on which a log was placed. One man, the sawyer, stood at the top and guided the saw as it cut along the timber from end to end; the other man, the pitman, stood below in the pit and provided the main motive power as he moved the saw up and down and got much of the sawdust in his eyes. Sometimes the platform was built high above the ground with no pit beneath (Carter, 1958, 122).

The pit-saw blade was quite long and often "whipped," or bent, when bound in the log—hence, its other appellation "whipsaw." The pit-saw was an extremely old European method of sawing and was widely used in all of the American colonies, following the frontier westward.

The sash saw, an early water-powered version of the pit-saw used in New England in the early 1600s (Morrison, 33), followed on the frontier closely behind the pit-saw and in Mormondom generally replaced the man-powered blade. The sash saw consisted of the same long straightedge blade placed in a metal frame, or sash, which stretched the blade taut, preventing whipping. Like its predecessor it moved up and down, but in this case it was driven by a connecting rod (pitman rod) from a crank on the shaft of a water wheel (Sloane, 45).

Straightedge water-powered saws were established in the oldest communities of Utah in the early 1850s (Hunter, 355-356; Carter, 1941, 9-30), and in a few places water-power circular saws were also established at that same early period (Carter, 1941, 30). The circular saws, however, were rare during the initial lumber-using phase.
The early sawmills were set up in the canyons near the settlements and operated on a share contract basis. Initially, most of the pioneers felled their own logs, took them to the mill to be cut into lumber, and paid the miller by yielding to him his toll, a certain percentage of the total cut. A man normally had no more lumber cut than he needed for himself and his saw payment--that was usually just enough to make improvements on his own house which was ordinarily already built of logs or adobe, and to make a few sheds and other improvements on his homestead. Much of the lumber accumulated by the miller as payments went into the interior finish work of public buildings. The initial lumber-using phase lasted for about the first 10 to 15 years in any given settlement and was characterized by a scarcity of lumber, most of which was used as a supplementary or secondary material to log and adobe. Rarely was a structure of any kind made principally of lumber until a later phase.

The second phase in building with lumber was made possible by improved roads to the coniferous forests, the purchase of steam-powered circular saws, improved water-powered circular saws, and the establishment of commercial lumber yards within each community. In terms of specific dates, the oldest settlements, Salt Lake City, Ogden, Provo, and the oldest communities of southern Utah, obtained superior circular saws in the late 1860s (Carter, 1941, 9-30; Hunter, 357) and by the early 1870s in northern Utah (Ricks, 161). Following close behind the new sawmills were shingle
mills, planing mills, door and sash factories, and commercial lumber yards. The increased supply of lumber available for purchase in the community was followed by a rapid decline in the use of logs and an increase in the construction of frame barns, other outbuildings, and public buildings; however, there was only a modest increase in the construction of frame dwellings due to the now traditional preference for masonry dwellings. During the second phase much lumber was used as clapboarding or weatherboarding on older log and adobe houses.

The third lumber building phase began before the turn of the century in most of the Mormon region and was characterized by a significant stimulation in lumber usage and the construction of frame houses and other buildings. The local lumber yards began to import precut lumber of superior quality from the Pacific coast, northern Idaho, and Montana, bringing the inevitable shutdown of most locally operated sawmills. The imported lumber into Mormondom must be disqualified as a folk building material, but it is mentioned here in view of the fact that most folk building forms—houses, barns, granaries, coops, and sheds—continued to be constructed with the new material until well after 1900. In fact, between 65 and 70 percent of the remaining folk dwellings in the northern half of the Mormon culture region remaining in 1971 are either made completely of lumber or are veneered with it (Table 4). Communities farther south have between 20 and 30 percent of their houses in frame construction or clapboard veneer. Most of the clapboards remaining in 1971
were constructed during the third lumber building phase, as were the remaining hay barns and plank granaries.

**TABLE 4**

<table>
<thead>
<tr>
<th>Community</th>
<th>Approx. No. of Remaining Houses Built Before 1900</th>
<th>19th-Century Frame and Lumber-sided Houses as of 1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parowan, Utah</td>
<td>60</td>
<td>14</td>
</tr>
<tr>
<td>Kanosh, Utah</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>Elsinore, Utah</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>Mt. Pleasant, Utah</td>
<td>82</td>
<td>16</td>
</tr>
<tr>
<td>Coalville, Utah</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Willard, Utah</td>
<td>44</td>
<td>2</td>
</tr>
<tr>
<td>Hyrum, Utah</td>
<td>65</td>
<td>46</td>
</tr>
<tr>
<td>Paris, Idaho</td>
<td>38</td>
<td>25</td>
</tr>
</tbody>
</table>

**Fired Brick in Mormon Country**

Visitors to the Mormon city of Nauvoo, Illinois, in the 1840s were invariably impressed by its large quantity of brickwork. A city so new and on the frontier, thought the typical newcomer, should be almost entirely of logs and lumber. Actually, log and lumber structures did far outnumber those of brick in Nauvoo. There were about 300 brick houses, more than 400 frame houses, and more than 1,000 ax-hewn log cabins left after the Mormon exodus in 1847 (Blum, 395). But log and frame houses got little attention from spectators, as indicated by the following typical response from a newcomer to the city in 1843:
We have a good many brick houses [in Nauvoo] and others are frame-wood and log houses. Some . . . appear strange to the person who has been accustomed to live in a fine-built place, but a great many are quite smart large brick houses, which would look well in any city. I was quite surprised to find so many good brick-built houses. Brick houses, stone, and others are building as fast as they can, and I see a great difference in the short time I have been here. (Quoted in Flanders, 156-157)

Though brick was not the predominant building material in Nauvoo, it undoubtedly was the most favored for permanent buildings which were constantly in demand. Several brickyards in the city advertised regularly in the Nauvoo Neighbor for more labor to produce brick quantities in the millions, many of which were destined for use in the rapidly growing business and public buildings construction. Clearly the making of bricks occupied a significant position in the Mormon material culture before the Utah period; nevertheless, brickmaking in the Mormon West for a long time was almost totally replaced by adobe. Early attempts at burning brick in the Salt Lake Valley failed, as explained by Richard Burton: "The brick in this part [Salt Lake Valley] splits while burning, consequently the sun-dried article [adobe] is preferred" (Burton, 344). But there were other reasons why fired brick did not compete well with adobe during the initial settlement phases: the most important involved labor skills and costs.

Every family could learn quickly to make its own adobes and thereby remain independent of special skills possessed by only a few. Brickmaking, however, required skills and practices not possible on the individual family homestead; the construction of the kiln and the baking process
had to remain in the hands of a few skilled individuals, and the burning process itself added to the cost of the product. Nevertheless, few would deny that good quality fired brick made a superior building material and once it finally appeared in the West, it was everywhere in demand among the Mormons. Three brick-using phases are recognized in this study, each differing in production methods, brick supply, and quality.

The initial brick-working phase had very humble beginnings in Utah, but at least as early as 1849 a few bricks were being produced in the Salt Lake Valley (Carr, 404). Clay was prepared in the same manner as that for adobe, that is, it was spaded loose on the ground surface, wetted, and trodden with bare feet while a little straw or dry grass was added. The bricks were first molded by hand, rolled in sand, and then placed in a sand mold or sanded wooden mold in the same manner as in Nauvoo. When turned out on the ground or a pallet to dry, the brick showed a richly sanded surface. After about a week of drying the bricks were then stacked in a locally fashioned kiln and baked continuously for about one week, but it was difficult in those days to maintain the desired temperature, and the bricks were not consistent in quality. Brickmaking methods may have actually degenerated for a time in Mormon country when in the 1850s and 1860s some brickmakers simply burned previously made adobes in their kilns—adobes which had been split into two or more pieces (Winburn, 23). Brick sizes also varied from
one brickmaker to the next because all made their own molds without mutual agreement on specific size. Nearly all the bricks during the initial phase were used only in the construction of chimneys and fireplaces and perhaps an occasional foundation, and the brick quantities produced were minuscule compared to those of adobe.

The second phase in brickmaking was associated with the rise of brickyards comparable to the adobe yards, and the use of the same type pugmill to mix the clay (Fig. 4, p. 29). In spite of similar mixing processes, the brick and adobe yards were not integrated as one business operation but were owned and operated in each community by separate individuals in competition. Brick, however, was not a significant threat to adobe during the second phase, for brick rarely became the principal material used in the construction of any building; rather it was used as veneer on adobe walls. In fact, the vast majority of the nineteenth-century brick homes in Utah were actually brick veneer with adobe used as the primary load-bearing and walling material.

In terms of specific dates, the second phase of brickmaking began in the oldest settlements in the 1860s. The first successful brickyard and the first all-brick house, the Atwood house built in 1864, were in Murray (near Salt Lake City) (Winburn, 23). Shortly afterwards came other successful yards in other communities; Provo had one in 1866, Midway in 1868 (Markham, 12), and Ogden in 1868 (Hunter, 363). Thus, it was more than fifteen years after
the Nauvoo exodus that brick regained a foothold in Mormon material culture. Not until the third phase beginning in the 1880s, however, did brick effectively replace adobe in the oldest settlements of central and southern Utah, and not until the third phase was it especially important in the northern part of the culture region where brick and lumber together brought on a rapid decline in the use of logs.

Third phase brickmaking was made possible by greater prosperity and by improvements in kilns and pugmills which replaced much of the hand labor, and which standardized the sizes of all bricks. These more mechanical methods of producing bricks reduced the cost of brick and made it more competitive with other materials; hence, a rapid increase in the use of brick occurred during third phase and brick again became as widely used as it had been earlier in Nauvoo. In many communities before the turn of the century, especially in Utah, brick became the predominant building material. Brick also became one of the most widely distributed materials, occurring in every Mormon town without exception, as indicated in Table 5. Even lowly two-room cottages so numerous in the Mormon country were most frequently built of brick or brick veneer after 1890.

Some advantages of brick over adobe are that brick is more resistant to weathering than adobe and also it can be laid into a variety of patterns to produce pleasant designs on the wall surface. The designs also functioned to bond the outer layers of brick to the adobe or other stress-bearing
TABLE 5
NINETEENTH-CENTURY BRICK AND BRICK VENEER HOUSES REMAINING IN 1971 IN RANDOMLY SELECTED MORMON COMMUNITIES

<table>
<thead>
<tr>
<th>Community</th>
<th>Approx. No. of Remaining Houses Built Before 1900</th>
<th>19th-Century Brick and Brick Veneer Houses as of 1971</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percent</td>
</tr>
<tr>
<td>Parowan, Utah</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>Kanosh, Utah</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Elsinore, Utah</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Mt. Pleasant, Utah</td>
<td>82</td>
<td>11</td>
</tr>
<tr>
<td>Coalville, Utah</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Willard, Utah</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>Hyrum, Utah</td>
<td>65</td>
<td>4</td>
</tr>
<tr>
<td>Paris, Idaho</td>
<td>38</td>
<td>2</td>
</tr>
</tbody>
</table>

material behind. The various folk cultures of Europe and America employed several brick-bonding patterns, but each culture in the early days tended to differ from others in the pattern most favored. In the American colonies during the early eighteenth century, for instance, Flemish bond was almost universally preferred (Fig. 22a) (Morrison, 294). But the Mormons a century later in Nauvoo and in the West used mainly common bond patterns (Fig. 22b) with stretcher bond (Fig. 22c) frequently occurring on veneered walls. Flemish bond and English bond (Fig. 22d) are exceedingly rare in the Mormon West, as are more decorative patterns. Most of the Utah brickwork seems to be a copy of adobe walling patterns which also occur in common bond almost without exception. No doubt many brick homes in Utah were built by pioneers who first learned masonry-walling practices with
Fig. 22. Nineteenth-century brick bonding techniques observed in the Mormon culture region in 1971.
adobes. This in part may account for the plain and unimaginative brickwork typical in the Mormon culture region.

**Domestic Stone Masonry in Mormon Country**

Mormon material culture originally derived from the New England western frontier where there was a dearth of stone masonry. New Englanders were unfamiliar with stone-working techniques despite the abundance of morainic stone in the area (Morrison, 68-69). Some stone houses as well as a large stone temple and other buildings were constructed in Nauvoo, but on the whole stone work before the Utah era was poorly represented and insignificant for the construction of houses and outbuildings. In the Mormon West, however, stone masonry gained considerable impetus especially during the 1860s and 1870s when in some communities it became the predominant building material or at least vied with brick or adobe. Nearly all settlements within the Mormon culture region contained at least some stone work. Stone was conspicuous in town business sections and was almost the exclusive material for the construction of early Mormon tabernacles and temples, but it was also an important material on the homestead--barns, granaries, coops, and houses in large numbers were made entirely of stone or at least utilized stone for the foundation and chimneys.

Unlike the other building materials, the incidence of stonework in Mormon country is highly variable and erratic, with one community building predominantly in stone and a
nearby community containing almost no stone. The principal reason for this was the fact that stone could not be transported profitably very far and was therefore used only where found nearby. But there were other reasons contributing to the erratic display of stonework in Mormondom. Building a house of stone, unlike that of adobe or log, was not a simple matter performed by every family, but required skills usually acquired through an apprenticeship (though many stonemasons were more or less self-taught). The skilled masons seem to have been concentrated more in some communities than in others, even in areas where stone supply differences were insignificant from one settlement to another. In San Pete County, for instance, the communities of Fairview, Spring City, Ephraim, and Manti all have considerable numbers of stone houses; but Mt. Pleasant, located within five and six miles of Spring City and Fairview, respectively, contained no nineteenth-century stone houses in 1971. With stone just as accessible in Mt. Pleasant as in other nearby communities, it seems that the absence of stonework there is, coincidentally, due to the shortage or absence of skilled masons.

Some communities acquired several stonemasons as a result of church construction projects. Stone temples, for example, were built in St. George, Manti, Salt Lake City, and Logan, and other towns became the sites of stone tabernacles. Several stone houses were built in these communities by employees sent specifically to work on church building projects in those localities. The Mormon Church was so in
need of skilled masons that Brigham Young gave orders to proselyting missionaries to concentrate on converting people with building skills, and as the converts arrived in Utah many were specifically assigned to certain communities.

It is well documented that before 1890 most stone-masons in Utah were from Europe, especially Great Britain (Fife, 1972, 18-19). And the newly arrived Europeans, though desiring to assimilate, nevertheless frequently stayed together and established the various "ethnic" communities. For example, the majority of the stonemasons in Manti and Spring City were of Danish and Swedish background. Scandinavians were also responsible for most of the stonework in Pleasant Grove, while in Heber and Midway there were many English stonemasons, and Scottish immigrants built essentially all of the stone houses in Beaver (Roth, 1972, personal interview).

It is interesting, however, and significant to the conclusions of this study that the stonemasons, regardless of national origin, built houses having Mormon-American floor plans. Stated another way, it is impossible to determine the national origin of a builder of any given stone house in Mormon country by studying the floor plan, stone masonry method, or any other characteristic. Important reasons for this are that stonemasons either worked under the supervision of carpenters, most of whom were Americans, or followed their employers' designs (Roth, 1972, personal interview). Also, by the time stone work became important in Mormon country
(after 1860), a good many, if not most, stonemasons had already been assimilated into Mormon-American culture.

**Stone Walling Patterns and Building Phases**

The initial stone building phase was characterized by the gathering of stones at random from home lots, farm fields, creek beds, mountain slopes, or any source that would yield a fair number of a size conveniently handled by one man. Typically, such miscellaneous fieldstone (in contrast to quarry stone) was used for fences, dugouts, fort walls, and farm outbuildings and was mortared (if at all) by ordinary clay or adobe mud, although there are examples of good lime-mortars during the initial phase made from lime burned locally. Much initial stonework was performed by more-or-less untrained stonemasons who were not necessarily familiar with stonecutting or with the best stonebonding methods. Consequently, most of what they built is what in this study is referred to as rubblestone masonry. During the initial phase rubblestone walls usually consisted of uncut fieldstones varying greatly in size and rendering no symmetrical pattern when placed in the wall, though the largest stones were usually laid as the quoins and as jambstones under windows and along the doorway. In areas where stone was relatively soft, the stone was frequently split with a chisel or crudely shaped with an ax (Driggs, 83). But rubblestone masonry and the use of fieldstone were by no means confined to dugouts, outbuildings, or fort walls or confined to the
initial stone building phase. A great many sturdy stone houses built of fieldstone long after the initial phase are still in use, especially in northern Utah and southern Idaho. During the second stone building phase, however, many improvements had taken place.

The second phase was characterized by the use of lime-mortars obtained by kiln-burning local limestone, by an influx of skilled stonemasons (especially from Europe), and by the rise of privately operated stone quarries (in addition to those operated by the Church). In many communities the stone quarries functioned somewhat like an adobe or brickyard in that they provided building materials prepared by full-time specialists. Some quarry operators, for instance, promised to deliver stone to the building site cut or shaped in any desired fashion (Hunter, 362). Many stone dealers, especially in northern Utah, continued to deliver fieldstone, but usually split the stones so that at least one cut side could be used on the outer wall face (Fig. 23). The largest fieldstones were cut into roughly rectangular blocks and placed as the quoins and jambstones (Fig. 24). The smallest remained uncut and were used for filling between the larger joints and as backing material forming a wall about two feet thick. Rubblestone walls were necessarily thick because of the difficulty in bonding together so many small and oddly shaped pieces.

The skilled mason during the second stone building phase improved (from his point of view) the appearance of the
Fig. 23. Close-up of wall on house in Fig. 24 below, exhibiting split fieldstone and clay mortar.

Fig. 24. Built in 1861, this house in Willard, Utah, is a fine example of early rubblestone masonry. Note the large quoins and jambstones.
rubblestone wall by one of several methods. All joints were made smooth and obscure with mortar and were then either outlined with scored indentations or pointed in high relief with a high lime mortar (Fig. 25). Pseudo-courses were sometimes effected on rubblestone walls by forming straight horizontal mortar lines spaced at intervals across the facade wall, giving the wall an even-coursed ashlar appearance; or by forming staggered or broken horizontal lines producing the appearance of a broken-coursed ashlar wall (Fig. 26).

Much stonework during the second phase utilized symmetrically cut (block cut) quarry stone, especially in central and southern Utah, enabling the mason to build truly even-coursed ashlar walls (Fig. 27). Ashlar walls, usually measuring 18 inches or less, were generally not as thick as those of rubblestone because bonding the blocks in a wall was relatively easy. Ashlar walls were also safer than rubblestone walls even when only small amounts of mortar were used. Some ashlar walls had little or no mortar in the joints (Fig. 28), whereas the mortar typically occupied considerable space and bulk within walls made of fieldstone. Remaining stone houses with broken or cracked walls or walls buckled out and in a ruined state are far more common if built of fieldstone than of quarry stone.

Domestic stone masonry declined rapidly in Mormon country with the increased production of lumber and brick

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13Ashlar is here defined as a wall having a face of square or rectangular stones.
Fig. 25. Pointing with white lime mortar outlines most of the joints between the stones on this house near Rexburg, Idaho.

Fig. 26. The stone walling on this house in Logan, Utah, appears as a broken-coursed ashlar because of the indented scoring in the mortar and the staggered or broken horizontal lines.
Fig. 27. Even-coursed ashlar masonry in Spring City, Utah, utilizing stone quarried from an outcrop of oolitic limestone.

Fig. 28. Even-coursed red sandstone ashlar in Washington, Utah. Much of the poor quality mortar has weathered, leaving many of the joints nearly devoid of mortar.
beginning in the 1880s in the oldest settlements and after 1900 in later settlements.

**Stone Types and Stone Walling Patterns, An Areal View**

Stone-walling patterns during the second building phases tended to be associated with certain types of stone, so that in any specific settlement most of the stone and stone masonry was much alike. But when the stonework of several communities is viewed comparatively, there is considerable areal variety, much more so than is true of any other building material discussed in this study. In the Mormon culture region several domestic building stone regions are recognized (Fig. 29). Fieldstone was taken from mainly three general stone sources, the most widespread of which was volcanic basalts locally called lava rock. The largest areal extent of this gray-to-black stone occurs in the Snake River Valley of Idaho (Fig. 30) but is also conspicuous in southeastern Idaho and Beaver County, Utah, where basalt was one of the chief building materials, and in St. George, Washington County, where the lavas were confined mainly to foundation stones.

A second general source of fieldstone for houses is termed here miscellaneous metamorphics, a general term including a host of stone varieties scattered profusely in areas north of Salt Lake City. The stones included gneiss, schist, quartzite, siliceous limestone, and others located on the slopes of the mountains and in the lacustrine benches of the
Fig. 29. Distribution of the kinds of stone used in 19th-century folk houses in the Mormon culture region.
Fig. 30. The remains of a rubblestone wall composed of Snake River basalt, near Rexburg, Idaho

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former pleistocene Lake Bonneville. Many of these stones were rounded and smoothed by the action of water, and some from higher slopes were roughened and broken by glacial ice. Nearly all stone houses and other buildings north of Salt Lake City exhibit rubblestone masonry composed of these miscellaneous hard metamorphics (Figs. 31, 32), especially the cities of Bountiful, Centerville, Farmington, Willard, and scattered in the settlements of Cache Valley.

A third source of rubblestone is the fist-sized cobblestones taken from river beds throughout the Mormon region. Cobblestone was frequently used to fill larger joints in the rubblestone walls but was used exclusively only on chimneys (especially those of cabins during the initial settlement period) (Fig. 33). There is no particular region in the Mormon West where cobblestone appears to be significantly more important than in other regions. Nowhere did it ever predominate as a building material even for chimney construction.

Symmetrically cut quarry-stone used for houses was almost wholly confined to the regions south of Salt Lake City. Most quarry-stones were bedded sandstones and limestones which could easily be cleaved and shaped into blocks. Red sandstone is conspicuous in all settlements of the Virgin River Valley, especially Santa Clara, St. George, and Washington (Fig. 29, p. 100), in Kane County and in Millard County, especially in Fillmore. A tan or buff-colored sandstone was quarried for houses in Castle Valley and Sevier.
Fig. 31. Metamorphic stones taken from the lower slopes of the Wasatch Mountains, Farmington, Utah

Fig. 32. The fieldstone used in this ruined schoolhouse north of Brigham City, Utah, exhibits a great variety of colors and shapes.
Fig. 33. Cobblestone chimney on a cabin in Cedar City, Utah, built in 1851 originally in Parowan.
County, and several quarries in the Salt Lake Valley produced an excellent gray sandstone (Dixon, 25-30).

Limestones also occurred in numerous places, the most commonly used being that in San Pete County. Quarries near Ephraim and Manti supplied this attractive creamy white stone for numerous houses in the settlements of that area as well as for the temple at Manti. The oolitic limestone when burned properly also made an excellent lime for mortar. Limestone also found its way into many homes in Utah County, in American Fork, and especially in Pleasant Grove which had an outcrop of tufa, a very soft type that was initially cut with hand axes (Driggs, 83).

Other varieties include a soft volcanic tuff, easily shaped into the pink stone blocks at Beaver, and a light gray tuff in the Heber Valley. Much granite was quarried near Salt Lake City but granite was rarely used for homes there except for an occasional foundation or for quoins.

The Building Materials Phases: A Summary

Mormons extracted from local resources a variety of construction materials but the predominance of the materials selected varied in time and place; supply, accessibility, cost, and preference were some of the determinants in choice. All of the materials in time passed through two or three phases of utilization, each phase differing from others in terms of circumstances under which the materials were selected and prepared, and the degree to which each material was used.
The initial phase was associated with the frontier when the need for shelter, however makeshift, was an immediate concern of all families; all were more or less engaged simultaneously in the act of building their homes, doing most of the work themselves with little trade or barter. Every step in the process of acquiring and preparing materials for a house was personally accomplished with a minimum of tools and without the aid of middleman, broker, or professional supplier. But the materials selected during the initial phase varied from place to place. In some areas cottonwood and willows predominated while in others pine logs were important; in still others it was soil for adobes or fieldstone for dugout walls. Chief among the factors influencing the initial selection of materials were accessibility and resource supply; the relative ease with which a material could be acquired largely determined its cost in both labor and time. Neither labor nor time was abundant in virgin lands where Indians and cold winters were potentially inhospitable. The range of choices during the initial phase, therefore, remained confined to materials produced quickly—principally log and adobe, with stone sporadically important, and lumber and brick minuscule.

The initial phase was also significant as a schooling process to all participants regardless of cultural origin, a time in which cultural diffusion and the assimilation of once diverse peoples were most effective. Time spent in a frontier settlement was a time to learn anew, to share alike, to cooperate and fellowship; the nonconformist did not remain.
Initial phase and the other phases made more complete the newcomer's conversion to Mormon culture which resulted in conformity to material culture as well as to the social and the spiritual.

The second building materials phase was a time when permanent structures superseded the temporary, a time of replacement of materials initially used, and a time when the acquisition and preparation of building materials moved from the hands of the individual family into the hands of a few full-time suppliers. The adobe yard, lumber yard, brick yard, and stone quarry established in each settlement offered the settlers a wider range of materials superior to those previously prepared. Again, the materials used differed from one locality to another--adobe dominating south and west of the Wasatch vying occasionally with stone, brick, or sawn logs; and sawn logs and lumber dominating north and east of the Wasatch, challenged sporadically by adobe, stone, or brick. Cost and supply were predominant factors influencing the selection, but a cultural bias favoring the non-combustible, insulative, and "attractive" qualities of masonry encouraged the construction of brick and stone houses even where their costs were higher. Masonry, especially stonework, also gained impetus from an influx of skilled labor from Europe.

A third building materials phase was brought on by greater contact with the world beyond Mormondom and by general prosperity permitting cultural and individual
preference to supersede low cost as a factor in selecting materials. Pugmills were imported, capable of producing a high-grade brick, and together with imported superior grades of lumber, there emerged a predominance of lumber and brick, signaling a rapid decline and the ultimate end to adobe, log, and stone. Thus, the third phase was the beginning of the end to folk building materials production. Third phase was also the age of disguising (or preserving) old walls with new or improved veneering materials such as high lime plasters, portland cement plaster, and siding (Table 6).

As the building materials changed in time and place, so also did the structures. Yet, no building type or form is strictly associated with one specific type of building material. Needless to say, the shape or floor plan of a house or cabin can be duplicated with a number of different construction materials. But just as there were evolutionary phases in the acquisition, preparation, and utilization of building materials, which pulsated outward from the regional core to the fringe, so also were there evolutionary changes in house form beginning initially with the simple makeshift and ending with the more complex. This subject will be considered in Chapters III and IV.
### TABLE 6
RELATIVE OCCURRENCE IN 1971 OF VARIOUS BUILDING MATERIALS USED AS THE PRINCIPAL MODE IN THE CONSTRUCTION OF 19TH-CENTURY FOLK HOUSES IN SELECTED MORMON COMMUNITIES

<table>
<thead>
<tr>
<th>Community</th>
<th>Adobe</th>
<th>Brick</th>
<th>Log</th>
<th>Lumber</th>
<th>Stone</th>
<th>Plaster or Siding over Unknown</th>
<th>Mud-Concrete</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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CHAPTER III

MORMON TEMPORARY SHELTERS

During initial settlement in the Mormon West, colonists were forced simultaneously to carry out a number of urgent tasks: preparation of land for seed, diversion of water for irrigation, assembly and preparation of materials for construction, and erection of simple, temporary shelters. The construction of such shelters required temporary reduction of known folk housing ideals; no family could immediately build the dream house it sought or attained in Nauvoo or Kirtland. The initial phase reduction process was the important formative stage in the emergence in Mormondom of a certain kind of areal uniformity in folk housing form, and a crucible into which peoples of diverse origins were merged into a more uniform whole. Many thousands of the participants in initial phase colonization (especially after 1850) had never experienced frontier life, never seen a log cabin, a dugout, or fort. These newly arrived members were directed to the frontier by experienced frontiersmen who perpetuated the temporary dwelling form models patterned after the dwellings of the first Salt Lake Valley settlement.

The identification and description of temporary shelters in this chapter provide a better understanding of the processes fostering conformity in folk housing, provide data for an analysis of the relationships between the
temporary shelters and later permanent houses, and make it possible to isolate certain basic folk building form traits that seem to be characteristic of all Mormon folk housing.

The aims of this chapter are best accomplished by an emphasis on building form rather than on function or methods of construction, though some consideration is given to the latter two factors. The term "form" is used here as a synonym for morphology or shape, especially with respect to the overall structure. "Form element" refers to component features fundamental to the overall shape of a dwelling, such as the floor plan, or room shape, roof structure, or the arrangements of chimneys and doors. The principal dwelling forms recognized here include the dugout, the cabin, and the fort, especially the dwelling units within the forts in relation to the forms of other temporary dwellings.

**Dugout Form and Construction**

Dugouts were semisubterranean houses used widely by Mormons during the initial settlement phase. In fact, for many of the newly arrived pioneers, a dugout was the first home in the West and a welcome improvement to the family wagon box. Dugout construction was usually an expedient affair, especially at many of the newly designated village sites where several families arrived simultaneously to found a settlement. In such cases, labor was frequently pooled in a cooperative effort to erect a number of separate dugouts and cabins under the supervision of an experienced frontiersman (Allen, 12). When built with pooled labor, the dugouts
took on a rather uniform appearance, but even where settlements grew more gradually by accretion (where dugouts were built one or a few at a time), there still seems to have been little variety in general form. Indeed, certain form elements were apparently rather consistently preserved. These include a gable roof made of poles, willows, and "dirt," a gable-end entrance, and a nearly square room (a few had two rooms) measuring somewhere between 12 and 18 feet and dug to about 3 or 4 feet below the ground surface.

Most dugouts were located on a hillside or a creek bank so that the back of the dwelling was "buried" in the side of the hill, and the front faced downslope, affording outward drainage away from the entrance (Fig. 34). Many dugouts, however, were built on level land and appeared somewhat like the upper half or more of a gable roof cabin protruding above the ground (Fig. 35). The gable-end entrance was reached by four or five steps downward to the door. A southward facing doorway was to the lee of most storms and offered more direct sunshine and warmth at the front of the dugout in winter, but the direction the entrance faced was determined more by the direction of the slope than a desire to face the south.

Dugouts built in river or creek banks utilized logs obtained from the gallery forest, especially cottonwood and quaking aspen, and willow for roofing material. The subsurface walls of the room were usually lined with logs held in place against the dirt wall by posts set securely in each
Fig. 34. Old Mormon hillside dugout. (Photo, courtesy of Utah State Historical Society)

Fig. 35. Though a little higher above ground than most, this Mormon dugout is otherwise typical of those built on level land. (Sketch based on a photograph of the Metcalf dugout, Whitlock, 31)
corner of the room (Reeder, 159). Above the ground level the logs were corner-notched and placed horizontally in the same manner as on a log cabin. References to Mormon dugouts indicate that stone was perhaps as common as log for dugout construction. Stones were used for flooring and for lining the inside walls below the surface and above the ground. Above the ground surface a stone facade wall was sometimes mortared with an adobe mud (Whitlock, 31) or formed by making a symmetrical heap arched over the gable roof and sides of the dugout. In the latter case, the dugout appeared to the observer as hardly more than a pile of debris and rock with a doorway formed in front; but inside, under a pitched ceiling, was a nearly square room easily kept warm in winter and cool in summer.

The gabled roofs were made by laying a ridge pole lengthwise resting either on the highest rocks or logs of the wall or on upright posts placed at each end of the dugout (Shumway, 116). Roofing material consisted of either plank shakes made from a wagon box, small poles only a few inches in diameter, or willow branches tied together and placed parallel to the gable slope between the ridge pole and eaves. Upon the poles or shakes was placed a layer of bunch grass or willow twigs and 6 to 12 inches of earth, sometimes held in place by a log or plank placed edge-up along the line of the roof at the eaves. The roofing material on some dugouts was simply held in place by piling earth or stones up to the...
eaves, as in Fig. 34. The shed roof was apparently uncommon on dugouts though the principle of its construction was well understood. Chicken coops in the Mormon area almost invariably have shed roofs, as do many of the smaller pig sheds and granaries, but rarely does a shed roof appear on a dwelling. A hearth and chimney, built mainly of stone, or an iron stove was placed in the rear of the dugout, though frequently the cooking was done outside.

As stated earlier, Mormon dugouts preserve forms and building traditions taken for granted at the time. The gable roof is most conspicuous; noteworthy too are the shape and size of the room in the dugout. Dugout room dimensions, except for the low ceiling, do not differ appreciably from the main room dimensions in cabins or houses. Even large two-story houses are formed basically from nearly square rooms measuring somewhere between 12 and 20 feet. But there were some departures from traditional dwelling form. Other than the obvious fact that a dugout was partly underground, the most important departure is the gable-end entrance which is extremely rare on a Mormon dwelling except for the dugout. Only on churches, schools, and other public buildings were gable-end doors common.

Though dugouts were common initially in nearly every settlement founded by Mormons, this form of temporary shelter was nowhere exclusive and was rarely, if ever, the predominant type of dwelling at any organized settlement. Log or
adobe cabins could be made about as quickly in most places and were much preferred over the dugout.

Lack of evidence does not permit a definitive statement on the origin of the Mormon dugout. Perhaps the dugout derived from the family root cellar once common in parts of the Midwest. These structures were similar to the dugout in form and may have been used occasionally as sleeping quarters. Nevertheless, the dugout (or cellar) as a temporary family shelter was not new to the first companies of Mormons entering the Far West. Even while en route to the West in 1846, the Mormons, seemingly as a matter of course, built many dugouts in their several way stations on the Great Plains. Andrew Jenson, the Church historian, described Mormon dugouts at Winter Quarters (near what is now Omaha) (Shumway, 116):

There were two types of dwellings that predominated [at Winter Quarters]: the log house and the dugout. . . . The dugouts were situated on the sidehills and were constructed by the method the name implies. Using the earth as much as possible to perform the function of the walls, these dugouts were usually roofed with straw and dirt supported by a ridgepole held up by two uprights in the center. The structure would be very similar in construction to our present [20th century] potato bins.¹

Cabin Forms

To most Americans the term "cabin" in the context of frontier settlement connotes a small, rather crudely constructed log structure built for the temporary needs of a

¹The potato bin (or cellar) to which Jenson refers is still common, especially in Idaho, and virtually without exception has a gable-end entrance and gable roof covered with earth.
newly arrived settler, yet in another setting a log dwelling may be designated a "house." Thus, it is necessary here to draw a distinction between "cabin" and "house," especially those built of logs. The difference between log cabin and log house depends in part on whether the dwelling was constructed for temporary or for permanent use. In the Mormon area this is a useful distinction for it involves differences in modes of construction and in the ultimate form of the dwelling.

In this study the term "cabin" retains the connotation evident in Mormon pioneer usage, that is, a crudely fashioned one- or two-room detached dwelling intended as a temporary shelter for a family. The cabin was built of logs, adobe, or fieldstone, usually had a low-pitched gable "dirt roof," and lacked a solid foundation, especially if built of logs. "House" here is defined as a dwelling unit designed primarily as a permanent residence for one family and completely detached from the living quarters of other families.

A log house does not differ in form from houses made of other materials; it may be two stories and contain eight rooms, or indeed it may consist of a single room and still differ from a single-room cabin. A log house is larger than a cabin, contains a superior roof structure, a steeper roof pitch, a solid foundation, a neater facade finish, and exhibits superior quality workmanship. The same distinctions can be drawn between houses and cabins made of adobe and
stone. It should be emphasized, however, that the differences between the cabin and the house are all differences of degree rather than of kind. The cabin, in a sense, is a reduced and cruder form of the single-room cottage, which is a permanent house type and is discussed in the succeeding chapter. All of the essential elements of cabin form, the building techniques, and materials of construction (except adobe and perhaps earth roofing) were traditional to Mormon and Anglo-American folk houses before the Utah period of settlement.

The so-called "dirt roof" is a most conspicuous feature on Mormon cabins and still survives on many Mormon cabins, especially in southern and eastern Idaho. Virtually all cabins in Mormon country originally had such roofs; in fact, the dirt roof can be considered a distinguishing trait of the cabin. It is a low-pitched gable roof having the usual ridge pole and purlins but commonly lacking the rafters. The roofing material is supported mainly by small poles placed tightly together running parallel to the gable slope and long enough to extend from the ridge to the eaves (Fig. 36). Later model cabins contain 1" x 6" sawn shakes instead of poles. On top of the poles or shakes was placed a thin thatchwork of dry grass or willow twigs and 6 to 12 inches of loose earth or sod. The earth roofing was held in place by a log or plank fastened edge-up at the lines of the eaves (Fig. 37).

The dirt roofs served reasonably well as insulation against seasonal and diurnal temperature extremes but did not adequately shed water. During heavy rainstorms many
Fig. 36. Farm shed near Rexburg, Idaho, with roofing materials typical of many early Mormon cabins.

Fig. 37. The planking around the eaves of this restored cabin in Gunnison, Utah, once held several inches of earth in place on the roof. The restored cobblestone chimney is typical except for the modern flue.
pioneers attempted to retard the dripping mud from seeping through by tacking unbleached muslin (known to pioneers as "factory cloth") to the ceiling, but that was always inadequate and temporary. The final solution was to build a new roof of shingles, but that was usually not possible in any new settlement until after two or more years. When better roofing materials finally became available, the cabin was either abandoned in favor of a new house or was completely remodeled to become a house itself. A new high-pitched shingle roof typically was accompanied by a sleep loft in the attic, a lean-to kitchen, a plank floor, improved foundation, and plaster on the inside and sometimes outside. Rarely does a cabin exist with an improved roof but without these accompanying improvements. The dirt roof, therefore, is the most obvious and reliable of the distinguishing traits of the cabin in Mormon country.

The quality of workmanship on temporary cabins is cruder than on houses; nevertheless, there were considerable differences in workmanship from cabin to cabin, especially those made of logs. Some were made of a poor quality cottonwood of uneven sizes, unhewn, and saddle-notched as explained in Chapter II. But many, if not most, were made of well selected, even-sized pine logs that were ax hewn and neatly dovetailed at the corners. The latter lent themselves to later remodeling. Invariably, however, the cabin rested on a makeshift foundation consisting of unmortared stones or no foundation at all. Floors were often "foot packed dirt" or
"Missouri puncheons" (Carter, 1958, 122). Windows were at first just square openings cut out of the front wall and covered with a translucent oiled muslin. The inside walls were kept neat and clean with an annual whitewash made of a lime paste plastered on muslin attached to the walls.  

In contrast to the central or inside gable-end chimneys on houses, the cabin frequently contains an outside gable-end chimney, never sharing that end with a window or door. Many of them were made of cobblestone (Fig. 37, p. 119) or adobe. The chimney was always centered equidistantly between the two corners of the wall so that the flue always abutted the end of the ridge pole or apex of the gable.  

Many cabin dwellers, especially in settlements after 1870, owned iron stoves and consequently built small chimney flues on the inside gable end or dispensed with a chimney completely in favor of a high metal stove pipe.

Except for a low ceiling, most cabin floor plans (Fig. 38) preserve a room size and shape which predominate in all Mormon folk-house types, that is a near square

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2Puncheons are floorboards made of logs split in half, placed tightly in the floor with cut surface up, and planed as smoothly as possible.

3This whitewash practice was apparently very widespread. The presence of lime plaster and muslin inside a log shack on a present-day farmstead may lend final convincing evidence that that shack was once a cabin home, rather than always a farmyard shed.

4This practice is largely taken for granted locally but is not universal on cabins in America. The Swedes and Finns of Delaware, for instance, placed chimneys in a corner of the cabin (Weslager, 158, 168-169).
Fig. 38. Cabin floor plans

a. Outside gable-end chimney
b. Inside gable-end chimney
c. Cabin with light partition
d. Two cabins joined
measuring between 12 and 20 feet with the length usually not more than three feet greater than the width. Cabins of about 15 by 16 feet are most typical though some are more rectangular having a ratio of approximately 1:2. Many of the latter contain two small rooms effected by a light partition (Fig. 39). Occasionally two cabins were joined solidly together at the gable ends with the two sometimes of dissimilar materials (Fig. 40). The door is virtually always on the broadside, rather than the gable end opposite the chimney. There were no so-called dogtrot or dogrun cabins found in field work or described in Mormon literature.

A Mormon family typically occupied a cabin for two to five or more years, but the family usually did not demolish the cabin upon acquiring a permanent home. The cabin was commonly remodeled and "absorbed" into a new house. Today it is common for an old house to contain a room that was originally a cabin (Fig. 41). The original section is frequently of log while the remainder of the present house is of another material and the whole veneered with a siding of plaster, rendering the original materials undetectible. If a cabin was abandoned as living quarters, it was often left intact but unimproved near the new house to become a toolshed.

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5The dogtrot cabin type was achieved by placing two cabins close together at the gable ends, leaving a passage between over which a roof was constructed binding the two cabins and passage under one roof. This type was very common in the Hill South, especially in Tennessee, and is considered the simplest way to increase the size of a log house (Kniffen, 1965, 561; Weslager, 72).
Fig. 39. Small two-room cabin in Oakley, Idaho, with stove pipe rising from the middle partition.

Fig. 40. In Deseret, Utah, these log and adobe cabins joined together illustrate a common method of increasing the size of a dwelling. Also typical is the willow and earth roofing.
Fig. 41. Built in 1851 as part of a fort in Parowan, Utah, this cabin was later remodeled and is now part of a large house. Unlike most cabins that have become integrated with larger houses, the original log surface on this example remains exposed.
or some other kind of outbuilding. Log cabins with dirt roofs still survive in some isolated Mormon communities, especially in Idaho, and are frequently found a short distance from an occupied house.

The Mormon Fort as Temporary Housing

The various forts built on the American frontier during the nineteenth century served a variety of purposes. Some were military posts and housed only soldiers, others served as way stations for weary travelers and migrants, while still others served the interests of fur trappers or missionaries. Such forts, except the military posts, were privately owned and functioned, at least in part, as business establishments or missions. Mormon forts, however, differed from other forts in concept, form, and function. No Mormon fort was ever established as a mission residence or as a business establishment of any kind, and rarely did one serve as a haven for a wayfarer traveling through Utah Territory.6 Mormon forts were residential communes constructed in a manner that afforded protection from hostile Indians. The Mormon pioneer was not protecting the remote territorial claims of his government as was the soldier; he was defending his own family, home, and property. As such, the Mormon fort must be discussed in this study as a type of housing and a type of settlement. It is especially

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6Cove Fort in Beaver County, Utah, served, in part, as a way station for travelers.
important to know what, if any, changes were exerted on the form of individual dwelling units as a result of a "fort style" arrangement.

In virtually all Mormon settlements founded between 1847 and about 1869, the Mormons were instructed by Church leaders to erect a fort for defense against Indians. Ideally the fort was to be constructed immediately after the streets and lots of a newly founded settlement were surveyed, and was to occupy one or more of the newly surveyed city blocks before any other major construction took place. Because of general friendly relationships with the Indians, the Mormons as a whole were quite lax about building and living in the forts. Some 35 forts were completed or nearly so (Baum, 108), and most of them were occupied for but a short time—seldom more than one year. With the exception of Fort Salt Lake City and some of the other earliest communities, a fort was almost never the first major construction undertaken. Most of the settlements were actually several years old and quite well established before a fort was built. Sometimes a fort was started but never finished.

Most frequently the new settlement was first characterized by cabins and dugouts either scattered somewhat haphazardly or located on the surveyed home lots. Moving into a fort usually meant moving a cabin previously built on a home lot into a public square sometimes protected by adobe or stone walls. In many settlements, notably St. George, the settlers never felt threatened enough by Indians to begin construction
on a fort, even though they were advised by Church leaders to do so.

When comparing the details of the various forts, it is clear that Mormon forts exhibited great variety. But when the minor details are ignored, each fort can be placed into one of three general forms referred to in this study as (1) cabin-row forts, (2) detached wall forts, and (3) contiguous compartment forts.

Cabin-row forts were constructed by joining or placing cabins closely together at the gable ends, forming the relatively solid walls of a square or rectangle enclosing several acres (Fig. 42). This method of fort construction permitted the preservation of the cabin in an almost completely unmodified form for it required no important breaks with traditional cabin forms. Each cabin retained its low-pitched, gable dirt roof, gable-end chimney protruding above ridge pole, and door and window on the broadside. The only requirement affecting the individual dwellings in cabin-row forts was that all doors and windows had to face the inner square, while the opposite broadside of each cabin functioned as the outer wall of the fort and had to remain devoid of all openings.

The inner court or square had several different functions but differed from one fort to another, depending on the size of the fort. Small forts, which covered perhaps a city block of ten acres or less, used the square for the individual gardens of each resident. Irrigation ditches
Fig. 42. Cabin-row fort. (Illustration based on an original sketch by a pioneer resident of Fort Springville, Utah) (See Don C. Johnson, frontispiece)
diverted water from a river into the fort. Livestock were kept at night in a separate stockyard enclosed by a fence extending outward from one end of the fort, and during the day stock were herded on range beyond the farm lands which surrounded the fort. In larger forts, those covering 35 or 40 acres, a stockyard and small barns and chicken coops were often placed in the center court, surrounded by the cabins.

The principal advantage to the cabin-row forts was the relative ease with which they could be constructed and later dismantled. When Indian hostilities abated, the pioneers simply moved the cabins from the fort to their home lots. Cabin-row forts were not the best for defense—determined Indians could easily scale the cabin walls. But apparently this rarely happened; the existence of the fort itself seems usually to have deterred the Indians from entering the fort.

The second type of fort built by Mormons, the detached wall fort, was constructed simply by joining cabins together at the gable ends or by closely spacing the cabins apart on small home lots assigned to each family and then constructing a massive wall 6 to 18 feet high around the rows of cabins. The walls were set a few feet behind the cabins and were usually made of adobe, or a mixture of clay and straw. Some of them contained stone foundations varying from 2 to 6 feet thick. Portholes for guards, bastions on the four corners, one or more heavy gates, and a mote around the outside of the wall were features common to some of the walled forts. But
while several settlements started such a wall fort or had plans for one, very few were actually finished. One of those completed was at Pleasant Grove:

As soon as the walls were fairly started the people began to build homes within the fort square. These homes were built just inside the walls of the fort, on three rod lots, with the house set about in the center of the lot. All houses faced toward the center blocks of the fort. A roadway extended all the way around the four center blocks of the fort and across this road from each home lot were the individual owners' barns. Within the space circled by the barns was a large community corral. Privately owned barns and the community corral together, covered the area now contained in four city blocks. . . . A small box flume carried the pure mountain water from the hills to the northeast corner of the fort; thence into the fort, where it was turned into smaller boxed flumes which extended all the way around the fort on the front line of each individual home lot. . . . The construction of the walls and the water system went on all the more rapidly after the settlers were all located within the fort, . . . (Charles B. Harper, in Baum, 97)

It is clear that the detached wall forts required no important modifications of the basic cabin forms, perhaps even fewer than the cabin-row forts, for the wall made it unnecessary to join the dwelling units together in a solid line. The chief advantage of the detached wall forts was their superiority in defense, but their construction was obviously costly and labor demanding; hence, very few were finished once it became apparent that enemy threats were not so great as anticipated.

The third fort type, the contiguous compartment, contains the elements of a high and massive wall as well as of dwelling units joined together, but in this case the fort wall itself forms the inside back wall of each dwelling.
A single shed roof, shared in common by all dwelling units along one wall, slopes downward from the high wall to the inner court. And a single partition separated each dwelling unit (compartment) from the other in much the same manner as in a modern apartment complex (Fig. 43). Again, all doors and windows face the inner court, but the chimney hearth, instead of being to the right or left of the door as in the traditional gable roof cabin, is directly opposite the door lodged within the big fort wall, and the top of the chimney may protrude above the top line of the wall (Fig. 44). The compartments are contiguous with the massive wall and with each other and consist of one nearly square room for each family.

Apparently very few of these massive and expensive compartment forts were built, Fort Salt Lake City being the first and largest. By far the best remaining example, though smaller and much better built than was typical, is the beautifully preserved Cove Fort in Beaver County, Utah.

The contiguous-compartment forts required more modifications of the traditional dwelling units than the other fort types, but these breaks with tradition were temporary and confined to the fort. When the occupants moved back on to their separate town lots, they again followed traditional patterns in building their cabins and houses. Mormons, as well as other Anglo-Americans, placed great value in possessing single-family, detached dwelling units with a yard and space for a family garden and outbuildings. They were hesitant
Fig. 43. The compartments inside Cove Fort, Utah

Fig. 44. Outer walls of Cove Fort, showing the chimneys of the individual compartments rising above the line of the wall

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to give up these for closer quarters in forts, even under Church advice and threats of enemy attacks. Clearly there was a strong traditional bias against living in multiple-family dwelling units represented by the compartment forts or even the close quarters of the other fort types.

As a final note, it is apparent that Mormon forts were not carbon copies of forts such as Laramie, Bridger, and Pueblo which the Mormons had seen on the Plains en route to the Salt Lake Valley. These forts were essentially fortified private estates with protected space available for travelers and for the storage of goods—they did not consist of cabins huddled together in a square. Rather, the village or communal forts built by Mormons were similar in concept to those in frontier eastern America (Newcomb, 46-47).

Conclusions

The dugouts and cabins built by Mormons exhibited little variety in form (though constructed of a variety of materials). Some dugouts were "buried" in the sides of hills, others were built on level terrain, but all types shared in common a gable roof, gable-end entrance, and a nearly square semisubterranean room. The cabin differed from the dugout mainly in that the cabin was built above ground and had a broadside entrance. The temporary arrangement of cabins within forts represented a significant departure from traditional Mormon settlement patterns but exerted little or no important changes to the cabins or the form of dwelling units therein.
The fact that all participants in Mormon initial phase settlement accepted rather universally the established dugout and cabin forms as described indicates that these shelters were not important obstacles to cultural assimilation. Peoples of diverse cultural origins accepted the temporary dwelling types and in doing so took an important step toward the development of a distinctive Anglo-American subculture in the Mountain West. The lack of monetary means, tools, and materials together with the urgency of the moment delayed the immediate construction of permanent houses and thus provided a period of several years during which further assimilation could take place. By the time a given settlement underwent its second building phase—that is, the replacement of the temporary shelters with permanent houses—all or most of the settlers could have become acquainted with "standard" Mormon house types from their observation of older settlements. This is the subject of the next chapter.
CHAPTER IV

MORMON HOUSE TYPES AND FORM ELEMENTS

The passing of the initial phase of the frontier was accompanied by an increase in wealth, security, and better building materials, permitting the construction of permanent houses. Each individual family took charge of building its own house, but with a little barter or labor-trade, the family could get help from a neighbor or tradesman for at least part of the house construction.

Typically a family's first permanent house was a modest one- or two-room cottage, but as the family increased in size or attained greater wealth, they added new rooms or built an entirely new house. Subsequent additions to a house nearly always followed one of several traditional floor plan patterns, as if each family had an overall "master plan" to be followed as they added each successive "installment" to the old house. The "master plan," of course, was simply an image of a model inherently shared and understood by the members of the culture. Such a model has no written plan or blueprint, but is nevertheless copied from existing houses and perpetuated through many generations of time.

All such models (or folk house plans) built by Mormons within the prescribed study area are identified and described herein and are referred to as "house types." In this study, house types are classified only on the basis of form.
The use of a certain building material (construction mode) does not determine the form of the building (Kniffen, 1965; Jackson, 27); thus, the various building materials are not used as criteria in this study for house type classification.

Frontier societies usually reproduce house types closely patterned after those with which the settler is most familiar; thus, the new land generally comes to resemble the old in terms of folk housing form. The house types of the Mormon West are certainly patterned after those of the American Midwest, the formative hearth of the Mormon movement. Salt Lake City in the 1850s did resemble Nauvoo, Illinois, of 1845 in terms of folk house form (but not building materials). But as Mormon proselytism expanded into Europe, America, and elsewhere, Mormon immigrants to the western Zion became ever more diverse in terms of their cultural origin. Nevertheless, according to the finds of this study, cultural diversity in Mormon immigrants is not readily apparent in terms of folk housing forms. Elsinore, Utah, for example, settled by Mormon immigrants primarily from Denmark, always bore greater resemblance to other Utah communities and to Nauvoo, than to Elsinore, Denmark. This chapter shows that, with respect to house form, an assimilation of the once diverse cultural elements was effected in Mormondom, and that the American Midwest and the New England frontier provided the platform on which the assimilation was based.
Floor Plans and Related House Types

The house types here recognized are based on overall house form effected especially by the shape and arrangement of the main rooms, or basic floor plan. Stated another way, the basic floor plan constitutes the principal criterion by which the various houses are designated as types. Each basic floor plan, however, contains variations resulting from certain interrelationships between it and other form elements such as the lean-to and the position of the chimneys, staircase, and main entrance. These variations do not constitute separate house types, just permutations of the same type.

Single-room House Plans

The single-room house plan, the most common type in the earliest settlement phase in the Mormon West, is the basic construction unit in Mormon folk housing (Fig. 45). Its antecedents are traceable to the American Colonies and to England, though it differed slightly in the various colonial regions where it became popular. Its nearly square form is primitive; in preparations to build it, the pioneer simply foot-paced the dimensions, marked each corner by driving a peg in the ground, and evened the corners with a square-rule or by good guess work. The house type which he produced based on the one-room plan is referred to here as the single-room cottage.

The single-room cottage is the simplest of all the permanent house types, though not so crude as, nor synonymous
Fig. 45. Single-room cottage floor plans

a. Off-center doors
b. Kitchen partition, end chimney, and stove flue
c. Lean-to, rear stove flue
with, the temporary cabin forms discussed in Chapter III (Fig. 46). Unlike the cabin, single-room cottage types have well built gable roofs with shingles and rafters and often an attic, and are most frequently perched on solid masonry foundations. They do, however, preserve the floor plan typical of the near-square cabins; in fact, many single-room houses are converted or remodeled from cabins. The room dimensions vary between 11 by 13 feet to 18 by 20 feet, but the most typical is 14 by 16 feet or 15 by 17 feet. This perhaps is slightly larger than the average cabin floor plan but seems not to differ from main room sizes in other folk houses, regardless of the size of the house. There is that occasional oddity, however, which may be much larger or smaller than typical.

The simplest and most nearly universal way to add space to the single-room cottage is to construct a lean-to on the rear broadside (Figs. 47, 48). This is done at the initial time of construction or added later, but in either case, the roof of the lean-to on most single-room cottages contains its own rafters slanting at a reduced angle with respect to that of the main roof, rendering an assymetrical or broken angle to the rear roof slope. The lean-to serves mainly as a kitchen, but sometimes a light partition may enclose a small bedroom or pantry.

In addition to the lean-to, the attic, if made accessible, may function as sleeping quarters for a child or for storage. A small unobtrusive staircase or ladder may rise to the attic from one corner of the house.
Fig. 46. Single-room log cottage in Paris, Idaho, built after 1000 and containing elements of construction unlike that of temporary log cabins: an excellently built shingled roof, corners square-notched by a saw and spiked with large nails, interstices chinked with modern portland cement, and inside end chimney made of modern fired brick.
Fig. 47. Single-room adobe cottage with lean-to kitchen in St. George, Utah. The structure in the background is an adobe granary.

Fig. 48. Front view of the above cottage, illustrating the typical off-center door balanced in space with one window.
Though the Mormons commonly placed chimneys outside on the gable-end of cabins, they virtually always placed chimneys inside on the single-room cottage. The facade, always on the broadside, contained one or two front windows: if two windows, one placed on each side of a central door achieved symmetry; if one window, it was balanced with an off-center door.

As a permanent home, the single-room cottage type, notably stark and deficient in adornments, indicates poverty, especially when inhabited today. In the early phases of settlement, this type predominated and a few still remain today in nearly every settlement and are quite common in Mona, Mt. Pleasant, and Sterling (Fig. 49). Mormons continued to construct the single-room floor plan in frame (Fig. 50) and log after 1900 and perhaps even as late as the 1930s. The oldest remaining examples of single-room houses are built of adobe and a few of stone (Fig. 51).

Two "natural" stages in the evolution of single-room cottages are (1) adding a full second floor above, producing a type known in Colonial America as the one-over-one, or (2) adding a room to the side, creating an oblong, rectangular, two-room, one-story cottage. Mormons rarely built the one-over-one; thus, this type is not included in this study but should be remembered as a logical (but unpopular) outgrowth of the single-room cottage that occasionally occurred and that forms at least a theoretical construction unit (or permutation) in two-story houses. Where Mormons did construct
Fig. 49. Single room, one-and-a-half-story adobe cottage with lean-to in Sterling, Utah

Fig. 50. Single room, one-and-a-half-story frame cottage with lean-to in Paris, Idaho
Fig. 51. Single-room, one-and-a-half-story stone cottage in Fillmore, Utah. The lean-to, part of the original construction, nonetheless preserves the change in pitch in the lean-to roof of separately built (morphologically earlier) specimens.
one-over-one houses, they most likely intended them to be
the first installment of a planned two-story or "I" house.
Infinitely more popular than the one-over-one was the two-
room cottage.

Rectangular Floor Plans

The rectangular floor plans are constructed by joining
two nearly square sections at the gable ends, producing a
house measuring about twice in length as in width. The "two
sections" were nearly always constructed simultaneously as
a single rectangular unit partitioned into halves with inside
partition walls constructed of the same material as the outer
walls. If of adobe or stone, the partition walls may measure
from 16 to 24 inches thick, matching the outer walls. When
the two sections are built at different times, they are fre-
quently of dissimilar building materials.

Four house types, recognized here, exhibit a rectan-
gular form measuring about twice in length as in width: the
two-room cottage, the two-story rectangular house with dormer
windows, the "I" house, and the modified saltbox. A fifth
house type, the four-over-four, also exhibits basically a
rectangular form.

The two-room cottage type (Fig. 52) includes several
one- or one-and-a-half-story varieties, depending on the
positions of the chimneys and entrance doors and the presence
of a lean-to and functional attic. The floor plan with
inside gable-end chimneys (Figs. 53, 54) is probably the
Fig. 52. One-story rectangular floor plans
Fig. 53. Two-room stone cottage with end chimneys, Coalville, Utah

Fig. 54. Two-room adobe cottage with end chimneys, Kanosh, Utah
most common and may contain one or two front doors. If one
front door, the door is positioned in the center in order to
effect symmetry in the facade, but a centered front door
necessitates an off-center partition on the inside rendering
the rooms unequal in size. On the central-chimney varieties,
the chimney flue always intersects the ridge pole but is
slightly off-center on houses with one front door (Fig. 55).
The chimney flue is truly centered and rooms are of equal
size only if there are two front doors (Fig. 56). Symmetry
on the facade is also achieved on houses with two front doors:
the doors are either spaced equidistant from each other and
from the corners, or are balanced in space with windows.
Only rarely does a door seem carelessly placed.

Some lay observers believe that two front doors on a
house, so common in Utah, indicates the home of a polygamist,
and that the house was divided into equal halves with each
half sealed from the other permitting some privacy between
the two wives. While a few polygamists may have taken
advantage of the two front doors and floor plan symmetry,
those features are not diagnostic traits of polygamists' homes; in fact, most were not the homes of polygamists (Fife,
1956, 256). The two front doors were frequently retained on
the single unit rectangles in an attempt to copy the inevit-
able two front door facade of a rectangular house consisting
of two separate dwellings joined together. The double-front-
door house is not unique to Mormons; it occurs in Eastern
America including the Midwest regions where the Mormons lived
Fig. 55. The central chimney on this two-room brick cottage in Rexburg, Idaho, clearly reveals that the interior partition is to the right of the doorway, rendering the two rooms unequal in size.

Fig. 56. Two-room adobe cottage in Scipio, Utah, with two front doors, central chimney, and lean-to.
before practicing polygamy. Furthermore, houses with two front doors were almost never functionally divided into equal halves; one room served as a living room and bedroom, the other as a kitchen-dining room; or if there was a lean-to attached, one of the front rooms was a bedroom, the other a living room. The two front doors is an independent variable on all house types in the Mormon area except the single-room cottage.

The lean-to, if not part of the original construction, was typically the first addition to the house. On two-room types and other house types discussed below, the lean-to usually extended the full length of the house and was divided into at least two rooms; one was virtually always a kitchen (to keep the stove heat from the front rooms during the summer), the other a pantry or a bedroom. Nowadays the bathroom is commonly located in some part of the lean-to. As with the single-room cottage, the roof of the lean-to joins the eaves of the house but has a lower angle pitch, rendering an asymmetrical roof line.

Many two-room types contain an attic or half story with a ceiling sometimes high enough for standing room (Figs. 57, 58). The upper floor may be used as a sleeping loft for children or for storage. The staircase typically rises from a rear corner of one of the main rooms. Two small windows may be placed on either side of the gable-end chimney.

Two-room cottages are extremely common in Mormon country and no doubt were predominant to at least 1875 and
Fig. 57. One-and-a-half-story, two-room log cottage, Oakley, Idaho. Most such log houses are veneered with plaster or siding to conceal the logs.

Fig. 58. One-and-a-half-story, two-room adobe cottage, Elsinore, Utah.
perhaps beyond. It was the most popular type with lower-income people and many were constructed in lumber (Fig. 59) well after the turn of the century. Several post-1900 log examples also occur, especially in southern Idaho (Fig. 60).

Rectangular houses, built two stories in height and one room deep, represent morphological evolutions of the two-room cottage (or one-over-one) but exhibit a greater number of variations than one-story examples. Some of these variations are due to internal floor plan differences, such as optional arrangements of staircases, chimneys, and hallways. Other variations are related to exterior form elements, namely, the presence or absence of dormer windows, a lean-to, and symmetry in the roof line.

Dormer windows became exceedingly popular among the Mormons especially after 1870 when such windows most frequently occurred with a Greek Revival portico (Fig. 61), a full two-floor porch (Fig. 62), or fancy lathe-turned wood trim lining the gables. Apparently these facade features presented an image of moderate wealth and social attainment, but the dormer also served the important function of permitting light into the upper-story rooms when the eaves extended below the top line of the upper-story windows. The dormers are considered here an important form element because they indicate a broken angle (45 degrees) on the outer edges of the upper-story ceiling at about shoulder height (Fig. 63); nevertheless, the two upper rooms are considered a full second story rather than an attic.
Fig. 59. Frame two-room cottages, like this one in Paris, Idaho, continued to be constructed well after 1900.

Fig. 60. Two-room log cottage in Georgetown, Idaho.
Fig. 61. Stone two-story rectangle house in Willard, Utah, exhibiting typical dormers and Greek Revival por­­tico. The new chimney placed off the ridge is atypical of the old customary on-the-ridge position.

Fig. 62. Brick central chimney two-story house joined to a two-room cottage, Parowan, Utah. Full front porch and upper balcony are common as are the two front doors on the ground level. Uncommon is the asym­­metrical facade with upper windows not in line with those below.
Fig. 63. Comparative profiles of Mormon house types
The "I" house, also extremely popular among the Mormons, is a second variety of two-story, one-room deep rectangles. The "I" houses built by the Mormons do not have dormers; rather, they usually have a simple or plain facade with the eaves well above the top line of the upper-story windows (Figs. 64, 65); in fact, the lower ends of the rafters may closely coincide with the horizontal line of the upper floor ceiling (Fig. 63, p. 156).

The "I" house type so common in Mormon country was by far the most widely distributed old rural folk house type in Eastern America prior to 1850 (Kniffen, 1965, 555). It was especially important in the Midwest at the time the Mormons inhabited Nauvoo, Illinois. Nauvoo contained several "I" types; even the Hermitage, the first residence of the Mormon leader Joseph Smith, is a combination log and frame "I" house (Lillibridge, 114). The "I" house was taken to Utah by the Mormons at a time when its popularity was declining in the East, but it continued in vogue among the Mormons to the 1880s.

The "I" house nearly always contains a one-story lean-to which is part of the original construction and which is similar in size to that of the two-room house type

1 The term "I" house was first used by Fred Kniffen when he in the late 1930s noticed a high frequency of two-story rectangular houses built by people from the states of Iowa, Illinois, and Indiana. The "I" was first used in reference to those states as well as to the fact that it has a form like that of the letter "I". The term has since been used widely (Kniffen, 1965, 553).
Fig. 64. Frame central-hall "I" house with plain facade, Spring City, Utah

Fig. 65. Fieldstone "I" in Willard, Utah, with lean-to as part of the original construction
(Figs. 65, 66). When added later, the lean-to is usually made of material other than that of the original house. One variety of lean-to always constructed simultaneously with the house produces a house type referred to here as the modified saltbox.

The modified saltbox, a third variety of the two-story rectangles built by the Mormons, has a somewhat unique appearance in that the lean-to section contains continuous rafters from the roof ridge to the eaves of the lean-to, producing a uniform angle to the slope in the rear (Fig. 67). The lean-to itself may therefore have a second floor consisting of two small rectangular rooms "tucked" under a low slanting ceiling. But frequently the builder takes advantage of the higher space in the lean-to section and builds the staircase in the lean-to adjacent to the main wall of the house.

The original or true saltbox type in New England contained a massive central chimney, but as this type moved to the Midwest with the Yankee settlers, it generally lost the central chimney in favor of two inside gable-end chimneys. The Mormons apparently built only this modified two-end chimney type. The type appeared as such in Nauvoo (Lillibridge, 112) and in Utah with a rather plain and unadorned facade. The few remaining Mormon examples in the West date to the 1860s or earlier. Apparently the modified saltbox was never particularly popular in Mormon country.

The saltbox, common in New England in the 1600s, was so named because it had the appearance of a box used to package salt for shipment (Morrison, 22).
Fig. 66. Volcanic stone "I" in Beaver, Utah, showing the lean-to as part of the original construction.

Fig. 67. Adobe modified saltbox, Parowan, Utah. Lean-to is story-and-a-half and contains the staircase.

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The most common two-story rectangular floor plan (Fig. 68) is the central-hall and central-staircase variety with inside gable-end chimneys (Fig. 69). A few contain two central chimneys (Fig. 70), one on each side of a central hall. The central hall is an old Colonial American practice said to have been introduced during the Georgian architectural period which emphasized symmetry (Glassie, 1968, 23). The central-hall house plan permitted rooms of equal size on each side of the staircase. This staircase landing may be directly in front of the central doorway as one enters the building and may be completely enclosed by the two partitions on each side, or it may be slightly off center from the door with a hallway along one side. In either case, the central hall house tends to measure three to four feet longer than the two-room cottage because of the central hall. The room sizes, however, do not differ in the two types.

It is interesting to note, as pointed out by Fife (1972, 10), that symmetry of facade is valued so highly that many two-story houses contain a door on the upper floor immediately above the ground floor entrance door (Figs. 71, 72). Very often this upper door has little functional purpose but usually it opens onto a landing with rails and is sometimes used to air bedding or to sweep dirt from the upper story floor. The upper door in the center appears to be diagnostic of the central-hall plan but, actually, it occurs frequently without the central hall (Fig. 73). Using only the upper central door or other exterior features as indicators, one
Fig. 68. Two-story rectangular floor plans

a. Central staircase, end chimneys

b. Upstairs with outside central door

c. Central hall and staircase, two central chimneys

d. Rear staircase, two front doors

e. Modified saltbox

f. Four-over-four
Fig. 69a. Central-hall two-story house with end chimneys, portico, and dormers, St. George, Utah.

Fig. 69b. Floor plan of above house
Fig. 70a. Central-hall house with two central chimneys, Mt. Pleasant, Utah

Fig. 70b. Floor plan of above house
Fig. 71. Two-story brick house, Spring City, Utah, unusual in the absence of upper story dormer windows on the facade, but the upper-story door without a landing is common.

Fig. 72. Two-story stone house, Willard, Utah, with dormers, gable trim, and upper story door without landing.
Fig. 73a. Two-story adobe in St. George, Utah. A center door on the upper floor is not proof of a central hall and staircase.

Fig. 73b. Floor plan of above house
could be misled in attempting to estimate the numerical importance of central-hall houses from roadside observation only. The only exterior proof of a central hall is the presence of two central chimneys spaced a few feet apart on the ridge, but that is a relatively rare feature in Mormon country, occurring on but a few of the central-hall houses.

Another common floor plan variation of two-story rectangles is the inside rear staircase with two end chimneys, or central chimney, or one central and one end chimney. The rear staircase may spiral in a corner next to the end chimney or be constructed straight along the inside back wall of one of the rooms. The antecedents of the rear staircase plans predate the central hall and are traceable to early Colonial America and to England (Glassie, 1969, 5).

A fourth two-story rectangle in Mormondom is the four-over-four (Fig. 74), a logical enlargement of the upper story of a saltbox floor plan and another product of Georgian architectural symmetry. The four-over-four appears very much like an "I" house except for its larger size, having four full rooms on the ground floor and four above; but, like many "I" houses, it is frequently built with a central hall and staircase between the two front rooms. There may be four chimneys, one in each room on the inside gable-end rising near each side of the gable ridge, or they may contain two chimneys on the ridge and on the partition near the gable end with a

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3Francaviglia, in an article published in 1971, overstated the occurrence of central-hall plans in Utah.
Fig. 74a. Limestone four-over-four in Manti, Utah, built in 1861 as home of Frederic Cox and four of his wives and families. The round hole in the attic functioned as a porthole when the house was part of the old fort at Manti.

Fig. 74b. Original floor plan of above house. The original chimneys were placed inside the gable end as here illustrated.
hearth in each of the eight rooms. In contrast to the ubiquity of the "I" house, the four-over-four is quite rare in Mormon country, though not so rare as the saltbox. Some extant specimens are known to have been the houses of prominent citizens and wealthy polygamists, although they were not the favored type of that group or any class. The remaining examples date from the 1860s and 1870s.

The "T" Form Floor Plans

The "T" house plan (Fig. 75), sometimes called "upright and wing," is the most common house layout in the Mormon West. Undoubtedly, it was known to the Mormons on the Western Reserve of Ohio and in western New York where Mormonism began (Pillsbury and Kardos, 29). In Utah the "T" occurred in the 1850s but really gained momentum in the 1870s and 1880s.

The "T" floor plan is formed by placing a gabled wing section in the middle of the rear broadside of a rectangle. This wing to the rear, also called the "cottage wing," may be part of the original construction or a later addition; in either case, it contains its own gable end so that the house has three gables. The formation of the "T" is the most common and one of the simplest methods of adding a full section (rather than a lean-to) to a rectangular floor plan.

The "T" formation lends itself to more variety in character than rectangular plans, because the front of the "T" house (the side facing the street) can be on one of two
Fig. 75. "T" house floor plans

a. "T" with rear cottage wing
b. Gable-facade "T"

* Street scale reduced

Fig. 76. "L" house floor plans

a. Gable-facade "L"  
d. Street-corner "L"

*Street scale reduced
sides depending on the builder's preference. The main broadside, the "top" of the "T," may face the street and have one or two front doors. That arrangement with respect to the street gives the two-story "T" house the character of the "I" or two-story with dormers (Fig. 77), and in fact may be indistinguishable from two-story rectangles, unless the rear gable can be seen. But probably half or more of all "T" houses take on a different character when the main broadside is placed perpendicular to the street. This arrangement necessitates a front door on the "stem," or "cottage wing," of the "T" and a street-facing gable (Figs. 78, 79). This plan is referred to here as the gable-facade "T," but is not considered to be a separate house type because the basic floor plan is identical in the two varieties.

Some "T" houses have a two-story main rectangular section and a one-story cottage wing (Fig. 80). The cottage wing may be part of the original construction, but most of them appear to be later additions attached to the rear of an original rectangular house. This type represents one of the earliest stages in the evolution of "T" floor plans.

Floor plans on the cottage wing of the "T" house remain rather constant, even when a broadside of that section faces the street. Usually one front and one rear door are placed rather close (within six feet) to the intersecting walls of the main section, though occasionally there are two front doors, one directly above the ground floor entrance, thus preserving the symmetry of the "I" house. As expected,
Fig. 77. "T" house with rear cottage wing, Georgetown, Idaho. The bay windows and large gable over the upper story balcony were not common before the 1890s.

Fig. 78. Gable facade "T" in Parker, Idaho. With front entrances on both wings, this example is built of adobe with clapboard siding.
Fig. 79. The front entrance to this house in Paris, Idaho, is on the cottage wing. Note the absence of an entrance on the broadside, typical of many gable-facade "T" houses.

Fig. 80. Adobe "T" house in Ephraim, Utah, with one-story rear cottage wing.
the main-section floor plans exhibit the same variety as the "I" house. Of those varieties the one seemingly the most popular is the central hall and staircase with two inside gable-end chimneys, though the central chimney and rear wall staircase is frequent.

Two-story "T" houses permit the addition of porches or rooms in a variety quite unlike the lean-to of rectangular floor plans. Where the cottage wing is built to the rear of the house, quite often the space behind the two front-section wings is completely "filled in" with added rooms. These are never really part of the original house, and are almost always of a material other than the original; lumber is the most common. On the gable-facade "T," only the rear broadside of the cottage wing lends itself to additions. Otherwise, the gable-facade type does not differ in floor plan from the other "T." The gable end, though frequently dressed with bay windows and fine trim, never contains the entrance door on its facade. There is, however, often a "second entrance" on the front broadside of that protruding gable section (Fig. 78, p. 172).

The one-story "T" is generally a plain, unadorned house type occupied by lower income residents. In a few of the apparently poorer communities, such as Elsinore, Utah; and Paris, Idaho, the one-story "T" is the predominant house type, but in most communities the two-story "T" outnumbers every other type. Most one-story types contain a usable attic or half-story in the main section and a small staircase.
in a corner of one of the main wings, similar to that of
the two-room cottage. Several very rustic examples of log
and adobe one-story "T" houses (Figs. 81, 82) occur through-
out the Mormon area attesting to their popularity.

The two-story "T" differs little from the one-story
"T" in floor plan but usually takes on a more elegant char-
acter. Height, dormer windows, and the occasional occurrence
of various motifs of trim on the gables (Fig. 83) indicate
that this house type was the aspiration of the middle and
upper-middle class. Of all the folk house types remaining
today in the Mormon regions, the two-story "T" is the most
numerous in nearly every community (Table 7, p. 178). There
is no question about its popularity especially during the
1870s through the 1890s, but the large number remaining today
may be slightly misleading with respect to its relative occur-
rence during the late nineteenth century. Most two-story "T"
houses were occupied by people who could afford to maintain,
add to, and remodel them. Even when built of frame construc-
tion, the two-story "T" was generally not so ephemeral as the
single-room and two-room cottages that might always have pre-
dominated but failed because they did not last in numbers
enough to tell the tale. In some of the once prosperous but
now stagnant communities, well preserved two-story "T" houses
outnumber even modern houses. Willard, Utah, for instance,
comes to mind.
Fig. 81. One-story log "T" in Bennington, Idaho.

Fig. 82. One-story log "T" in Spring City, Utah.
Fig. 83. Large stuccoed stone "T" in Willard, Utah, with gothic trim on the gable eaves. This home occupies a street corner and contains a front entrance on each wing. Note the upper story doors.
### TABLE 7

**NUMBERS OF REPRESENTATIVE 19TH-CENTURY FOLK-HOUSE TYPES REMAINING IN 1971 IN RANDOMLY SELECTED MORMON COMMUNITIES OF UTAH AND IDAHO**

<table>
<thead>
<tr>
<th>Community</th>
<th>SRC</th>
<th>2RC</th>
<th>2SR</th>
<th>1 &quot;T&quot;</th>
<th>2 &quot;T&quot;</th>
<th>1 &quot;L&quot;</th>
<th>2 &quot;L&quot;</th>
<th>Cruc.</th>
<th>Total</th>
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<td>8</td>
<td>8</td>
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<td>0</td>
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<td>38</td>
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<td>5</td>
<td>3</td>
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<td>2</td>
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<td>76</td>
<td>113</td>
<td>12</td>
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**Key:**
- SRC - single-room cottage
- 2RC - two-room cottage
- 2SR - two-story rectangular houses
- 1 "T" - 1 and 1-1/2 story "T"
- 2 "T" - two-story "T"
- 1 "L" - 1 and 1-1/2 story "L"
- 2 "L" - two-story "L"
- Cruc. - cruciform
The "L" Form Floor Plans

The "L" form involves extending a gabled-wing section from one end of the broadside of a rectangle, forming a right angle (Fig. 76, p. 170; Figs. 84, 85). "L" house types share the characteristics of "T" and rectangular houses with respect to the positioning of doors, chimneys, and staircases. "T" and "L" houses are especially indistinguishable unless at least three sides of the house can be seen, for, as with the "T," the builder of the "L" also had an option in positioning the house with respect to street frontage. Sometimes the "L" is placed on a corner lot, with each of the two outer broadsides facing a street, so that at least one broadside (sometimes two) contains a broadside facade with characteristics exactly like those described for rectangular houses. But most "L" houses are turned the other way, that is, the "inside" of the "L" faces the street so that the entrance is on a broadside somewhat recessed behind the protruding gabled wing of the "L" (Fig. 86). This position lends itself well to the construction of a front porch, while the rear may take on a lean-to (but usually contains no additions). The one-story "L" is similar to other one-story houses in that it tends to retain a plain and unadorned facade, while the two-story "L" may display a facade character exactly like that described for the two-story "T" and rectangular house.

"L"-type houses are not so common in the Mormon area as are the "T" and rectangular houses, but they have the same widespread distribution as all other Mormon types and were
Fig. 84. These two log houses placed closely together at right angles with passage between illustrate the concept of the "L" plan. Spring City, Utah.

Fig. 85. Log "L" in Almo, Idaho, with a front entrance on both wings.
Fig. 86a. Native brick facade "L" house in Elba, Idaho, constructed before 1890. There is no entrance on the main broadside.

Fig. 86b. Floor plan of above house
constructed during the same periods. The one-story "L" most likely occurred with the "T" in the 1850s in Utah and was still being constructed in the 1920s in some isolated places but not in any great numbers. The two-story "L" declined with its cousins, the two-story "T" and rectangle, before and during the 1890s.

The Cruciform Floor Plan

In most communities of Utah, a few houses have been built in the form of a cross with four gabled wings. The so-called "cruciform" is achieved by adding a second wing to a gable-facade "T" house. It can also be thought of as an intersection of two rectangles across their center points (Fig. 87). One of the rectangular sections is usually a little longer from gable to gable than the other and can be considered to be the main section; the main section usually runs perpendicular to the street frontage, and usually contains an entrance on one or both sides but not on the gable end. The wings on each side of the main section also contain entrances. All of the extant cruciform houses observed are either one-and-a-half or two stories, and most appeared to be the homes of rather wealthy and influential citizens. The fact that no humble one-story log or adobe cruciform types were found indicates that the cruciform was not an early type in the Mormon country and was not a favorite among the poor. Most remaining examples date back to the 1880s and many of them are very plush, obviously built by very skilled workmen and are perhaps on the upper threshold of folk housing.
Fig. 87a. Stone cruciform house, Willard, Utah, with an entrance on each wing of the facade.

Fig. 87b. Floor plan of above house
A house type similar to this in form and called the "temple house" (Glassie, 1968, 129, 132) was common in the 1840s in the northern margin of the states of Ohio, Indiana, and Illinois (Peat, 45, and plate 48), where Mormons once lived. Though the temple house frequently had a street-facing gable-end entrance and usually only one side wing, the Mormon cruciform and gable-facade "T" and "L" may have derived from it.

The cruciform house, though one of the least represented of all the folk types, is nevertheless widely distributed. Cruciforms still exist in southern Utah (especially at Parowan), in central Utah (especially in Mt. Pleasant), and in the north at Willard.

The "H" Floor Plans

A few Mormons of above average wealth, including some polygamists, built houses with "H"-form floor plans, a form morphologically related to floor plans previously discussed, especially the "T," the "L" and the rectangle. The two parallel wings in the "H" run perpendicular to the street (Fig. 88) (as does the main wing of the gable-facade "T" or "L"), so that the facade contains two street-facing gables. Most frequently the two parallel sections function as the main wings having dimensions identical to those of the "I" type or other 1 x 2 rectangles. However, the wing between the two main sections (the horizontal bar of the "H") seems to vary in length between one-and-a-half and two rooms.
Fig. 88a. "H" house, Richfield, Utah

Fig. 88b. Floor plan of the above house
Though complete data are lacking on the "H" house type in the Mormon West because of its rarity, the few remaining examples indicate that the "H" preserves the basic form elements typical of most other Mormon house types. The "H" may be one or two stories, have central or inside end chimneys, have central or rear staircases in the main sections, and confine all entrances to broadsides rather than to gable ends. In the case of the "H," it appears that entrances other than those located on the interconnecting center section tend to be on the inner broadsides facing one another rather than outward facing away from the outer broadsides of the house. This same characteristic is true of many gable-facade "T" and "L" houses.

The Houses of Polygamists

In 1890, after years of pressure by federal officials, the Mormon Church hierarchy finally agreed to cease granting plural marriages. Until that time, polygamy was practiced and encouraged especially for the Church leaders in the late Nauvoo period and throughout the Utah period. In practice, polygamy was largely an upper-class institution among the Mormons, for only a minority of the men could afford to support more than one family at a time.

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4In current anthropological usage the term "polygyny" more accurately defines the Mormon practice of men taking plural spouses, but "polygamy" is used in this study for that is the term used by the Mormons themselves and by the local and federal courts of law at the time.
There were basically two kinds of polygamous families: the integrated and the nonintegrated. The nonintegrated families had separate houses for each wife and her children. Sometimes these houses were adjacent to each other, but frequently, especially during the federal raids, each house was in a different neighborhood or even in a different community miles away. The nonintegrated polygamous families had no effect on house type form or any form elements; their houses were indistinguishable from those of the monogamist majority.

The integrated plural families managed with all or most members under one roof. All household duties and all "day rooms" were shared in common—the cooking was done in one kitchen and all dined together—and in some cases all or most of the children shared one or two large bedrooms upstairs. But because each wife had her own private bedroom, an integrated family of four or more wives required a very large house. The largest example of a polygamy house is Brigham Young's "Lion House" in Salt Lake City which probably housed more than a dozen of his wives and numerous children (Goeldner, 31). The Lion House, with twenty bedrooms, each of which has a gabled dormer, is hardly typical of Mormon folk housing (or of polygamy houses) except in its symmetry. It was wise for a husband to avoid all appearances of favoritism; thus he took advantage of symmetry in order to provide equally for each wife. For the most part, the integrated plural families could achieve floor-plan symmetry by using traditional folk type floor plans.
There is no typical folk house type especially identified as a polygamist type, nor any standard housing pattern set by the polygamists. But the four-over-four (Fig. 74, p. 168, and Fig. 89) was one house type used by some polygamists, possibly because it could easily be divided into at least eight rooms of equal size (plus a basement below). At least one "polygamous" four-over-four contained a full two-story gabled wing to the rear of the house creating a very large "T" house (Goeldner, 33). Others utilized the "H" plan or simply increased the length of the "I" by a half (one-over-one) or joined two full "I" houses at the gable ends (Fig. 90). The poorer polygamists, however, managed with typical two-room or one-story "T" houses. Occasionally, a smaller house with two front doors contained sealed partitions (without doors) inside to afford a little extra privacy between two wives (Fig. 91), but the sealed partition was not at all a typical practice in small one-story houses.

An unusual feature found in some of the larger houses is the so-called "polygamy pit," a secret hideout for the husband used during the federal polygamy raids. The pit, which delayed or saved the husband from a prison term, was a concealed shallow crawl space beneath one of the ground floor rooms and was reached only by a hidden trap door. The Orson Hyde house in Spring City and the Canute Peterson house in Ephraim retain excellent examples (Goeldner, 29).
Fig. 89a. Canute Peterson house, Ephraim, Utah, constructed in 1869.

Fig. 89b. Upper floor plan showing five bedrooms rather than the traditional four typical of a four-over-four. (Goeldner, 29)
Fig. 90. Polygamy house achieved by joining two "I" houses at the gable ends. The Hutchins House, Beaver, Utah.

Fig. 91. Two-room stone cottage, Santa Clara, Utah, built by Fritz Reber of Switzerland in 1872 with plans for two wives. The inside partition completely seals the two rooms, and passage between the two rooms is possible only via the two front doors.
Simplicity and Symmetry: A Summary of House Form Elements

Simplicity and symmetry are two overriding themes running through all Mormon folk housing (Fife, 1972, 8). Even the two-story "T" or the cruciform, large and sturdy as they appear, are based on rather simple construction techniques that evolved through folk, rather than architectural, tradition. The single-room cottage, or nearly square room, is the basic construction unit of all Mormon folk housing.

If a tradesman were skilled at constructing a single-room cottage, he most likely could construct a two-room cottage, an "I" house, a "T," an "L" or even a cruciform simply by joining the squares or juxtaposing or intersecting rectangles in various combinations. The basic principles used in building one form were common to the others, but it is clear that a great variety of house types can be built by utilizing the same basic building practices shared in common among the tradesmen.

A product of the employment of Mormon folk skills is symmetry in floor plan and other form elements. It is easy for a given tradesman to build symmetrically--that is, to place chimneys, windows, doors, and staircases in a balanced order and to make all rooms similar in shape and size. But in the folk world at large, symmetry is not universal in time

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5 This idea was suggested by Austin Fife during an interview with the author July 3, 1972. It is also clearly stated in Sloane, 53-55.
or place and there are other reasons for it among the
Mormons. Symmetry in form is associated with the Georgian
architecture styles, which cut across cultural lines and
had an important impact on folk housing in all sections of
Eastern America in the eighteenth and early nineteenth cen­
turies. The Georgian form brought about the central hall
and staircase, caused the asymmetrical roofline on the
saltbox to be evened up producing the four-over-four, and
dictated that the exterior openings to the home be rhythm­i­
cally arranged (Glassie, 1969, 23-25). Symmetry was inherent
in Mormon architecture before the Utah period and was con­
tinued through the entire folk phases of building. Symmetry
was also associated with a nineteenth-century "rationalistic
movement . . . a time when artists strived to produce pleas­
ing effects upon the mind through a logical and geometrical
order" (Fife, 1972, 8).

In regard to the facade and other exterior elements,
symmetry is also very much in evidence. The door or doors
and windows on the front are almost always spaced equidistant
and balanced to give an ordered effect. Two-story houses
may contain two, three, four, or five dormers, but regardless
of the number, the dormers are most frequently balanced with
the windows and the door below. An orderly placement is
ture also of windows on the gable end except the occasional
off-center window which gives way to the chimney. The place­
ment of the chimneys also effects a balanced appearance:
they virtually always coincide with the roof ridge. Rarely
were chimneys offset from the ridge, except for the stove flue in a lean-to kitchen. Placing the chimney flue above the highest ridge also serves a practical purpose in that the ridge provides the greatest support for a flue which has to be high enough to draw the smoke from the hearth or stove below. In the days when chimneys were made of adobe or put together with adobe mud, that extra support from the roof ridge was especially important.

Simplicity, the second overriding theme, is also very apparent on the facade. An unadorned facade is expectable on the humbler pioneer homes, but even many of the sturdiest and largest two-story stone and brick houses present a stark and completely undecorated facade, especially those homes built before 1870.

The paucity of the early pioneer agrarian economy and the tendency of Mormons to be frugal in all matters of family economy were in part responsible for the undressed facade on early homes, but more important was the lack of ready-made ornamental trim in the isolated Utah mountains and valleys. Once the railroad was completed in Utah in 1869, Mormons demonstrated a definite interest in the Greek Revival styles that were in vogue in the East and the Midwest. Largely from mail order houses, Mormons purchased lathe-turned classical columns to give their newly built porches and porticoes a Greek Revival look. This new look in columned porches, along with a Greek type heavy cornice, spread rapidly from Utah cities to the countryside and became an established
fashion even on some of the humblest folk houses.

Greek Revival style in Utah did not, however, affect folk house floor plans or house types, merely the outer dressing. The Greek Revival provided the Mormons with an acceptable, fashionable, economical, and very simple way to dress and finish the facade without affecting the size or shape of the house or the arrangements of the rooms inside. It also encouraged symmetry already inherent in Mormon architecture.

Following closely behind the Greek Revival and in some places concurrent with it was the Victorian wave of architectural styles. In contrast to the Greek Revival, the Victorian did not exhibit simplicity but did affect floor plans. In fact, the Victorian represents the rise of a national domestic architecture in Utah and was accompanied by a rise in professional architects who turned their attentions to houses. It represents a time when, with increasing affluence, the Mormons could begin to copy the houses displayed in nationally distributed magazines and to hire professional carpenters who could read the new blueprints. In brief, the Victorian represents the influx and predominance of housing ideas rather "foreign" to folk ideas. Thus, the Victorian marks the beginning of the end to folk house construction, especially in the more populous and wealthier centers.

Before the turn of the century, Salt Lake City was almost completely given over to Victorian architecture and almost completely lost its once very large inventory of folk houses. After 1900 most of the younger Mormon families built
one of several modern house types common most everywhere in the nation. The California bungalow, for example, gained considerable popularity for a short time (Spencer, 1945).

Notable effects of the Victorian era in Utah other than floor plan changes were changes in roof types. The simple gable roof, one of the most constant and unmodified elements in Mormon folk types, was replaced by mansard roofs commonly with balustrades or by very steep-pitched multiple gable roofs with turrets emphasizing vertical lines (Figs. 92, 93). During the 1890s and after, a few houses with basically folk floor plans such as the "T" or the cruciform appeared with pyramidal, mansard, or hipped roofs. In Utah such an occurrence is an architectural miscegenation, for the simple gable roof is so utterly dominant on all Mormon folk house types that it can be considered one of the diagnostic elements of folk. This is not true outside of the Mormon West, or even in the Midwest Mormon town of Nauvoo, where a few of the houses had mansard roofs (such as Joseph Smith's "mansion house") and Dutch-like stepped gables, the latter of which is completely missing in Utah.

One minor impact of the Victorian period on Mormon folk houses occurred again on the facade in the form of fancy wood trim for the eaves and dormers. Some of this "gingerbread" was purchased in the smaller rural communities where it was applied to some of the larger two-story folk houses (Fig. 83, p. 177). This practice seems to detract
Fig. 92. Built of stone in 1901 in Rexburg, Idaho, typifying new ideas in roof types accompanying the Victorian Era. This house is not a Mormon folk type.

Fig. 93. Non-folk type house built in Kanosh, Utah, in 1890s. The truncated pyramidal roof came to Utah with Victorian architecture.
from the earlier compliance to simplicity but was largely confined to the more substantial houses.

**House Types: Regional Uniformity and Diversity**

With the achievement of cultural assimilation in folk housing values and practices among the diverse ethnic elements in the Mormon culture region, one expects to find areal similarities in Mormon folk houses. Indeed, such similarities do exist, but so also are there some areal differences. The primary aim here is to identify and to explain the reasons for the recognizable areal likenesses and differences in folk housing patterns among the Mormons.

Three kinds of areal differences in folk housing patterns are recognized: (1) differences in the regional predominance of certain building materials, (2) differences in minor architectural details on facade, and (3) differences in relative numerical importance of certain house types.

Certainly, the most notable and immediately recognizable areal difference is that of building materials predominance. The rough adobe or log walls of Elsinore, for instance, stand in contrast to the smooth and painted lumber walls of Hyrum. Even more striking are the stone houses of Willard, Beaver, and Spring City. Do these contrasts indicate failure to assimilate a commonly-shared set of values in folk house types?
Fieldwork and evidence presented in this study clearly reveal that building materials (construction mode) and form of the house are independent variables. That is, a specific house type retains the same shape, or floor plan, roof type, chimney positions, and door positions, regardless of whether it is constructed of log, stone, adobe, lumber, or brick. Conversely, the areal differences in the predominance of stone, adobe, log, or whatever do not correspond to areal differences in the relative predominance of specific house types. Furthermore, with the possible exception of stone, areal differences in the use of building materials do not correspond to areal differences in the ethnic background of the various Mormon communities.

Even in those communities where European Mormons dominated in stone construction, house forms do not differ from those in other Mormon communities. In Willard, for example, nearly all early folk stone construction has been traced to one Shadrack Jones, a Mormon from Wales (Giroux), who in Willard built a very large "H" house, a cruciform, some "T" houses, and several "I" houses. Among the "I" houses were central-hall and staircase plans, rear staircases, and central and inside end chimneys. European Mormon stonemasons followed American floor plans in the Mormon West (Fife, 1972, 8) because most of them worked with American carpenters (Roth interview) or built houses for American Mormons who desired traditional American folk house designs.
All evidence indicates that differences in the kinds of building materials utilized from place to place within Mormondom did not bring about differences in house form; consequently, areal variations in building materials do not indicate failure by Mormons to acquire a commonly-shared set of values in folk house plans. As stated earlier, economics and factors relating to accessibility and supply were the primary reasons for the regional differences in the selection of building materials.

A second kind of areal difference here recognized involves minor architectural details on the facade of the house. Where such details appear unusual, they are typically confined to a few houses within one or two neighboring communities. In St. George, for instance, some houses have the so-called "Dixie dormer" (Goeldner, 26) (named after the southern part of Utah locally known as Dixie); and in Midway, Utah, a unique scroll trim lines the eaves of several houses. In every case, such uniquenesses can be traced to the artistic treatments of one or two individuals whose work was never copied widely by others. Though such small area traits exhibit some details of innovation, these few minor and areally confined differences pose no serious challenge to the general and much larger theme of regional uniformity and cultural assimilation. Certainly, the whole concept of cultural assimilation or regional homogeneity is relative; some subtle areal differences in details occur in any cultural region.
A third kind of areal difference is the relative numerical occurrence of the various floor plans (house types) in each community (Table 8). The two-story "T," for example, is generally the most numerous floor plan, comprising over 30 percent of the total of all nineteenth-century houses remaining in the eight surveyed communities. The two-story "T" actually varies between 12.5 percent at Paris to 61.7 percent at Willard. Similar variations occur with all other types. Clues to the reasons for such variations are indicated in Table 8: where there is a high percentage of one-story houses, there is a correspondingly low percentage of two-story houses. The general prosperity of each community, the major periods of growth and change, and the rates of growth and change account for the numerical differences in the occurrence of various house types.

Far more important (relative to diffusion of folk knowledge) than the numerical variations is the dominance throughout Mormon country of a standard set of morphologically related house types. All Mormon folk house types here recognized are formed by a standard set of rectangles intersected or juxtaposed in various combinations, exhibiting the same shared concepts in house form and requiring generally the same folk building skills.

Standard house types so dominate all Mormon communities that rarely can one find a pre-Victorian house that does not conform to one of these described models. The exceedingly rare example which does not conform may be a folk house but
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**Key:**

- SRC - single-room cottage
- 2RC - two-room cottage
- 2SR - two-story rectangular houses
- 1 "T" - 1 and 1-1/2 story "T"
- 2 "T" - two-story "T"
- 1 "L" - 1 and 1-1/2 story "L"
- 2 "L" - two-story "L"
- Cruc. - cruciform
always stands unique, not copied elsewhere and not representative of a recognized pattern or type observed elsewhere in Mormondom. An example of such a folk house truly unique in the Mormon country is the squat, flat-roof, Spanish-looking house located in Manti and built by the same Mr. Cox who built the standard four-over-four next door. More important and relevant in terms of cultural assimilation is the thorough acceptance of the standard house types everywhere within the Mormon region, for that is the important kind of regional uniformity which demonstrates the existence of a commonly-shared set of values and concepts in folk housing.

Nevertheless, some writers on Mormon architecture perpetuate the mistaken notion that the odd-looking house is the rule rather than the extremely rare exception, or that Utah is made up of a hodgepodge of house types directly traceable to widely scattered places throughout the world. The following illustrates this common belief today (Markham, 2-3):

Since great numbers of immigrants were continually moving into Utah from Canada, England, the Continent, and particularly the eastern United States bringing with them more recent developments, it is not at all unusual that we should find buildings of widely different styles being constructed side by side or even buildings with one style expression on the exterior and wholly different on the interior.

... As families firmed their attachment to a farm or city lot, the new house was undoubtedly conceived in the image of the old homestead in Nauvoo, Kirtland, Dresden, County Cork or Nottingham. ... Families came from the cultured cities of the east coast, Providence, Albany, Philadelphia, the plantations of the South, the back woods farms of Kentucky and Tennessee, from the great cultural centers accustomed to the most advanced amenities; others had their rearing in simple cottages
of the coal towns in Wales, farm houses of Denmark, or the city slums of Birmingham. Each brought to his new home a unique background with the demands, preferences, habits, etc., which inevitably found a limited but characteristic expression in its size, form, area and furnishings.

Actually, there is nothing in the way of folk house form to support the notion of a strong nineteenth-century European influence—or of a hodgepodge of widely diverse house-form elements traceable directly to widely scattered parts of the world. A few nineteenth-century European motifs were built on some large urban mansions at an early time, especially in Salt Lake City (Carter, 1941, 40), but these are most certainly not folk houses.

To repeat, the roughly equal frequencies in all parts of the Mormon culture region of all folk house types identified here demonstrate a willingness and ability on the part of the Mormons to assimilate into an accepted mold, regardless of their diverse cultural origins. Several factors fostered this cultural assimilation. One is the so-called reduction process which occurred during the initial phases of Far West settlement—a time when all pioneers, regardless of their origins, had to reduce their housing to a minimum below that to which they had been accustomed. These pioneers (especially those from Europe) had never seen a log or adobe cabin or cottage and they learned from experienced American Mormons how to build cabins. The techniques of building a "standard" cabin or cottage became rapidly diffused throughout the culture area. Likewise, the permanent house types became
standardized everywhere but might not have in the light of economic growth had it not been for the reduction process which caused several years of delay and permitted a full assimilation of folk houses into a set of standard varieties.

An intense desire on the part of Mormon converts to conform and become assimilated is a second and most important factor fostering regional uniformity in the culture area. Conversion to Mormonism was accompanied by an intensely negative ostracism, rejection, and persecution from old friends and neighbors at home, and a very positive promise of a new way of life, economically as well as spiritually, among new friends and neighbors in the new land of Zion. Conversion to the Church was synonymous with emigration to Zion and synonymous with rapid assimilation into the Mormon American culture. Brigham Young proclaimed English to be the divine language of the Mormon Church and did all that he could to encourage its use, and he and all other Church authorities made certain that newly arrived immigrants (who often came as foreign ethnic groups unable even to speak English) were always accompanied by several experienced American Mormons from whom the newcomers could learn irrigation and cropping practices and the art of building log and adobe houses (Olson, 201). Indeed, the social and religious climate exerted pressure against separate ethnic expression, even in the form of home building, and the various groups showed no desire to resist that pressure.
A third factor fostering likeness in house types from place to place was the high degree of mobility within the Mormon culture area. Settlers frequently moved from one village to another, and new communities were settled by experienced pioneers from older communities. Some individuals became rather well known as colonizers, founding one community, assisting newly arrived settlers, staying long enough to see the settlement on its feet, and then moving on to help settle another community. These individuals not only taught others their trades but must have built the same cabins and house types over and over in widely scattered places. But even later, after the frontier phase of settlement had passed, frequent moving from village to village and attendance at churchwide conferences in Salt Lake City further encouraged copy work and repetition in house types. Mobility was thus an effective tool of idea dissemination.

Social and geographical isolation from non-Mormons must be counted as an additional factor fostering uniformity in the Mormon West. Most of the Mormons' isolation was deliberate. In fact, the main purpose for the Mormon migration to the Great Basin was to possess a land no other group wanted, so that their goal of a self-sustaining economy and commonwealth could be realized. But even when Gentile miners and soldiers drifted into Mormon country, Mormons were advised by their leaders to avoid sustained social contacts with the Gentiles. Indeed, many non-Mormons to this day consider the Mormons "clanish."
House-type Affinities Between the Mormon West and Eastern American Folk House Regions

All nineteenth-century Mormon folk houses are patterned after house types once common in Eastern America. But the East is actually made up of several dissimilar folk housing regions; thus, the Mormon West bears greater resemblance to some eastern regions than to others. The major folk housing regions evolved from colonial centers where southern New England, southeastern Pennsylvania, and Tidewater Virginia formed three separate hearths or source areas from which folk ideas spread outward to the West and South to form at least three major culture regions (Kniffen, 1965, 560; Glassie, 1968, 33-39). Each hearth area contained some likenesses and differences, but the differences intensified as time passed and the houses in each expanding region changed. The region of primary interest here is that created by the westward-moving New England frontier which by 1830 had crossed the Appalachians via New York's Mohawk corridor and had reached the southern shores of the Great Lakes to Michigan.

The formative years of Mormon culture began in the early 1830s in New York's Mohawk Valley and Ohio's Western Reserve, areas rather exclusively within the realm of New England frontier housing traditions. Indeed, the majority of the earliest converts to Mormonism had spent their lives in areas dominated by New England folkways. Not surprisingly, house types traceable to the New England hearth were built by Mormons in Nauvoo, Illinois, in the 1840s (Lillibridge, 109; Newcomb, 153) and later in the isolated Mountain West.
valleys. Though certain strong affinities exist between the Mormon West and New England folk house forms, the former is not a mirror image of the latter. Some early popular New England types (notably the two-room deep, one-story and attic Cape Cod cottage) are missing in the Mormon West, but even those house types carried to the West were modified through time with changing architectural styles.

Some important modifications occurred before the Utah period and some during that period. The old New England "I" house, for example, reappeared in western New York in the early 1800s, but its original massive central chimney had given way to a central hall and internal end chimneys (Glassie, 1968, 129). The saltbox, too, went West with New Englanders but in the process yielded its large central chimney to the one on each gable end, or its asymmetrical roof line was evened up, producing the large four-over-four usually with a central hall and inside chimneys paired on the ridge (Glassie, 1968, 125). Further changes occurred as New Englanders built their houses along the southern shores of the Great Lakes and as Greek Revival became a fashionable style (Kniffen, 1965, 559). The "T" floor plans, for instance, especially that with a street-facing gable, became popular in the Mohawk Valley and northern Ohio in the 1830s and were definitely known to the Mormons there at that time (Newcomb, 154). Sometimes called the "temple form house" (Glassie, 1968, 132), the Midwest gable-facade "T" often contained a wing on both sides of the front-facing gable, producing a
cruciform plan closely resembling the floor plans of those in the Mormon West. But front-facing gable houses underwent further modifications in the Mormon West where all gable front entrances moved to the broadside, and the occasional Dutch-like, stepped gable\textsuperscript{10} completely disappeared.

As old New England house types underwent modifications in the Great Lakes Midwest, the Mormons, when established in Nauvoo in the 1840s, may have received additional folk influences from the river valleys and prairies south of the lakes where there was "a strange confusion of influences, those direct from Pennsylvania mixed with many of the same influences that had gone southward . . . and then returned" (Kniffen, 1965, 561). Indeed, the Pennsylvania "I" house with a single end staircase (as well as the central-hall type) and early two-front-door versions containing four or five upper story windows balanced with the door and window below, seem very much like many early Mormon "I" houses. The Pennsylvania "I" became exceedingly popular as it spread south into Appalachia and West into the prairies (Kniffen, 1965, 560-561), finally reaching the Great Plains in the 1860s (Pillsbury and Kardos, 56). Furthermore, Mormon migrants to the Nauvoo Zion arrived in large numbers from all parts of eastern America at a time when Mormon culture was still in a formative stage. Pioneers arriving from areas influenced by

\textsuperscript{10}The Brigham Young house in Nauvoo preserves the best example of stepped gables on a midwestern Mormon cruciform house (Lillibridge, Fig. 6, 112).
Pennsylvania folkways (Kniffen, 1965, 560) probably reinforced the popularity of the "I" house, and perhaps other house types bearing similarities in both New England and Pennsylvania folk culture regions. But older Pennsylvania derivatives such as the dogtrot house and the German or Continental cabin were not adopted by the Mormons.

As Mormons gathered in the Mountain West from Europe and America, they preserved the essence of the folk house forms common to the early nineteenth-century northern Midwest, but certain modifications continued. The greatest changes occurred after 1870 when the steeper-pitch roof with dormer windows became ever more popular, gradually replacing the older "I" house and eventually predominating on two-story "T" and "L" houses built before the turn of the century.
The house is the hearth but not the limit of one's home. Beyond it is the yard (homestead) with its outbuildings, all of which are intricately associated with daily life and the home and farm economy. The outbuildings provide sheltered space for storage and for animals and therefore represent an extension of housing which exhibits deep-seated traditions in folk architecture. The inclusion in this study of the most important outbuildings not only makes the description of Mormon domestic folk architecture more complete, it also lends support to the conclusions drawn concerning cultural assimilation and homogeneity. The emphasis is again on form, especially the form of the barns and granaries, the most important outbuildings, but the functions of these buildings are also discussed, especially where function relates to form. It is important, however, to preface the descriptions of outbuildings with a brief introduction to the nature of the Mormon homestead and village pattern.¹

The early Mormon settlements in the West are best defined as nucleated farm villages, that is, they were

¹Mormon village patterns have been rather thoroughly discussed by scholars from many disciplines (Nelson; Spencer, 1940; Francaviglia, 1970). There is no attempt here to plow again this ground already well cultivated but merely to provide a general setting for a discussion of the outbuildings.
primarily established as residential communities for farmers. The houses, barns, granaries, coops, and sheds were all located on a village lot separate from the farm which was largely free of buildings and was somewhere outside the village. Livestock were kept at night on the individual homesteads in the village and during the day were taken collectively to a common pasture or range by a herd boy. Each village was surveyed and platted according to a rigid north-south-east-west grid forming rather large square blocks of eight or ten acres each. Most blocks were subdivided initially into four home lots, each containing about two or two and one-half acres--rather large for the village homestead of one family. Some of the lots were reserved for a church, school, and other public buildings.

Admittedly, there were exceptions to this general pattern, but it was followed remarkably well, considering the fact that the Church had no enforced regulations equally applicable to all newly established settlements. But there were some very strong precedents set for Mormon settlement patterns, and Church leaders consistently encouraged and

2The main precedent is known as the "plat for the City of Zion," an explicit plan drawn by Joseph Smith in 1833 for a city which was to have been established by the Mormons near what is now Independence, Missouri. The city never materialized because of failures by the Church to retain a firm foothold in Missouri, but it remained firmly entrenched in Mormon minds. Finally, in 1847 the "divinely inspired" plat was employed in the founding of Salt Lake City, the culture hearth of Mormon settlement in the West. The plat was copied in nearly every Mormon settlement for the next fifty years (Nelson, 34-45).
in some cases ordered the nucleated farm village pattern in the settlements established before 1900 (Jenson, 1890, 130).

The homestead, while it was not so rigid or predictable in the spatial patterns of its contents as was the village pattern as a whole, did contain characteristic arrangements and form elements perpetuated along with the village pattern by the urgings of Church leaders and by traditional cultural practices. The house was typically situated on the corner of the large home lot near the street intersection, so that facing each intersection was a cluster of four houses, one in the corner of each lot set back about 35 feet from the street. Along the street frontage between each house were gardens, orchards, or pasture (Francaviglia, 1970, 23) and frequently a row of Lombardy poplars. Located in the interior portion of each homestead were the numerous outbuildings associated with both the home and the farm economy. Every family, regardless of its occupation, owned its own horses and a few cows, pigs, and chickens. The various outbuildings associated with keeping these animals were found on all homesteads in every settlement. Even in Salt Lake City, before the automobile age, there was a barn or two behind every house. On the nonfarm homesteads all of these buildings were related to the home economy, but on the farm homesteads which are intermingled in the village with those of the nonfarmers, some of the outbuildings were related to the farm economy only and tend to differ from the others in function and size. The most conspicuous of the outbuildings
(and diagnostic of a farm homestead) is the rather large hay barn.

The hay barn functioned mainly as a storage shelter for hay and was two levels (stories) high. The ground level contained stabling space, an enclosed saddle and harness room, perhaps a pen or two for a newborn calf or lamb, sometimes a grain bin or a general small-implement storage space; all or most of the hay was stored above in the hay loft. The earliest Mormon hay barns contained an entrance at both gable ends wide enough to permit a wagon loaded with hay to be driven through (Fig. 94). The hay was pitched into the loft above from the wagon positioned somewhere along the driveway within the barn. But later the roof ridge pole was extended beyond the front gable by four or five feet and acted as a boom pole to which was attached a block and tackle and Jackson fork, permitting hay to be hoisted to the loft from outside the barn and carried into the loft on a tram. This made it possible to eliminate the door openings at both ends (Fig. 95) and to increase the floor space of the loft.

The size of the hay barn varied according to the needs and prosperity of the farmer: some were 18 feet wide, 50 feet long, and 25 feet high, but so great was the variation in sizes that no specific set of dimensions can be regarded as typical. The shape, however, was more constant, being that of a rectangle with a ratio varying between 1:2 and 1:3. On this rectangular superstructure a shed was sometimes added to one or both sides (Figs. 96, 97).
Fig. 94. Though larger and better preserved than the typical, this barn in Rexburg, Idaho, retains large gable end entrances and loft above. This was built originally as a tithing barn when tithes were paid in kind.

Fig. 95. In Elba, Idaho, this hay barn was built without wagon entrances. Hay was hoisted to the loft from outside by means of a Jackson fork attached to the beam at the ridge pole.
Fig. 96. Now simply a shell for hay storage, this hay barn in Spring City, Utah, shows well the basic rectangular form, vertical board construction, protruding ridge pole, and one shed.

Fig. 97. Two sheds have been constructed on each side of the main section on this Spring City, Utah, hay barn. Partitions and the loft floor have been removed to provide more room for hay.
simple gable roof was one of the most constant of all the form elements of the Mormon hay barn. Virtually always at a 45-degree pitch, the roof was usually quite flimsy, consisting of vertical planks nailed to a framework of widely spaced log rafters and purlins (Figs. 98, 99); only the most prosperous farmers could afford shingles. But this roof, as leaky as it was, apparently came to be the most important element of the barn, for many farmers did away with the walls and the superstructure in favor of a roof perched on high posts creating a completely open shelter for hay. This latter development is hardly a barn at all but is derived from the hay barn and is a very common feature, especially in southern Utah. The rationale for this change was to provide at least minimal shelter for the ever increasing amount of hay produced, but most of the hay (even though the barns continued to be used) later came to be stacked out in the open on the farm lots or on the homesteads.

In view of the later practice of storing hay in the open, the actual need for a large hay barn in dry Utah may be questioned. It appears that tradition prevailed beyond actual need. Most of the remaining old Mormon hay barns are still in use, standing as open shells with all pens or bays and the loft removed giving more space for hay storage. Evidently, Mormons today prefer some protection for their hay when a shelter is available, although they rarely build new hay barns.
Fig. 98. Hay barn in Hyde Park, Utah, exhibiting typical mode of construction and state of repair. Roof contains only two or three purlins.

Fig. 99. Two typical hay barns in Ephraim, Utah. Note poor quality log work and lack of chinking and roof of vertical plank attached to widely spaced purlins. Barn in the rear is typical of the later evolutionary stage of the hay barn—simply a roof perched on high poles.
Construction of the traditional hay barn declined after the turn of the century at about the same time large gambrel-roof dairy barns began to appear (Fig. 100). Though the latter did not functionally replace the former, many of the newer dairy barns seem to be based on older Mormon forms except for the superior roof and its form. The large gambrel-roof barns are actually copies of more modern midwestern barns seen by Mormons in nationally distributed magazines. The gambrel roof was absent in nineteenth-century Mormon country.

In contrast to the Mormon house, the hay barn seems hastily put together\(^3\) with inexpensive lightweight planks nailed vertically to a minimal frame of widely spaced poles. Before lumber was widely available, log was the chief material. Log hay barns were smaller than those of plank (Fig. 99, p. 214, and Fig. 101) and were put together with little care, with little or no chinking, and an overlapped saddle-notched corner as previously discussed.

The horse barn (Figs. 102, 103), a second barn type,\(^4\) was more closely associated with the home economy and was therefore a type found on nearly all homesteads except on those of some of the farmers who managed with only one large

\(^3\)In many folk cultures (e.g., the Pennsylvania-German) much pride and quality of workmanship go into barn construction, and barns are often better constructed and more expensive to build than the family house (Pillsbury and Kardos, 57, 74).

\(^4\)The two barn types discussed here are not usually designated separately by the Mormons. They refer to both types simply as "barns."
Fig. 100. Gambrel roof barn, Rexburg, Idaho, not typical of 19th-century Mormon barns

Fig. 101. Log barn with stone shed, Midway, Utah
Fig. 102. This small log barn, Sugar City, Idaho, was once a common type on the village lots of non-farm families.

Fig. 103. Stone horse barn on a town lot in Farmington, Utah

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hay barn. It was used to store feed for the family horses and cows, and was located near a small corral and pasture. Again, there was great variation in size, but it was both smaller than the hay barn and related to it in form. In fact, the hay barn most likely evolved from this smaller barn as hay yields and general prosperity increased. There was no consistency with respect to the inside arrangement of bays or pens, or with the positions of doors; some were side opening, some open at the gable end, depending on how the barn was situated with respect to the adjacent corral. The roof was nearly always a simple gable with about a 45-degree pitch, but some shed-roof horse barns gained popularity about the turn of the century or later.

In contrast to the ubiquitous vertical-plank construction on the hay barns, horse barns exhibited more variety in mode of building. Many were of adobe in southern Utah or stone where that material was abundant, but log undoubtedly predominated in Mormon country as a whole until cheap lumber was available.

Another outbuilding common to virtually every homestead was the granary. Granaries, like barns, can be divided into two functional types, the family granary and the farm granary. To some extent the two types were different in form and occurred at different periods of time.

The family granary (Figs. 104, 105) was associated with the home economy and was frequently built over a root cellar close to the rear of the house, giving the building
Fig. 104. Stone granary, Midway, Utah

Fig. 105. Limestone granary, Spring City, Utah
the appearance of having two structural levels. The semi-subterranean level, called "the cellar," provided cool storage of garden produce, fruit, milk, etc., during the summer and protection from frost in the winter. The level above, strictly referred to as "the granary," was for the storage of items needing protection from moisture, especially wheat used by the family, but sometimes there were separate bins for oats and barley, if there was no provision elsewhere for these animal grains. Meat was also stored in the granary, especially in winter. Cured ham, pork, and smoked beef were wrapped and buried under the grain (Allen, 1987) or hung on the walls. Early in Utah history, some granaries were used to smoke the meat; in fact, the Mormon granary most likely evolved from the smoke house of Eastern America (Spencer, 1937, 162). During the warmer months the granary was frequently used as sleeping quarters for the older boys, and apparently there were numerous cases where granaries served as temporary living quarters for a whole family while in the process of building a house.5

In contrast to the flimsy appearance of the hay barn, the granary was usually a very solid structure built of adobe, stone, or heavy 2" by 6" plank, but rarely of log (Fig. 106). It had a simple gable roof and two front doors on the gable end (in contrast to houses), one door was below

5Professor Andrew Karl Larson, in a personal interview, attributed this information to the well known Utah historian, Juanita Brooks.
Fig. 106. Log granary, Elba, Idaho

Fig. 107. Farm granary, Paris, Idaho, showing the "inside out" plank construction
ground surface, off-center, and was reached by steps downward, and the other was two or three feet above the ground surface and was reached by steps upward. Some granaries had one door on each gable end.

The farm granary, a second type, was mainly for the storage of grain for farm animals. It was found only on the farmer's homestead, usually occurred in addition to the family granary, and was located close to the barns and sheds rather than near the house. The farm granary was larger than the family granary and had either a shed roof or gable roof. Those built late in the period of Mormon settlement or after the turn of the century frequently had shed roofs. The latest farm granaries were built of 2" by 6" plank nailed horizontally to the inside of the vertical studs (Fig. 107, p. 224).6

Other outbuildings include the sheds and coops for pigs and chickens. The "hog sheds" were built with very little care, "just slapped together." Consequently, there is virtually none left from the previous century. But it can be assumed that the numerous examples remaining today of those built after 1900 differ little from those in the distant past. The "hog shed" found today on the Mormon farmer's homestead is an open shelter consisting mainly of a roof supported by posts and is made of a thatch work of

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6Folklorist-geographer, Henry Glassie, termed this the "inside out granary" on a recent visit to Utah (Franca-vigilia, 30). Apparently, he was intrigued by this mode of construction as well as with the granary itself.
straw. It slopes backward in shed-roof fashion to the back wall of the shed which often is contiguous with the corral fence but reinforced with heavy lumber. The open broadside of this very rectangular shed usually faces the south, to the leeward of most storms.

Chicken coops also contain a sloping shed roof but are fully enclosed and much more solidly built than the hog shed. Coops in the past were often made of stone or adobe, but more recent ones are built of lumber.

**Summary**

The various outbuildings on the Mormon homestead in the nineteenth century all exhibited considerable variety in size, but unlike the house the differences in size were not especially associated with essential changes in plan or form. On barns and granaries, the gable roof and rectangular plan were constant elements regardless of size variables, but time and the rise of commercial agriculture further encouraged certain variables. The positions of the doors on barns, for instance, became more variable; and barn floor plans changed as stables and pens were removed to make room for more hay storage. For a long time, granaries contained gable entrances, but eventually, the shed roof appeared, and granaries were increasingly built without the cellar below. The lesser sheds and coops became larger as the number of commercial animals increased. Again, however, all of the basic forms with all of the variables occurred in
in rather equal proportions in all parts of the Mormon culture region, demonstrating not only a strong degree of economic and cultural homogeneity but also effective cultural diffusion and rather complete cultural assimilation. The described building forms common on Mormon homestead, as well as many other aspects of the Mormon landscape, are not typical of non-Mormon settlements in the West (Franca-viglia, 1971), but all are traceable in form to the regions of the Midwest prairies where the Mormon culture acquired its initial folk building forms.
CHAPTER VI

CONCLUSION

The broad concern of this study was to investigate the nature of nineteenth-century Mormon folk housing in the Far West Mormon-settled area. The rationale for the study was based on the assumption that Mormon people, who were gathered from a wide diversity of cultural backgrounds, were assimilated under theocratic rules and frontier conditions, and the degree of that assimilation is evident in the uniformity of certain cultural landscape features. Some landscape features such as the village street-and-field patterns became common because of Church policy or direct promotion by Church leaders, but folk housing forms were never prescribed or consciously promoted by officialdom. The depth of cultural assimilation and homogeneity can be better appreciated by an analysis of folk housing, for the perpetuation of standard housing types appears due more to an unconscious acceptance at the "grass roots" level of Mormon society than to direct policies set by Church hierarchy.

The Mormon culture evolved from humble beginnings in the enthusiastically religious environment of western New York and at first comprised only peoples who shared a set of values common to the New England frontier of 1830. But as the culture continually gathered more and more converts
and moved repeatedly to the fringe of the western frontier, finally settling in the Mountain West, its population became more and more heterogeneous in cultural heritage. Though Mormons of all ethnic backgrounds mixed freely, nevertheless several communities in the Far West were composed chiefly of one or more foreign ethnic groups.

New convert immigrants were assisted in adopting Mormon frontier life by the Church's policy of sending experienced colonists with the novices when founding new settlements. In instructing newcomers in the methods of preparing and building with log or adobe or in the manner of constructing dugouts or cabins, the experienced colonists relied on their own backgrounds and thereby initiated the first important and practical steps in the diffusion of their own folk skills and values. The earliest settlers had previous experience in the American northern Midwest where they used logs, lumber, and brick to build cabins and houses. They subsequently adopted adobe after contact with Mexicans in the Far West, and the use of stone was intensified by an influx of European Mormons.

The findings of this study indicate that all Mormon Far West communities possessed the same housing forms in the nineteenth century regardless of the cultural background of the settlers or the kinds of building materials used. And these housing forms are all traceable to the New England-Midwest hearth of Mormon culture.
As permanent houses and outbuildings emerged on the landscape, Mormons moved frequently and traveled from one community to another; this mobility, together with the social and cultural isolation encouraged by the Church, permitted the permeation of a commonly shared set of folk concepts to take effect on the collective Mormon mind. As a result, a high degree of regional uniformity and distinctiveness evolved to form the Mormon cultural landscape.

Uniformity of folk building forms exists, but great variation in building materials accompanies them. Learning to prepare and use the various materials is seen here as an important stage in the assimilation and acquisition of folk skills, and most pioneers became familiar with the use of the available construction materials. Regional variation in the use of log, adobe, stone, brick, or lumber is primarily due to availability of materials, cost, and accessibility rather than cultural preferences and assimilation and diffusion processes. This belief is substantiated by the fact that the two major aspects of folk housing—the building materials utilized and the form or shape of the building—are independent variables; thus, the employment of stone, brick, or whatever building material never dictated the employment of a specific floor plan, or vice versa.

Finally, those elements of Mormon folk housing that appear to be regionally uniform are precisely those that demonstrate the existence of a shared set of material folk
concepts, values, and skills made possible only by rapid and effective diffusion and assimilation processes. And the existence of these elements rather uniformly on the landscape further validates the notion that the Mormon-settled areas formed a viable and distinctive culture region in the nineteenth-century Far West.
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VITA

Leon Sidney Pitman was born on a farm in Dietrich, Idaho, on September 4, 1938, the fourth of five children to George Howard and Emily Morgan Pitman. He attended the Dietrich public schools until 1956 when he enlisted in the U. S. Navy and worked as an aircraft mechanic at bases in Texas and Hawaii. Upon his discharge in 1959, he went to New Zealand where he served a two-year mission for the Mormon Church. In the fall of 1961 he traveled extensively in the Middle East and Europe before his entrance into Brigham Young University, Provo, Utah, as a freshman in January 1962.

After receiving his B.S. degree in geography and history from B.Y.U. in 1965, he began graduate studies in geography and city planning at The University of Oklahoma, Norman, where he earned his M.A. in August 1966. He then taught college geography for one year at Louisiana Polytechnic Institute, Ruston, Louisiana. In the summer of 1967 he entered Louisiana State University, Baton Rouge, to work toward a Ph.D. in cultural geography and anthropology. Since completing his course work at L.S.U. in 1969, he has been an assistant professor of geography at California State College, Stanislaus, in Turlock, California.

While at B.Y.U., Mr. Pitman married Sally Crenshaw of Marshall, Texas, in 1963, and they have two children, Lori, age eight, and Michael, five.
EXAMINATION AND THESIS REPORT

Candidate: Leon Sidney Pitman
Major Field: Geography
Title of Thesis: A SURVEY OF NINETEENTH-CENTURY FOLK HOUSING IN THE MORMON CULTURE REGION

Approved:

[Signatures]

Major Professor and Chairman
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:
March 27, 1973

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