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Article Summary: Examples of log construction in Nebraska are not common, but neither are they rare. This is a study based on a limited investigation of extant log construction and a more extensive examination of photographic documents from the files of the Nebraska State Historical Society.

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Photographs / Images: Log house which stood on the Johnstown-Springview road in Brown County; Log house from Dawson County; a sod house with "banking structure"; pioneer school house; "Smith Cabin" dated 1862

“NEBRASKA LOG CONSTRUCTION: MOMENTUM IN TRADITION”¹

By Roger L. Welsch

Introduction—In previous books and articles I have underscored 19th-century perceptions of the northern Plains as the “Great American Desert.”² However we define the word “desert” today—by amount of rainfall, botanical representation, or soil types—the fact remains that for most early visitors the Plains precisely fit *their* contemporary definition of desert: low rainfall in comparison with their home area’s precipitation, severely limited forestation, and sparse population, principally nomadic or semi-nomadic peoples. Indeed, some climatologists and geologists³ suggest that early settlers’ beliefs may reflect the long-term reality more accurately than our own, for we have been enjoying an unusually wet period on the Plains during the past century—including the 1930s Dust Bowl years.

At any rate, I have suggested that a wide range of folkloric expressions—foodways, architecture, music, folk humor—have been profoundly affected by the way Czechs, Swedes, Germans, Hoosiers, or Downeasters saw the Plains. I have concentrated my previous work on the changes that traditions underwent when they were thrust into the new, harsh environment of the Plains. This paper will be in another direction: I would like to address myself here to constancy rather than to change. To be sure the log house suffered (or enjoyed) many changes and eventual death as it moved out onto the treeless Plains, but what is remarkable about this form of folklore is its tenacity. This does not detract from the remarkable and technologically suitable phenomena that were born or came to an acme on the Plains—the sod house, the baled-hay house, or the railroad-tie house—but it is yet another facet of folklore, which simultaneously displays great consistency while never being without some variation.

One of the changes the migrants experienced in their voyage

from Sweden or Connecticut to Nebraska and the Plains was the disappearance of the forests with which they had grown up. It was hard for the migrants to imagine a life without those woods. As the oft-quoted citation from 19th century novelist James Fenimore Cooper had it: "[The Great Prairies] resemble the steppes of Tartary more than any other known portion of the world, being in fact a vast country incapable of sustaining a dense population in the absence of the two great necessities [wood and water]."4

Today those lines are often the butt of the boosters' jibes, but the fact remains that the Plains have not during the intervening years ever supported a dense population. Fifty years after Cooper wrote those words, the Scandinavians settling the northern Plains found little reason to change his estimates. As Beret in Rolvaag's *Giants in the Earth* laments, "How will human beings be able to endure this place? . . . Why, there isn't even a thing that one can hide behind!"5

And yet the trees they so missed had always been a mixed blessing. Trees were the most troublesome agricultural weed they had previously had to deal with. In the homeland they had had to cut the trees to develop a field, then grub out the roots over a period that might take decades, and finally hoe out the saplings every spring to keep the forest from reclaiming the hard-won openings. But trees were also the substance from which homes had been built and the fuel over which food had always been prepared. Suddenly here on the Plains there were no more trees, and entirely new systems for survival, for construction, and for cookery had to be devised.

While it is true that the striking geographical and historical conditions that obtained during the white settlement of the Plains were instrumental in the development of equally striking cultural responses, it is of equivalent importance to examine traditional forms that persisted even though removed from their eastern, woodland matrices. Tradition is tenacious: proverbs survive long after their meanings have been forgotten, children play games based on cultural activities many centuries lost, and food prohibitions and preferences persist long after any practical foundations for them have passed. And just as the momentum of tradition carries folklore through time to a temporal location where it is no less alive though an anachronism, so also does the momentum of tradition carry folklore across space to

geographical locations where it is no longer "appropriate."

The 19th-century frontier gives us a splendid example of that spatial momentum. Migrants from Scandinavia, eastern Europe, and the eastern states of America, from woodlands, lake country, mountains and sea came to the Great American Desert, bringing with them a traditional baggage that persisted even though alien to the Plains. The Norwegians to this day eat lutefisk and lefsa on Christmas, when cod are not caught in Nebraska streams, and the Germans of Kansas sing "O Tannenbaum" when they should perhaps render "O Tumbleweed." Thus, while there were profound and important changes to all traditions on the new soils west of the Missouri, there were also impressive survivors. Such anomalies are as interesting here at the edge of their distribution as are examples of them where they are common or as are the indigenous forms for this area. Just as the biologist looks with special interest at the eastern wood pewee and the western wood pewee at that point, the interface, where their distributions meet in the Niobrara Valley because he wants to know why it is that the two enjoy such a discrete distribution, so also does the folklorist look not only to the development of the new but also to the demise of the old. Of course the sod house is of particular concern to persons interested in the Plains: it was a product of the Plains; it was unique in America to the Plains; it was so instrumental in the settlement of the Plains; and it touched so many lives so intimately. Yet it is worthwhile to look back in time and to the East and note what happened to the waves of the log-house tradition as it waned and died on the treeless Plains.

The first settlers, after all, did not seize upon the idea of the sod house, embrace it, and abandon all they had known for centuries. They knew about log construction, they preferred it, and so as far as possible and as long as possible they built with logs. Probably no one has done any more than I have to underscore the importance of sod construction on the Plains, but the fact remains that Nebraska also constituted a segment of the log-house tradition—a segment of modest proportions to be sure—but with a powerful importance as the terminus for that tradition's continuous movement, historically and geographically.

A good many of my theses regarding the impact of the Plains on the migrant mind rely on the sudden nature of that impact. I

have admired and quoted the work of Everett Dick so extensively over the past two decades that I tremble at the prospect of arguing with him, but I feel that he misjudges the case and thus understates the Plains' impact on migrants and their customs when he writes in *Conquering the Great American Desert*:

Walter Prescott Webb, in speaking of the problems of the Great Plains, has pointed out that in the forest regions civilization stood on three legs: land, water, and timber. On the Great Plains, he remarked, two of the three legs were knocked out, leaving only one—land, and it was no wonder society there sometimes toppled in failure. It must be admitted, however, that the other legs were not knocked off suddenly upon reaching the one hundredth meridian. They were whittled away little by little beginning with the peopling of the prairies in western Indiana and Illinois.⁶

Few settlers in Nebraska experienced that studied progression of geographic change, however; all too often they came directly from Sweden, Switzerland, or Connecticut without passing through the gradual changes of others' years-long migrations across America. To my mind far more of them experienced relatively abruptly the savage difference between their homelands and the desert. The progression from East to West was, to be sure, gradual; Indiana upon first white incursion was predominantly wooded, primarily with oak and walnut; Illinois was approximately 40 percent wooded, Iowa 18 percent, and Nebraska a trivial 3 percent.⁷ But even by wagon over a period of a summer or a year, a change like that, one that altered a way of life that had revolved around wood and stone and abundant water for centuries, was indeed abrupt.

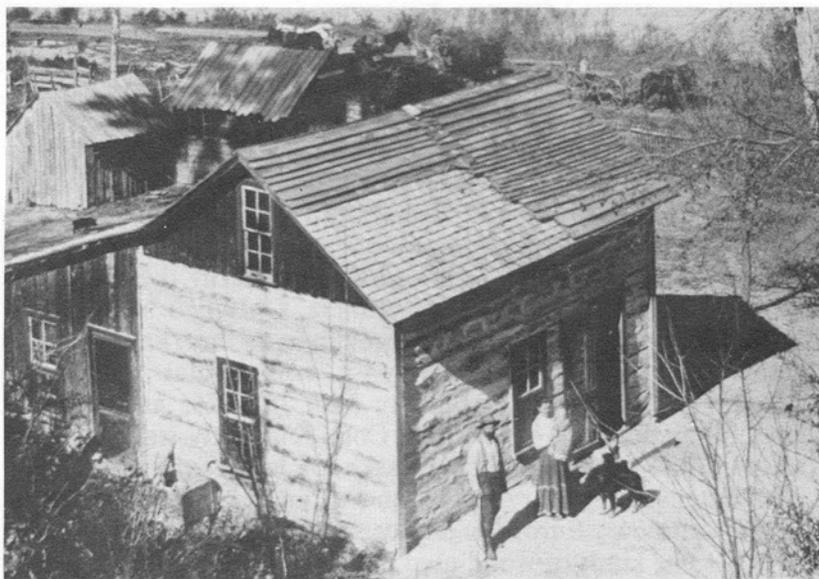
Moreover, what examples there were of the accustomed ecology were not scattered evenly over the Plains but were concentrated toward the East and along a few major waterways. It must nonetheless be noted that a tradition like log construction did persist to the extent that 3 percent forestation permitted. It should be noted that the fur traders, the military, and missionaries built a variety of log buildings in Nebraska prior to the homesteading period. Cantonment Missouri (1819) and Fort Atkinson, Nebraska (1820-1827), contained some of the largest log structures built west of the Missouri River.⁸ The first settlers did what they had always done and knew best how to do—build log houses.

Examples of log construction on the Plains are not common, and yet neither are they rare. Many communities have pioneer log houses and cabins "restored" as county museums, tourist information stations, or picnic shelters; most museum com-

plexes have a log structure from the immediate area; occasionally log buildings are uncovered during the razing of what was thought to be a frame building (as was the case with the Hudson House in Lincoln, now a part of the State Fairground's Heritage Village). Nebraska is, naturally enough, not thought of as a part of the greater log-construction region, but because log construction is more durable than sod, it has a greater proportion of extant log houses. Moreover, because Nebraska has been settled comparatively recently, we are fortunate to have many fairly good photographs of Plains folk architecture captured shortly after it was built and as it was being occupied, not as a survival but as a vital element of the frontier.

The substance of this article is based on (1) a limited investigation of extant log construction and (2) a more extensive examination of photographic documents, primarily from the files of the Nebraska State Historical Society. Both forms of evidence offer problems for the researcher. The photographs, though they are of high quality, do not show the interiors and give little opportunity to determine details like corner notching, wood types, and pegging systems. Extant buildings have often been so severely compromised over the 100 or so years of their existence that other details like early forms of flooring, loft access, and foundation preparation have been lost or destroyed. Indeed, such details have often been destroyed or left unrecorded by those who intended only to rescue the building from destruction. At any rate, the conclusions of this paper have been based on evidence drawn from approximately 200 log buildings in Europe and the United States other than the Plains, from approximately 30 extant log buildings in Nebraska, and from photographs of approximately 78 buildings in the Nebraska State Historical Society files.⁹

The log-house tradition on the Plains represents actually not one simple survival but at least two. Migrants from the eastern states of this country brought with them concepts of log construction that were applied in the Plains context; these came from the several traditions of the East.¹⁰ Log construction which is uncompromisingly European is also found here. Indigenous Omaha and Pawnee Indian use of logs for lodge frameworks did not apparently influence the settlers' construction patterns, nor, more surprisingly, did military construction techniques. Military posts, however, were not considered a



Log house, which stood on the Johnstown-Springview road in Brown County (Niobrara River in background), is an excellent example of log construction. Three roofing techniques are shown: shingles, horizontal lapped boards, and vertical lapped boards (on sheds in background). The house had been whitewashed and the corners boxed. The gable ends are board and batten. Supports for the loft floor appear not at the plate but at least two logs lower. . . (Below) Log house, which stood in Dawson County, displays many features common to Plains construction. Note, for example, the sod roof and sod addition to the rear. The interstices have been filled with smaller poles and the corner notching appears to be the V-notch.



place for decent folks (often with good reason), but extensive visitation to the forts by Indians did quite obviously affect that people's adoption of log construction during the late 19th- and early to mid-20th centuries. In 1966¹¹ approximately half of the extant log houses on the Pine Ridge and Rosebud Reservations of South Dakota used construction techniques similar or identical to 19th-century military log forms—primarily those using Hudson's Bay and "hogtrough" corners. Only two Nebraska non-Indian or non-military log buildings to my knowledge display such corners exclusively—a commercial building originally in Scottsbluff, reputedly built in 1876; and a log house, reputedly built by William Cody, currently standing in Arthur. Thus, we can see in Nebraska log houses the effect of the Plains environment primarily on two log-house forms in all of their variations, European and eastern American.

Walls—The kinds of wood used in Nebraska log construction affected two of its characteristics: Longevity and size or span.¹² It is very difficult or impossible to determine from early photographs, what kind of wood has been used to build the structures, but some few have an identification listed by the field photographer. The most common varieties are oak, walnut, and cedar, in that order. Of extant buildings the most commonly found woods are also oak, walnut, and cedar with some cottonwood and—in western and northern Nebraska—pine. This predominance perhaps is not an entirely accurate reflection of builders' preferences. Oak, walnut, and cedar have generally endured longer than cottonwood or box elder, thus gaining a numerical prominence through survival rather than application.

It seems reasonable, however, that the first builders would have elected to use hardwoods because of their durability, easy working characteristics, and because they were the woods the builders were used to. But once the supply of such durable and easy-to-work wood had been consumed as fuel or building materials, less desirable wood like cottonwood and hackberry were used. Most Nebraska houses mix woods, the walnut being used especially for the sills and plates; there are some oak and walnut houses with cedar or cottonwood components, the latter two usually found among the rotting logs in the building.

Nebraska timber was not only scarce but also short, knotty, and convoluted. Rare were the tall straight trunks necessary for

a large, tight log house. Such timber is the result of forest competition and full moisture in climax woodlands, a notably rare Nebraska feature. The short, curved pieces of timber necessitated the use of short wall spans with wide interstices between the logs.

Short spans of wall were achieved by (1) building small buildings and (2) interrupting wall spaces frequently with doors and windows, usually in the middle or near mid wall. Perverse-ly, the introduction of a door in the middle of a relatively short wall of logs almost entirely precluded the possibility of a window in that wall, the very short logs being unstable without a transverse element of some sort. This problem may account in part for the relatively high frequency¹³ of windows placed directly against door frames. The gaping interstices between logs were filled with all manner of chinking or nogging—brick, stone, lumber scraps, and shingles (usually arranged /////
), timber scraps, and clay mixed with horsehair, straw, and feathers.

During the dismantling of an 1872 log house near Pleasant Dale (the Bishop House) a section of broken rope-bed was found filling space between logs! I question a comment by Everett Dick in *Conquering the Great American Desert*: “Old log houses which remain today reveal the extremely crooked cottonwood logs with the large spaces between them, which with great difficulty had to be filled by wedging smaller limbs in the openings.”¹⁴ Filling in the wide gaps left by uneven logs (which is almost redundant when speaking of cottonwood!) was a far easier task than trimming logs to fit more tightly or lifting logs that would have been used had the spaces been narrower. Indeed, what I have seen suggests that often wide spaces were purposely left to cut down on the number of logs needed to form a wall of a certain height, again because it is easier to find and lift mud and branches than logs.

It should also be noted that it was far better to chink the interstices between logs by putting in a piece of branch and then mud to either side, because a solid mud chinking would have more quickly conducted to the interior of the house the cold and heat of the outside.

One puzzle of Plains folk architecture is the relative scarcity of half-timber buildings, especially in Nebraska. As Amos Rapoport has stated: “House form is the result of choice among

existing possibilities—the greater the number of possibilities, the greater the choice—but there is never any inevitability, because man can live in many kinds of structures.”¹⁵ We can therefore direct our attention to why this particular choice was rejected.

That rejection is puzzling because half-timber construction constituted so intimate an element in the architectural culture of most migrants, because it did arise in modest numbers across the country—but only once so far as we know in Nebraska—and because I cannot imagine a construction form better suited to Plains materials and conditions.

It might be argued that America was old enough by the 1860s to have forgotten half-timber construction techniques—but migrants to Nebraska were coming directly from regions of Europe where half-timber is widely known and appreciated, Czechoslovakia, Poland, and Germany in particular. Half-timber construction was fairly widespread in Iowa, Wisconsin, Missouri, and even Texas, but seems to have been rejected as a technique for the northern Plains.

Half-timber construction simply meant building an open framework of short heavy beams, the open areas then being filled with “nogging”—brick, stone, mortar, or adobe. As Kniffen and Glassie write: “This skeletal construction eliminated the need for a large amount of lumber, presumably a reason for its wide use in Europe.”¹⁶

Nebraska timber was scarce, short in length, crooked, and tough—perfect for half-timber construction. Sod could have been used for nogging, or it could have been mixed into a mortar or made into sun dried bricks (as was the case in some German-Russian homes in Henderson, Nebraska, and Hillsboro, Kansas, and in the single known example of a Nebraska half-timber house in the vicinity of Western, Nebraska).¹⁷

Thus, half-timber would have combined two Nebraska resources in appropriate proportions and to their best advantage. Moreover, the solidity of the half-timber house matches that of the log or sod house and would thus have served well under the assault of Plains weather. It could be argued that *all* Nebraska log construction is half-timber because it is after all a timber framework with nogging interstice—the chinking. But classical half-timber includes full framing (including diagonal members), a feature totally absent from Nebraska examples.

The conventional location of doors in log houses is in the middle of the eave wall, usually in both eave walls. But logs were scarce on the Plains and the walls were usually low—5 to 7 feet high—and a door in the eave end would either have been very small and low or would have had to cut through the sill and plate logs, introducing structural instability. So, the main door was often in the middle of the *gable* end, thus taking advantage of a slightly higher wall.

Chinking is surprisingly durable and efficient caulking, but where the soil was not fine enough to form a good mortar or where chinking was carelessly done (which was always possible: the average size log house has approximately $\frac{1}{2}$ mile of linear chinking!) a storm could turn a house into little more than a roofed cage. H. Lomax wrote of his first night in Custer County, Nebraska:

Entering the beautiful grove of cottonwoods and willows, we can see a small log building, ten feet square. It is built of round logs, imperfectly notched and unchinked, with a roof of cattle hides and a hide hung up for a door. The inside is furnished with a carpet of grass, standing as it grew before the house was built. The house is full of emptiness. . . .

I awake in the night realizing the north wind is rushing through the walls of the house and I am really cold. An emergency call and we pulled some of the hides from the roof, fasten them on the north and west walls and again seek rest and dreams.¹⁸

Lomax mentions above “imperfectly notched.” By far the most frequent corner notch used on Plains log construction was the half dovetail, which further suggests that the map formulated by Kniffen and Glassie for the United States east of the Mississippi can be extended into the Plains states.¹⁹ There are at least two occurrences of the Hudson’s Bay corner in Nebraska, but several other notchings are also found: saddle, butt-joint, V-notch, and flat notch.²⁰ A rough estimate of the proportions of notching systems used in Nebraska log construction is:

<i>Extant Houses</i>	<i>Photographed Houses</i>
Half-dovetail 14	Half-dovetail 12
V-notch 5	V-notch 4
Flat 2	Saddle 3
Butt 1	Diamond 1
Diamond 1	

Six photos show corners sheathed to further protect them from moisture.

This table constitutes the most vulnerable portion of the

paper. As Disraeli said, "There are lies, damned lies, and statistics." It seems altogether likely that the statistics will make me the liar rather than vice versa. I added this paragraph after the initial drafting of the article, and it became apparent that the precise content if not the thrust of the numbers will change. One begins writing conclusions to ethnographic data as soon as sufficient data has been acquired to give a clear direction to the researcher, to support the thesis or reject it. And yet, it must be obvious even to the casual reader that every day new photographs are being delivered to the State Historical Society and every year new log structures are being uncovered.

Since the rest of this paper was composed, Nebraska State Historical Society Collections have turned up two more buildings and two more photographs, one showing the rare diamond corner notch. However, none of the additional data has challenged the hypotheses.

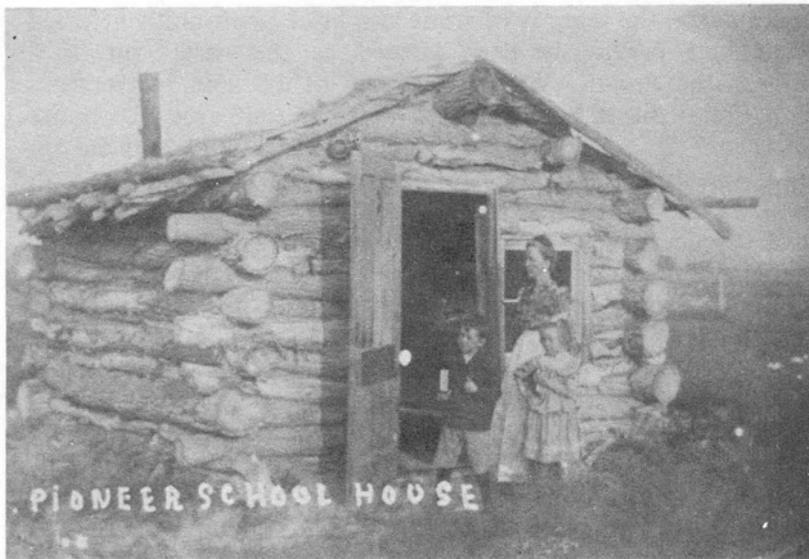
A table of corner timbering based upon the Nebraska State Historical Society building survey files is similar to mine with the exception of the Hudson's Bay or hogtrough examples. Their files have information on approximately 14 dovetail buildings, 1 v-notch, 1 saddle-notch, and 3 square-notch buildings. One *poteaux-sur-sole* house was demolished in the 1960s, and a log crib which utilized the semilunate as well as the saddle-notch is extant.²¹

Some few houses used two or more notches; the Bishop house for example intermixed the V-notch with the half-dovetail with no discernible pattern or rationale. Those joints most frequently used (the above list, excluding the Hudson's Bay, flat, and butt joints, which are by far the rarest forms) are remarkably practical; they hold the intersecting logs firmly in place, pulling them always inward, and they effectively combat the single worst natural danger to log buildings—wood rot at corner joints. Rot develops wherever moisture collects but these notches expose to the outside only sloping seams, so that rain or snow is not only excluded from the joints but is also expelled should it ever enter.

Foundations—Large portions of the Plains provide as little stone as wood. In some regions of the Dakotas, Nebraska, and Iowa, there are glacially deposited field stones (Sioux quartzite) and in even smaller areas (primarily the Blackhills of South Dakota) granite, (in North-central Kansas there is limestone postrock), and in eastern Nebraska some limestone and Dakota



A sod roof demanded a low pitch, and high winds common to the Plains sometimes required "banking" structures—piling sod around the walls—a practice also used with frame construction. . . .(Below) While care was taken in building log homes, less time was spent on public buildings, which were sometimes carelessly built. This school is small, rudely chinked, and logs are not squared or barked. The corners are not squared and the saddle notching is notoriously short lived. The low eave walls require a gable-end door. Note the placement of the window directly adjacent to the door.



sandstone which is soft but can be used for light foundations—but not fireplaces. Brick clay was available but rarely was there sufficient fuel to fire it during the early years of settlement and of log construction.

Thus, Plains geography profoundly affected the materials of house foundations. It is unfortunately impossible to determine much about foundations from photographs; many extant buildings are no longer at their original sites and the foundation therefore no longer extant. However, it is apparent that many log houses on the Plains were built directly on the ground—all the more a matter of logic when the floor was to be the ground, even if only temporarily. Other houses used available stone for a foundation structure; the Bishop House near Pleasant Dale had a full sandstone basement, the stone having been quarried by the builder within $\frac{1}{2}$ mile of the house site.

The scarcity of foundation materials and the severity of the weather also affected the form of the foundation. No Nebraska log houses were built on 1- to 3-foot piers, as were log houses in the south and southeast—for example, Kentucky or Tennessee. The open crawl-way under the house would have made heating more difficult and of course would have required an immediate, integral floor, which was again a problem here when timber and lumber were initially in short supply.

Similarly, the scarcity of stone and brick profoundly affected what had previously been viewed as the very soul of a house—the hearth. Warren Roberts of Indiana University's Folklore Institute has suggested that the uniformity of house and room size to the east may well have been a result of the optimum heating and lighting capabilities of an open hearth.²² All cooking had been performed for centuries over a hearth fire or in a fireplace oven—but here there was neither sufficient nor suitable stone to build a fireplace and not enough wood to fuel one were a supply of stone to be found. The effect of that kind of geographic and cultural disjuncture is hard to gauge,²³ but the question here of course is in regard to effects on the structure of the log house.

The cast-iron cookstove that replaced the hearth, burning cobs, cowchips, or twisted grass "cats," could heat more efficiently from the center of the house than from the edge, where the fireplace had been. However, it gave out no light. It was mobile to a certain extent, while the fireplace had not been, and



The "Smith Cabin," dated 1862 in the files of the Nebraska State Historical Society. The rudely riven shakes and the massive stone chimney seem to deny its identity as a Nebraska log house.

during the summer months it was sometimes moved out of the house to the shade of a tree or a fabricated bower. While brick chimneys were occasionally later supplied for the cookstove, most early photos show a plain stove pipe projecting above the room, perhaps shielded with sod for stability.²⁴ The construction factor of building a stone or brick chimney and incorporating it into the construction of a log wall had vanished totally on the Plains except in those rare cases where conditions permitted the persistence of antecedent tradition.

One such instance may appear in a photograph identified in the files of the Nebraska State Historical Society as being from Jefferson County, but I doubt that it shows a building in that county. The house is identified as the Smith log house on Smith Creek at Endicott, built in 1862 to 1863. In the photo are Ed Hawkes, Mrs. William Smith, and Mrs. D. McCanles, a name of some import to the history of the area southeast of Fairbury. This site is on the northern margins of the Kansas Flinthills, where limestone deposits were used extensively for construction. But it does not lend itself well to chimneys; it explodes when heated. However, John Carter of the State Historical Society has suggested that perhaps the massiveness of the fireplace pic-

ture allowed a fire to be built some distance from the interior walls of the fireplace, thus avoiding heating the stone to the point of explosion; he maintains there is ample evidence to place the house in Nebraska.

David Murphy adds: There is considerable evidence to suggest that the stove replaced the fireplace because of convenience, economy and efficiency rather than lack of suitable materials. This is clearly dependent upon the time and place of settlement but as soon as industrialization and transportation made it possible, the stove was used almost exclusively. In pre-Territorial (and in some places Territorial days) the use of the standard stone or brick fireplace was not uncommon. However, with few exceptions, the stove completely replaced the fireplace as soon as it was available, limiting the fireplace to the parlors of the 'great' houses. (We have evidence of bonafide fireplaces at the Bordeaux Post, Fort Atkinson, Moses Merrill Mission, and Cabanne's Trading Post in eastern Nebraska. But by the late 1850s, in eastern Nebraska at any rate, the only fireplaces we find are subsidiary to stoves—those of the Taylor-Wessel house in Nebraska City or the basement room of the 1864 Warner house in Lancaster County.)

I suppose one should require more evidence before such sweeping generalizations are proposed. However, nothing seems quite as fundamental to the study of Plains folk architecture than the absence of the traditional hearth. I suspect that, if the materials had been gathered, one would find the demise of the hearth taking place earlier in the prairie states to the East. (Franklin's stove appeared in Philadelphia in 1744; and iron stoves were being mass produced in the United States more than a decade before Nebraska Territory was opened to settlement.²⁵) The few obvious exceptions, particularly among first generation immigrants to the Plains, seem to occur where group cohesiveness and isolation are major factors.²⁶

The transition from hearth to stove was most probably the result of the intersection of a variety of geographical and historical circumstances. However, the impact of the ultimate result on migrant cooks—for better or worse—cannot be underestimated.

Roof—The log house feature most profoundly affected by Plains context was the roof, and the construction of the roof in turn affected other features of the structure. Even where suffi-

cient numbers and lengths of logs could be found to erect the walls of the house, there were seldom enough cedars or oak to be riven for shingles or shakes to roof it. Until sufficient quantities of roofing could be brought in by train in the late 1860s the alternative was to use sod for the roof as had always been the case with the sod house. The roof was notoriously the weakest link of the sod house, especially until advances had been made in finding something to form an impervious water barrier.²⁷ The use of heavy, unconsolidated sod for a roof meant that it had to be of low pitch to keep the sod from sliding off during rain and it had to have a very heavy framework to support the enormous weight of the sod. While framed log-house roofs in Nebraska very rarely have even a ridge pole as a transverse roof beam, in the case of the sod roof, whether on sod or log walls, there were usually three or more very heavy beams running from gable end to gable end. Photographs in the files of the Nebraska State Historical Society suggest that sod roofs on log houses are virtually identical in construction with sod roofs on sod houses. There is one example of a log house with a thatched roof but I suspect that the photograph is of a recent and fanciful reconstruction.²⁸ Loose hay coverings were used on animal shelters, log and sod alike. Some few houses had lapped lumber roofs, running eave to peak or gable to gable, an extravagance that suggests again the validity of my thesis made in regard to other forms of Plains folk architecture, that they constituted not merely a humble expedient but an appropriate, strategic response to Plains geography. Only later when there was sufficient fuel to permit the extravagance of frame construction was there the possibility to sneer at the lowly but very practical folk forms—sod, baled hay, railroad ties, and logs—in favor of wood planks, which rot, burn, warp, swell, split, leak, and can be eaten through by rodents and insects.

Roof rafters, in cases other than those of sod roofs detailed above, were oak, cedar, ash, hackberry, or cottonwood poles squared only on the bearing surface; they were frequently shimmed to present a relatively flat surface for the roof sheathing. The gable ends usually had windows in those houses with lofts, frequently—and curiously—cutting down from the gable end into the end plates. I say curiously because this weakened the plate structure, already of uncertain stability because of the roof pressure on the eave plates.

In most construction there is a tie between the plates; the weight of the roof presses down on the rafters, the rafters push out on the plate, and the ceiling beams are put across the plates to hold them together and to convert potential horizontal stress on the tops of the walls to vertical weight bearing directly down on them. But to gain height in the log house loft, the loft floor was, as explained above, suspended well below the plate, thus creating a story-and-a-half house.²⁹

Plains log house roofs displayed other minor variations from their eastern counterparts. The eaves and gable ends extended well beyond the walls (except in the cases of sod roofs of course) in contrast to the very narrow overhangs common only a few hundred miles to the east,³⁰ and the gable ends are also filled in with logs in some cases. Three features of Plains log houses permitted this latter variation: (1) the gables were low because of the low pitch of the sod roofs, (2) several heavy lateral beams were needed to support the sod, some substantial support thus being necessary below those beams, a support not afforded by conventional board and batten gables, and (3) because gable-end doorways, as described above, frequently cut through the gable end plate, thus requiring some support above the plate to bear the weight of the roof and beams.

Interiors—If it is difficult to determine the details of log construction from such uncertain contingents as photographs or from severely compromised survivals it is all the more difficult to arrive at an understanding of interiors from that evidence. However we can see that dirt floors were tolerated only very briefly, if at all, before a board floor was installed. Floor beams were unsquared (except for the top, bearing surface) oak or, as a decidedly inferior second choice, cottonwood. Floor beams crossed the narrower dimension of the house and rested on the sill log or a shim nailed to the sill. Interior walls were whitewashed, almost without exception. The pioneer had little desire for the quaintness of a log cabin; he wanted a house, a home as civilized as it could be made. Where clay and lath were available the interior walls were plastered and whitewashed, as was the case with the Menck house (1858) now on the grounds of the Stuhr Museum in Grand Island. There is also archeological evidence from Fort Atkinson, Nebraska, that lath and plaster were used in some log structures between 1820-1827.³¹ Newspapers are often plastered to the wall and whitewashed to

seal the walls further against drafts. The ceiling was also whitewashed, the floor beams for the loft frequently displaying a careful and artistic fluting, beading, or chamfering on the two lower exposed corners, another clear indication of the builder's intent to produce a finished and refined product rather than an expedient with primitive "charm." (Here too the Menck house at the Stuhr Museum provides an excellent example.)

The beams supporting the loft floor were suspended directly from the second or third log below the plate, fitting between lateral logs or in notches cut into them, or from a stringer spiked along it, almost never from the plate itself. There cannot be even an estimate of any accuracy but some Nebraska log houses also have only partial lofts, with some portion of the ceiling loft left open to the rafters—perhaps an efficiency in heating the loft or cooling the downstairs during the heat of the summer.

While early log houses may have had the loft ladder so favored by Hollywood and romantics, in most extant houses where there is evidence for conclusions, it appears that a narrow, steep, enclosed stairway at one end of the one room house was the rule. The stairway typically opened into the ground floor of the house at a wall; as one entered the stairway door to ascend to the loft, the stairway turned abruptly to parallel the short wall of the house and opened into the loft about three quarters of the way across the loft toward the opposite wall.³² There was a vertical door at the foot of the stairs, none at the horizontal opening of the stairway in the loft. The area beneath the closed stairs was used for storage shelves. Often a door or window lay beneath the "landing" at the top of the loft stairs.³³

Exteriors—Pioneer log house builders were no more eager to produce a rustic exterior than interior. Logs were carefully squared and plumbed; they were quickly whitewashed and covered with clapboard. The Scheer house was covered with lath and plaster on the outside as well as inside, as was also the Menck house in Grand Island; the lath on the Menck house was simply split willow wands nailed directly to the log walls.

One might well ask why almost all of the photographic examples I have provided here or that are on file with the Nebraska State Historical Society show unpainted and uncovered log walls if my above contention is true. The answer is, I believe, that once covered and painted, log houses are no

longer recognizable as such and therefore could not be included in my corpus. Only today are we enchanted with the rustic look of naked logs.

Dynamics of Construction—The description of the log house omits the most difficult part to imagine—the actual construction activities. No one who has worked with pioneer log construction can fail to be astonished by the skill of squaring huge oak and walnut logs—or worse yet, of raising the massive, heavy logs and of driving nails into them. In rebuilding the Bishop house John Carter of the Nebraska State Historical Society staff and I once stopped on a hot August afternoon, panting and cursing after a painful bout of pounding—or, rather, trying to pound—spikes into the oak log walls. The huge spikes were accordioning and folding under the sledgehammer blows; they would not penetrate the oak. Our frustration, however, turned to laughter when we noticed on the same log several huge, wrinkled square spikes. Over 100 years previously another builder had cursed the same log with the same frustration, and probably with the same vocabulary.

On the other hand, 20th century imitators must not overestimate the labor involved in log construction. In an effort to replace rotten logs in a 19th century building, I once took on the task of squaring four oak logs, a job I anticipated would take many weeks. The first log took a full day, the second two hours, the third an hour. David Murphy more quickly mastered the axeman's technique, squaring a side in half an hour.

The log house had the advantage of being built to last considerably longer than the sod house—even though the endurance of the sod house has been underrated by many modern observers. A disadvantage, however, was that it took considerably more time and skill to build a log house. The Bishop house near Pleasant Dale was built over a period of three summers and Mrs. Robert Ross wrote in 1936:

Father had a good team of mules which he found necessary to sell in order to buy oxen. The oxen were more suitable for breaking prairie and pulling logs from the canyons, which we used for constructing buildings. It took many months to chop, hew, and construct our first building, a barn. We lived in our barn until more time could be found to build a house.³⁴

In the same volume a longer text describing the processes of building with logs in Nebraska is offered by Mrs. Ella Trew:

Moving from Buffalo County in the spring of 1879, my husband, Will P. Trew, filed on his homestead in the spring of 1880. Our first home was situated on Deer Creek near the South Loup River.

Mr. Trew felled the trees, and hewed out the logs to build a three-room house for his family to live in. The family then consisted of myself and three children. The house was 16 x 24 with openings for a door and four windows. After the logs were put in place and chinked, the ridge log was placed and poles cut for rafters. Then plum brush was cut to put between the rafters and this was covered with wide boards. These boards were hauled from Kearney and a trip of this kind took one day to go, and one day to purchase the material and load up and one day to drive home with team and wagon.

The sod had to be plowed and laid on the roof boards to keep the roof from leaking. Then to keep it warmer Mr. Trew piled sod up against the logs on the west and north sides to protect from the cold winds and snow, of which we had plenty; blizzards sometimes lasted three days at a time.

After the partitions, windows and doors were in place, and the logs whitewashed inside, we had a nice, warm house, begun with Mother Nature and finished with hard-working hands.³⁵

Warren Roberts of Indiana's Folklore Institute has told me that in Indiana builders erected the walls as a closed pen and then cut out the doors and windows. While that was, of course, the case with doors and windows inserted later into Plains log houses there is substantial evidence that logs in some Plains buildings were cut to length to the door and window frames before raising. In the case of the Bishop house, oak butterfly spacers were inserted between the logs³⁶ to hold them at a proper distance until the door framing could be nailed into place—which in turn held the logs until chinking added its support to the vertical structure. This is generally viewed as a Scandinavian construction feature. Log ends at door and window frames were rarely secured with pegs as was the case to the east.

Additions—Once a log house was built, however, it was not *done*. Indeed, by the time the last nail had been driven into the last shingle, there were probably already plans afoot for the new addition. It is hard to imagine the pioneer who finished his 18x20 foot log house and then sat back contented to live in it as it stood for the rest of his life! This is why log houses are frequently found encased and hidden in what are assumed to be frame buildings: the additions to the log house quickly overwhelmed the simple, original log nucleus. It is the rare photograph that shows a house unencumbered with additions.³⁷ Those additions took the form of gable-end lean-tos, eave-side lean-tos (resulting in false salt-box houses), in extensions of the gable end, in raising the roof angle to produce a higher loft, and in L-additions.

The photographs of the Nebraska State Historical Society, however, show an interesting character in the additions to log buildings on the Plains: they are predominantly sod. It seems

clear that after the initial wave of log construction passed there was little timber left for additions. It is possible of course that in some photographs the initial construction was sod and the addition log, but that progression logically seems unlikely unless immediate shelter was needed and then the log building was erected at leisure—if one can use that word in connection with log construction—as described by Mrs. Ross above. However, many of the photographs demand the interpretation that the log element of the house came first, for no one adds a log house to a sod lean-to!

Another function of sod in adding to the comfort of the log house was for “banking,” as mentioned by Mrs. Trew. It was customary in the 19th century plains to “bank” a house for the winter by piling sod, earth, or hay around the foundation or in some cases well up the wall to seal out the cold. This was apparently the case with some log houses.

Dynamics of Occupancy—The dynamics of occupancy of the Plains log house are far more difficult to determine than are its physical characteristics. Just as the Nebraska log house shares physical traits with its eastern counterparts, I am certain that there are analogs in their effects on human occupants. The solidity of the log house must have provided a modest confidence and courage in Nebraska as much as it did in Illinois or Pennsylvania. The constraints placed on behavioral parameters by a house of 360 square feet on a family of two adults and nine children, as was the case with the Bishop house, and the effects on concepts of privacy must have been as profound on the Plains as 500 miles to the East. A misbehaving child, for example, could scarcely be sent to his room “until you behave”; insularity was not an option in a one-room house smaller than most modern living rooms. Moreover, tasks could not be compartmentalized and isolated; because the cooking and harness repair had to take place within the same living space, all children were intimately involved with every life process and a firm system of transmission of lore was sustained so that every member of the family knew every process of the house’s dynamics, in contrast to the modern home where children can grow up isolated from all processes of the household.

But just as there were new and different forms resulting from the clash of a centuries-old tradition of the log house with the severity of the new lands west of the Missouri, there were prob-

ably variations in the dynamics of occupancy too. The more severe the conditions, the more comforting shelter is, and few places offered a range of more severe conditions than the Plains, and few forms of shelter are more solid and reassuring than the log house. Today pioneer log houses seem cramped and close, but when first built they must have seemed almost fragile in the fury of the frontier and of Nebraska's weather. After a day in the huge fields under an endless sky so far from the homeland, the dark and quiet interior of the log house must have been a comfort rather than an annoyance. As John Demos wrote of the Pilgrims at Plymouth and their small, dark houses:

The low ceilings and dark walls would only have intensified the feeling of oppressiveness. But this, of course, speaks only for our own impressions. The settlers themselves were presumably quite content with such houses. For them there was no value in trying to connect their domestic setting with the elemental forces outside. Of sunlight they had plenty, during long days at work in their fields. Of "fresh air" they had likewise more than enough. Their houses seem to imply, and were meant to imply, a radical disjunction between the natural and the man-made environments. To them, indeed, she frequently presented herself in the guise of an antagonist, and they saw no reason to try and make place for her in their home.³⁸

There is ample evidence to illustrate the same conditions for the Plains pioneers 250 years after the Pilgrims. The land was seldom wooded but was instead conquered; it rarely embraced its lovers but far more often smothered them. The words of Plains authors ring with the theme of the hostile prairie, finding perhaps the most acute expression in O. E. Rolvaag. With bone-chilling grimness he titled, for example, the last chapter of his stirring book *Giants in the Earth* "The Great Plain Drinks the Blood of Christian Men and Is Satisfied."

Using literary sources, personal accounts, and experiential learning I wrote two articles making the case for the sod house as a response to the psychological demands of the Plains and the frontier as well as a simple shelter unit;³⁹ there is not nearly the volume of evidence available to support a parallel essay for the log house in Nebraska but what evidence there is suggests that the same hypothesis could be made and successfully defended.

Some modest idea of the relationship of the log-house tradition to the sod house tradition can be gained from a glance at the works of Solomon Butcher, considered one of the principal documenters of the sod tradition. His books *Pioneer History of Custer County, Nebraska* and *Sod Houses of the Great American Plains* (reprinted as one volume in 1965 by Sage

Books with an introduction by Harry E. Chrisman) contain many texts referring to log buildings and, respectively, nine and three photographs of log buildings, appearing primarily in those sections of the books dealing with the earlier years of settlement.

Two passages from *Pioneer History of Custer County, Nebraska*, provide especially vivid images of life in the log house and on the frontier and deserve note. The first is a passing comment on some of the accommodations made toward the finer points of log construction:

After the log house was finished Aunt Sarah was installed as cook, and many and varied were the experiences she passed through in that frontier home. The story of them alone would fill a large book. She had a dirt floor covered with green cow hides which she stretched tightly, hair side up, making the room look very neat and cozy indeed.⁴⁰

The second passage speaks about the value of milled lumber on the Nebraska Plains during the years of settlement. The Reverend T. P. Haley, in describing the construction of St. Andrew's Catholic Church in Dale, Nebraska, notes rather charitably that there was a loss of some \$400 during the process because "nearly all the lumber that had been hauled from Grand Island had been made use of by some kind friends who thought it well to help themselves."⁴¹

On the other hand, there are suggestions that pioneer lumber yards may have been modest enough that the presence of one in a town would not guarantee a rapid transition to frame construction:

The first lumber yard in Anselmo opened up for business with a stock that was hauled from Plum Creek on one wagon. It was unloaded on a spot that was supposed to be the future townsite, but when the town was platted the lumber was not in it. Ira Foster was employed to move it to the town and a pretentious sign was set announcing the fact that the National Lumber Company was open for business. The sign, however, had used up so much of the stock that there was but little left upon which to do business.⁴²

The log house has long been the very symbol of the frontier and American pioneering. While the Plains saw more of the soddie and dugout, there is no question but that the log house played an important role during the first years of settlement here too. Everett Dick writes:

The frontier was not a straight line advancing toward the west at an even pace. Like fingers feeling in the dark, settlement followed the river valleys ahead of the main line of settlement on the treeless lands. The valleys of several counties to the west were occupied before the upland adjacent to the same stream farther east had been claimed. This accounts for the fact that in portions of the eastern part of Nebraska the first

houses were made of logs and in the same vicinity the preponderant construction was of earth. The first settlers in the river valleys built log cabins and waited for neighbors who, when they did come, built sod houses.⁴³

Nor can there be any doubt that the abrupt change of historic and geographic conditions encountered by the frontier upon crossing the Missouri River affected dramatically the vestiges of the log house tradition as it strangled on the treeless Plains.

NOTES

1. Prepared for the folk architecture section of the American Folklore Society, November, 1977, meeting in Detroit, this paper complements previous papers presented to the society on sod houses, baled hay houses, and railroad-tie houses as expedient architecture on the Plains.

2. Roger Welsch, *Shingling the Fog and Other Plains Lies* (Chicago, Swallow, 1972). Herein is identified the tall tale as a response to extreme conditions, especially geographic. See also Roger Welsch, "The Myth of the Great American Desert," *Nebraska History*, 52 (Fall, 1971), 255-265.

3. See especially "Drought and the Model of a Quaternary Terrace Cycle" by C. Bertrand Schultz and Thompson Mylan Stout to be published in Volume 4, No. 34 of the proceedings of the Nebraska Academy of Sciences. I thank Professors Schultz and Stout for sharing their article with me prior to its publication. I also appreciated Dr. Schultz's suggestions in reference to possible sources for further information about Great Plains drought, which may be of interest to readers of this article, in particular the works of Harry E. Weakly, John E. Weaver, and Weaver and F. W. Albertson, listed below: Harry E. Weakly, "History of Drought in Nebraska," *Journal of Soil and Water Conservation*, 17, No. 6 (University of Nebraska Press: Lincoln, 1962); John E. Weaver, *Prairie Plains and their Environment; A Fifty-Year Study in the Midwest* (University of Nebraska Press: Lincoln, 1968); John E. Weaver and F. W. Albertson, "Effects of the Great Drought on the Prairies of Iowa, Nebraska, and Kansas," *Ecology*, 17, No. 4 (1936), 567-639; Weaver and Albertson, *Grasslands of the Great Plains: Their Nature and Use* (Johnson Publishing Company: Lincoln, Nebraska, 1956).

4. James Fenimore Cooper, *The Prairie* (New York: 1964), iv.

5. O. E. Rolvaag, *Giants in the Earth* (New York: Harper and Row, 1927), 29.

6. Everett Dick, *Conquering the Great American Desert: Nebraska* (Lincoln: Nebraska State Historical Society, 1975), 21.

7. *Encyclopaedia Britannica* (Chicago, 1973), "Illinois," Vol. 11, 1081; "Indiana," Vol. 12, 79; "Iowa," Vol. 12, 502; "Nebraska," Vol. 16, 153.

8. Marvin F. Kivett, "Excavations at Fort Atkinson, Nebraska. . . .," *Nebraska History*, 40 (March, 1959), 42ff.

9. Nebraska State Historical Society photo collections.

10. It appears that distribution patterns suggested by Henry Glassie and Fred Kniffen in "Building in Wood in the Eastern United States," *Geographic Review*, LVI (January, 1966), 61, continue west into the plains regions.

11. These figures are from work I performed with the support of a grant from the United States Office of Education Humanities and Social Sciences Development Grant Program.

12. "Span" is used throughout this paper to mean "length of unbroken wall space."

13. Windows appear immediately adjacent to a door in 15 of 65 examples of log houses in the State Historical Society photo collection and in 1 of the 16 houses I have looked at in the state. This is treated as a European, specifically Scandinavian, feature.

14. Dick, *Conquering the Great American Desert*, 22.
15. Amos Rapoport, *House Form and Culture* (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1969), 59.
16. Kniffen and Glassie, "Building in Wood," 42.
17. David Murphy, Nebraska State Historical Society, notes: "We do know of a couple of timber-frame houses, one built in the late 1850s in Nebraska City and one in 1871 in Lancaster County. There are also two other possibilities built in the late 1850s in Nebraska City."
18. Emerson Purcell, ed, *Pioneer Stories of Custer County, Nebraska* (Broken Bow, Nebraska: *Custer County Chief*, 1936), 1-2.
19. Kniffen and Glassie, "Building in Wood," 61.
20. *Ibid.*, 49, 52, 53, 55, 57, for illustrations of notches.
21. Nebraska Historic Building Survey files.
22. In conversation, November, 1976.
23. I have, however, attempted to discuss the cultural impact of the Plains in the pioneer kitchen in the foodways chapter of *Treasury of Nebraska Pioneer Folklore* (Lincoln: University of Nebraska Press, 1967), and in "Sorry Chuck—Pioneer Foodways," *Nebraska History*, 53 (Spring, 1972).
24. As was also the case to the east where cast iron stoves frequently replaced fireplaces, masonry chimneys were rarely built on a ground-based foundation. The brick flue usually started 5 to 7 feet above the floor of the house and rested either on two heavy vertical pieces of lumber running from floor to flue—usually with shelves placed between them and forming a kind of rude cabinet—or on a heavy shelf attached directly to the wall.
25. J. M. Fitch, *American Building, The Historical Forces That Shaped It* (1966), 15-21.
26. David Murphy, personal communication, January 8, 1978.
27. For a full discussion of techniques used to roof the sod house see Roger Welsch, *Sod Walls: The Story of the Nebraska Sod House* (Broken Bow, Nebraska: Purcells, 1968), 66-77.
28. One photograph of the Nebraska State Historical Society shows a thatched roof; others show what might be a thatched or simple tossed-straw roof but without sufficient clarity to be certain. The former is also a questionable piece of evidence. The photos, on loan to the Society from Emil Roeser of Grand Island, show the re-thatching of the roof of "Hahn's Ewoldt House," on July 4, 1932. It is obvious that someone in the operation was familiar with framing for thatching and thatching; one photograph shows, possibly, the practiced thatcher, H. Reher. It is impossible to know, however, on the basis of what documentation or research a thatched roof was placed on the cabin, which also appears to be a restoration or recreation. Thatched roofs were used on the occasional sod house, more frequently on sod barns and sheds. Of course there are no extant log cabins in Nebraska with original thatched roofs.
29. Of 65 houses in the Nebraska State Historical Society photo collection, 12 show a clear loft, 6 are a full story-and-a-half, 6 have two full stories.
30. Brought to my attention by David Murphy of the Nebraska State Historical Society.
31. Kivett, "Excavations at Fort Atkinson, Nebraska. . .," 45.
32. David Murphy and John Carter of the Nebraska State Historical Society have called my attention to a building recently moved by the Cass County Historical Society which is precisely the opposite of this. The loft stairs rise along the long wall of the house and turn at the top, presenting two more risers before the opening into the loft.
33. David Murphy of the Nebraska State Historical Society has noted that in Nebraska the loft stairs usually begin approximately two steps outside the stairwell and then turn in the well while a corpus of log one-room houses we have examined in the

Salt River Valley of northeast Missouri have the bottom steps within the stairwell and begin at once to turn along the short wall. That is, in Plains houses the door generally rests upon the second or third step, immediately before the stairway turns, while in the Missouri houses of this one region all stairs are behind the door.

34. Purcell, *Pioneer Stories of Custer County*, 116.

35. *Ibid.*, 32.

36. See illustration on page 101 of *The Foxfire Book*, edited by Eliot Wigginton (Garden City, New York; 1972), Doubleday and Company.

37. Seven Nebraska State Historical Society photos show a clear addition of sod, one addition other than sod. No assessment of such proportions is possible for extant buildings.

38. John Demos, *A Little Commonwealth: Family Life in Plymouth* (New York: Oxford University Press, 1970), 29.

39. Roger L. Welsch, "Shelters on the Plains," *Natural History*, LXXXVI (The American Museum of Natural History: New York, May 1977), 48-53 (a popular approach); "The Meaning of Folk Architecture: The Sod House Example," *Keystone Quarterly*, 21 (Pennsylvania Folklore Society, Philadelphia, Summer, 1977), 34-49.

40. Solomon D. Butcher, *Pioneer History of Custer County, Nebraska* (Denver: Sage Books, 1965), 41-42.

41. *Ibid.*, 355-356.

42. *Ibid.*, 307.

43. Dick, *Conquering the Great American Desert*, 22.