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ECONOMIC SELF-SUFFICIENCY AND THE EFFECTS OF ECONOMIC DEVELOPMENT ON VILLAGE HOUSING IN NEPAL

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ECONOMIC SELF-SUFFICIENCY AND THE EFFECTS OF ECONOMIC DEVELOPMENT ON VILLAGE HOUSING IN NEPAL

Abstract

Nepal is a small landlocked Asian country approximately the size and shape of Tennessee. It was never colonized and had almost no contact with Westerners or Western technologies until 1951. Its isolation was due both to geography and to deliberate government policy. Within its borders, Nepal has more diversity — apparent even over a few miles — in topography, climate, and vegetation than most countries in the world.

This diversity is reflected in the village architecture. The style, building materials, and construction methods used in different localities vary widely. However, the author, who travelled throughout the country and studied the architecture in five villages, observed several patterns beneath this diversity: (i) within a given village and over a small area the architectural style and construction materials and methods are surprisingly uniform; and (ii) in nearly every village more than half of the floor area of each dwelling is devoted to the preparation of food and the storage of food, fuel, animals, farm tools, etc. The author investigated the reasons behind both the similarities and the differences between house forms and construction materials. Her analysis led her to predict how village architecture might change in the future.

Although culture and climate undeniably affect the house form, the author was also struck by the influence of economic forces. In particular, high transport costs over short distances limit inter-village trade. There are few roads and all goods are carried by porter or mule caravan. The resulting absence of trade affects the houses in two ways: (i) the lack of trade and markets in foodstuffs compels each village and family unit to devote the majority of their energies to agriculture and/or animal husbandry and to be as self-sufficient as possible in food. Consequently the greater part of the house, regardless of location is devoted to food-related activities; and (ii) the lack of trade in building materials and the lack of itinerant house builders results in each villager using only those construction materials and laborers which are locally available.

Since 1951 there have been many changes in Nepal. These are reflected in the houses as well as in other areas. The village of Marfa is described as a case study of housing changes. Marfa is a village in the dry, arid Kali-Gandaki River Valley of Mustang District and a five-day walk from the nearest road. Formerly Marfa's inhabitants operated mule caravans, farmed, and worked as laborers in neighboring Thakali villages. Today the principal sources of income in Marfa are farming, horticulture, tourism, and mule trains. The author suggests that the Marfa house form has begun to change for two reasons. First, as more villagers spend the severe winter
away from Marfa, there is less need for houses which protect them from the elements; furthermore, as villagers switch from agriculture to tourism, house space previously devoted to food storage is converted to guest accommodations. Construction materials have not yet changed because it is not yet economic to import any but the lightest of materials (vinyl plastic, recycled tin cans, etc.).

If the thesis that economic conditions affect house forms is correct, then the houses of the future in Marfa may radically differ from the present ones. The planned construction of a road to Marfa (to be completed by 1995) will permit villages to import new materials at lower costs. Moreover, the completion of the small hydro-electric dam nearby will permit the villagers to construct their houses using more sophisticated tools and machinery.
Nepal is a small Himalayan kingdom located between India and Tibet (fig. 1). It is one of three countries in Asia that was never colonized and was the last country in Asia to come in contact with Twentieth Century technology and Western ideas. For centuries, Nepal closed itself off from the outside world, admitting almost no foreigners. It finally opened its doors in 1951.

Through the course of its long isolation, Nepal experienced little change. In the last two thousand years the country has been ruled by only four royal dynasties. The present royal family, in vower since 1769, conquered the many small neighboring principalities and extended the borders to their present position. The present king, Birendra Bir Bikram Shah Dev, like his predecessors, has ruled as an absolute monarch. He recently announced, however, that he will delegate some of his authority to the national parliament, which, until now has not had much power. This decision, as well as the results of the national referendum held in the spring of 1980, will likely bring some changes politically. Nearly as ancient as the dynasties is Nepal's foreign policy of neutrality and nonalignment, actively pursued since the Seventh Century AD.

1The other two were Afghanistan and Thailand.

2In the spring of 1980, a national referendum was held. By a 10% margin the people elected to continue their present one-party system instead of introducing a multi-party political system.
Nepal is roughly the shape and size of Illinois—about 500 miles long and 90 to 150 miles wide—but it has more diversity in its topography, vegetation, and climate than most countries in the world. The topography ranges from plains less than 600 feet above sea level to peaks over 26,000 feet. The vegetation ranges from lush, tropical jungle to alpine meadows, and the climate ranges from humid, tropical heat to dry, arctic cold. The terrain is predominantly mountainous. This has profoundly influenced Nepalese history, its present state of development, and its architecture. The mountains made campaigns by foreign armies extremely difficult, and the mountains enabled the government to remain independent. The mountains protected the original inhabitants and provided a safe haven for immigrants from Tibet and refugees fleeing the Mogul invasions in India. At the same time, the mountains made communications within the country difficult and kept settlements isolated. As a result, there are a large number of distinctly different ethnic groups within Nepal's borders, each with its own language, customs, and religion. Generally, each group located in a different area with a different altitude, climate, vegetation, available building materials and topographical features. This combined with the idiosyncracies of each group resulted in many different house types, building techniques, and settlement patterns. Even today in Nepal, 94.4% of its 14,315,000 people are still scattered throughout the country in small villages having a population of less than 500.

3Although Nepal has paid tribute to India, Tibet, and China at various times over the last 2000 years, it has always maintained its own sovereignty. The mountains certainly reduced foreign contact and invasions, but the malaria-infested jungle in the foothills along the Indian border also discouraged the British from waging any major campaign into the interior of Nepal.

4World Bank, p. 75 and p. 79. Herris, George, p. 40. In 1961 there were 29,120 villages, and the average village population was 335. Between 1961 and 1981, the total population expanded by 4,515 million people. Even if 1) the number of villages remained unchanged and 2) the cities absorbed none of the new population, the average village population would have risen to 490. In fact, of course, some of the new population is in the cities and the number of villages has increased. Thus, the average size of the villages is even smaller—certainly smaller than the bound of 500 asserted in the text.
Despite the vast differences between the housing in different areas, there are some notable similarities. These arose because, until recently, there was little trade, especially in food goods, within or between villages and each household was forced to function as a miniature self-sufficient economy. Houses within the same village did not trade because their situations were similar and they produced the same things in the same ways. Different villages did not trade, even though they produced different things, because the rugged terrain made transport too costly.

Although household self-sufficiency was the predominant characteristic in the rural areas, there was trade in exceptional circumstances within and between villages. Skills that a particular household would require only occasionally, such as house building, or metal working, were possessed by only a few families who exchanged their services for grain. Salt, one of the few necessities that the villages could not themselves produce, was traded at the intervillage level. The salt came from Tibet and now comes from India as well. There were several Tibetan trade routes that passed through Nepal en route to India, and some of the Nepalis who lived along the way were heavily involved in this trade. But aside from these exceptions, households did (and still do, for the most part) depend on themselves to produce whatever they need.

5Despite the vast changes in Nepal since 1951 and the popularity of backpacking that brings thousands of tourists annually into a few areas, most villages are still isolated and changes are slow. There is more intervillage trade than there was before, but there is still no easy, cheap way to "market" goods in the hills because there are still very few roads. Thus, the people must continue to be self-sufficient in most ways, particularly in regard to food.
The economic self-sufficiency at the household and village level has profoundly affected the form of the housing. In order to survive in Nepal, each family has to grow and store enough grain to last from harvest to harvest. In addition, each family needs a place to thresh grains, a place to dry grains in the sun (the only method of preservation in the absence of electricity and refrigeration), a place to store grains that is protected from moisture and insects, and a place to store other food-related items, such as farm tools, cooking fuel, etc.

In every village, the settlement pattern and the individual dwelling have evolved in such a way that every household has its own personal threshing and grain drying area or has access to a communal one. Every household has its own personal grain storage area. The size of this area in each dwelling varies, but, generally, it is about 30%. Adding to this other food-related storage, the amount of area devoted to food is well over 50%. The method of grain preservation within the dwelling depends on the local climate and so varies from village to village. The most usual method is to place the grain in a container as airtight and as insectproof as the villagers can make (usually a 3' wide x 4' high cylinder made of woven bamboo, lined with nim leaves and sealed with dung or clay pots packed with mud) and to filter smoke throughout the house whenever meals are cooked.\footnote{The smoke is used primarily to keep insects out of structural wood and secondarily to keep them out of grains. This use of smoke and the absence of a chimney has its negative side effects. Those who cook usually have chronic eye infections, and the entire family suffers from chronic lung infections worsened by sleeping together in a small space, unventilated because the windows are closed at night to prevent burglars and evil spirits from entering.}

The influence of household self-sufficiency and the importance of the grain storage can be seen in other aspects of the dwelling as well.
response to climate, most house types reflect food storage priorities rather than human comfort. The houses are waterproof (so as to safeguard essential grain), but not comfortable; hence, they are not lived in during the day. The space is cold, and the level of natural light is generally low. The openings, especially around the cooking and eating areas, are small for religious and security reasons. The outdoors is much warmer and more comfortable, and, because there is no electricity, is the only place where there is much light. It is where most villagers spend most of their time, usually in an area adjacent to the house. This area, though not physically enclosed, should be considered as part of the "habitat."

In the places in Nepal where there are monsoon rains and hot summer sun, the villagers move onto their front verandahs so that they can still take advantage of the daylight. Most of the living goes on outside and the house is, literally, a storehouse where people cook, eat, and sleep -- rising with the sun to spend the day outside and sleeping soon after sunset.

In the few areas of Nepal where electricity has been introduced, living habits are beginning to change. Everyone still spends all day outside, but the day has been extended with people tending to socialize inside at night. Most domestic electric consumption is limited to lighting, but in some places hot plates are used as room heaters on chilly nights. The hot plates are not used for cooking because for most families it is cheaper to use firewood, which can be gathered without private cost.7

7In Nepal, the use of wood for cooking and heating, where alternatives exist, is a classic example of what can result when there is an extreme difference between private cost and social cost of using a commonly-held resource, which is owned by no one in particular and, hence, by "everyone." [Hardin: p. 19-21]. The cost of using the wood to the individual villager is nothing, but the cost of its use to the village, Nepal,
Among Nepalese houses there are other similarities, such as the lack of differentiated spaces in the non-storage areas of the house and the absence of amenities. There are no separate rooms for the various household activities. Instead, the use of the space depends on the time of day. Often, cooking, eating, talking, sitting, and sleeping take place in the same room, although it is also common to separate cooking and eating in one room and talking, sitting, and sleeping in another. There is generally a very limited amount of furniture (which facilitates the multipurpose aspect of the space), and everyone sits and sleeps on the floor. Every household has access to a water source in the village, but no one has indoor plumbing. Some villages have communal water storage tanks, a few have piped water with communal water taps, but most have only a local spring. Going back and forth to the water source, which can be as far away as half a mile, is very time-consuming for the women of the house. Consequently, the water is used very frugally in washing humans and utensils. No one has a bathroom, very few houses have a latrine and most people relieve themselves at the

and India is incalculable. As Nepal's population continues to grow (at its present annual rate of 2.6%, it will double in less than thirty years [World Bank: p. 35]) more and more families need firewood for fuel. This places more demands on the local forest areas, which are rapidly being depleted. It has been estimated in some areas that where a family once had to walk only a few hours to get wood, they now have to walk several days and they may spend as much as three months a year getting firewood. [Sterling: p. 15] In addition, the deforestation of the land is having a devastating effect. Topsoil is washed away forever, leaving more people getting less food out of less fertile land. Further downstream, in India and Bangladesh, the rivers flood, causing untold damage and destruction, and they are becoming so silt-laden that the useful lives of reservoirs are being reduced by as much as 75%. [Milton: p. 7]

8 The low standard of living in Nepal is reflected in the fact that the average per capita income in 1977 was US $110. [World Bank: p. 75, 821
edge of the village. Nearly everyone in rural Nepal suffers from some kind of fecally-related disease. The general level of health is very low. The average life expectancy at birth in 1977 was forty-five years. 9

The similarities in Nepalese village housing are related to household self-sufficiency, particularly in food, and to a low standard of living. The component spaces of the dwelling, both food and non-food related, are the same all over the country, but the arrangement of the spaces in plan varies greatly as do the materials used and the appearance of the dwellings. The houses vary in height from one to four stories, with a flat roof made of tamped earth or a sloped roof made of slate, tile, wood, woven bamboo mats, or various types of thatch. The wall material can be wattle and daub, sundried brick, fired brick, fitted stone, wood, or tamped earth using a slip form method of construction. The settlement patterns range from very dense with shared party walls and communal exterior spaces to scattered detached houses with no communal spaces. The different house and village plans and the different building materials and construction methods are due to (1) the near absence of any itinerant house builders and any trade in building materials that might have made the houses more uniform in construction techniques, details and appearance, and (2) the differences in climate, site, local building materials and local building skills, customs, and religion. Any discussion of a particular village type in Nepal must also take these latter factors into account since they act in concert with the economic situation to create a particular house form and settlement pattern. The following discussion of one village type in Nepal discusses all these various influences as well as the changes that have resulted from economic development in Nepal since 1951.

9 World Bank: p. 36.
Marfa is a Panchgaun settlement in North Central Nepal, about thirty miles from Tibet (fig. 1 and 2). According to the 1977 village census there are 720 people, 162 houses and 182 families (in some cases there is more than one family per house). Marfa is located on one of the old India-Tibetan salt trade routes, which forms the main lane through the village, but Marfa's involvement with this trade was only indirect. While others traded with Tibet, the residents of Marfa were farmers who traded their services for Tibetan goods in neighboring villages that were involved in the Tibetan trade. In 1959, the Chinese greatly increased their control over Tibet and closed its borders. The villages that depended on this trade rapidly declined. Marfa, with its tradition of service, however, has continued to thrive and has now gotten into the trading business as well. The old trade route has become a principal trekking route for foreign tourists who come in large numbers during the tourist season and stay with many of the local families. Many families in Marfa own mules and run mule trains between Marfa and villages to the north and south of it and between villages south of Marfa. Today, Marfa's principal sources of income are farming, tourism, horticulture (recently introduced by the Nepalese government) and mule trains.

The direct contact between Marfa residents and foreign trekkers has brought many changes in economic terms -- increased income -- and in attitude -- exposure to new ideas. These changes are affecting the housing, but not very rapidly. Communication in the mountainous terrain of Nepal is still very difficult, and Marfa is still very much a remote area. Road

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"The Nepalese government immigration checkpost in Jomosom, which monitors foreign trekkers in the Marfa area, recorded 6,000 trekkers as having passed through in 1979."
construction is so expensive that in the entire country there are still few roads. The only way to reach most places is to walk. Marfa is a five-day walk from the nearest road. For its inhabitants, the closest tie to the outside world, until recently, was a wireless station located an hour's walk away in a neighboring village. In the same village, an air strip has opened with direct flight service to Kathmandu and Pokhara, a town in central Nepal, but this is bringing less change to Marfa than one might expect. The air strip is closed for the four-month monsoon season, weather prevents reliable daily service during the dry season, and the price of an air ticket is beyond the means of most area residents.

Long before the present era of prosperity in Marfa, however, the village settlement pattern and the dwelling house evolved. In the old houses the underlying influences of household self-sufficiency and the need to grow and store as much grain as possible are evident as well as the more obvious influences of climate, site, culture, and available building materials and technology. In the new houses economics (greatly increased labor, material and land costs, and labor that now migrates seasonally to Marfa from other parts of Nepal) and changing tastes have also been very influential.

Marfa is located at an elevation of 8900' in a narrow river valley just south of the Tibetan plateau. There are two harvests a year. The climate is arid (annual rainfall is 19.5 inches) and all crops must be irrigated. All arable land is at a premium and Marfa has been squeezed into a small area at the base of the western valley wall. Over the years, its growth has been up the hillside rather than out into the tillable land area (fig. 3). A strong wind blows all year long in the summer from the

"~here is no monsoon in Mrnfa. The air strip is closed because of the monsoons farther south in Nepal."
south and in the winter from the north. Locating the village on the south side of the valley gave it some protection from the winter gales. The wind makes the summers quite pleasant — maximum temperature is 82° F. The winters are cold — minimum 23° F. — but the minimum 25 miles an hour wind makes the effective temperature much colder. One-half of the village migrates to the southern and warmer parts of Nepal for the winter.  

The land shortage and the climate explain in large part the development of the village plan. Placing the houses immediately adjacent to each other minimizes both the land allocated for housing and the wind exposure to each unit. In addition, perhaps to insure that the farmland was maintained or to make the village more defensible, there was a village rule that no one could build outside the village. There were also cultural reasons for the original clustering — Marfa is an endogamous village. Further land economies were realized by eliminating a large communal exterior space common in many Nepalese villages. The principal communal exterior space is the main lane that runs the length of the village (fig. 4). This is used for socializing, but not for any grain threshing or drying activities, which are done on an individual family basis. The grains are threshed and hay is dried in naws, special structures constructed for just this purpose on the periphery of the village. In addition to a house, each

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12 The people migrate for various reasons besides the cold weather. There is no field work in the winter. Very few people grow enough for the entire year, and food is cheaper in the south. Rather than work for someone else, most people set up temporary tea stalls or restaurants, usually in the same place year after year. Fodder is scarce in the winter, but available at lower altitudes; so mule train owners take their mules south and run shorter routes. Until twenty years ago, Marfa residents spent only three months in the south because they were afraid of getting malaria. Now that it has been eradicated, those who migrate generally stay six months instead of three, and some residents have permanently migrated south.
family owns a **naw** or "**borrows**" someone else's when they have finished using it. The **naws** are enclosed. Most of the area is open or semi-covered. There is one small room where several family members live during harvest and guard the grain. Between harvests, the **naws** on the main lane are used at night to shelter passing mule trains, one of the local modes of freight transport. The manure that is collected there is an important source of fertilizer for the fields. In other Panchgaun villages where there is much more level ground, the **naws** are next to the houses.

In 1959, a primary and middle school was built east of the village. A playing field was made there and this is used by the villagers for archery contests held during religious festivals. It is never used for mere socializing, probably because it is too far from the village. The principal outdoor places for **socializing** are on the main lane at various tea shops, depending on which season and which shops are open (during the winter, many of the tea shop owners close up and go south). During the warm summer months, when **Marfa**'s population is at its height, the main lane is often congested with the large numbers of men who pass the day there drinking tea or **rakshi** (rice wine). With their tradition of service, the people of **Marfa** have always sold **rakshi** and food and provided lodging to the traders and animal drivers who passed through. Since the tourists have started coming in such large numbers, however, the number of tea stalls has proliferated. There are now twenty-four such **establishments**, on the main **lane** -- two with names and sign boards and the rest with no names, to **avoid** government taxes. Some of the tea shops cater only to local people, some only to the tourists, but most serve both groups.
In the future, the village plan may undergo considerable change. Since there is no more land in Marfa where houses can be built and buying an existing house is very expensive, the old village rule that forbade building outside the village has been changed. Houses and "hotels" are now being constructed on the trail outside the village and in the farm land.

Marfa now has two water sources. The original one, which also accounts in part for Marfa's present location,\(^{13}\) is a stream at the western end of the village, which was diverted into a small channel that runs the entire length of the village. All houses on the main lane have direct access and other houses away from the lane did not have to go far for water, which was used for bathing, washing clothes and utensils, irrigation and all garbage was dumped into it. Consequently, it was a major health hazard (fig. 5). In 1975, the village council elected to cover over the canal to improve the appearance of the village and to prevent animals from falling in. In 1977, a piped water supply from a source about three miles above Marfa was installed. UNICEF supplied the polyethylene pipe and Marfa supplied the voluntary labor. At the few points where it was left uncovered, the canal is still used for washing clothes and utensils,\(^{14}\) but these are rinsed, people bathe, and all drinking water is taken from one of the six new taps (fig. 6). The villagers reported that they have had far fewer problems with diarrhea and other digestive ailments since the water system was installed.

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\(^{13}\) Marfa was originally located about 500' higher on the valley rim, where it functioned as a military outpost for one of the local rulers. [Tiwari: p. 1] The village was moved about 130 years ago after a smallpox epidemic and a severe water shortage.

\(^{14}\) There are only six taps to be shared by 182 families. In order to eliminate long lines at the taps the village passed a rule that utensils and clothes must be washed away from the tap.
Like other Panchgaun villages, the gompa (temple) is located above the houses and occupies a prominent position on the Marfa skyline. The gompa complex includes a large courtyard, quarters for several resident lamas and a residence for one reincarnate lama. Most of the time, the gompa is empty. Only during religious festivals does it become a focus of village activity. Religion is, nonetheless, a very important part of people's daily lives, and the lamas visit individual houses whenever the need arises. The panchayat (village council) house, constructed fifteen years ago, is also located above the main lane, but it is not nearly so impressive a structure as the gompa. Reflecting the desire of the villagers to build a more "modern" structure that would resemble buildings in Kathmandu and India, it has none of the charm of traditional Panchgaun construction.

There are several other religious "structures" in the village, also prominently placed. Long mane walls, found in all Nepalese Buddhist villages, are strung out from each end of Marfa. The walls are piled high with small commemorative stones, each of which is carved with the same Tibetan mantra, Aum mani padme hum, "Hail to the Jewel of the Lotus." A gatehouse is located at each end of Marfa. Such gatehouses are typical in the Marfa region. They were built to protect the village from ghosts and spirits and to bless the travelers who pass beneath. The interior walls are covered with Buddhist murals and the exterior walls are now being used as billboards by local entrepreneurs (fig. 7). Within the village on the main lane are several walls of prayer wheels. When a wheel is turned, the prayer inscribed on it and the many prayers stuffed inside of it are sent to heaven. A testament to the communal spirit of
Marfa are the two communally-run flour mills. Water-driven, they are located over a stream west of the village. Such mills are typical in most hill villages of Nepal. Several families supervise the mills on an annual rotation basis.

The interwoven influence of economic self-sufficiency and climate is quite evident in the old Marfa house form. A scarcity of arable land necessitated a house that extended vertically rather than horizontally. Most houses were built into the hillside (although the one shown here is not), which facilitated the terraced section so typical of all Marfa houses (fig. 8, 9, 10 and 11). Land scarcity eliminated the possibility of an outdoor grain drying area at grade. Instead, the roof, flat because of the low rainfall, is used for this purpose (fig. 8, 16). The roof is exposed to the strong winds, but the area is protected by stacking wood, the only fuel for heating and cooking, around the edges. The stacked wood also functions as a coping and protects the stone wall below from water damage.

Over half of the total floor area (including the roof terraces) is used for food-related activities, and over half of the enclosed floor area is used for storage (fig. 12 and 13). The particular method of grain storage is very unusual in Nepal, but possible in Marfa because of the climate. The air is extremely arid; so there is no concern about moisture damaging the grains. They are placed in open bins and kept dry by a continuous updraft, possible because of the strong wind, and created within the house by placing vents in the walls of a central light well and in the walls and ceiling of the grain storage room. In the meat storage room the same updraft principle is used. This "system" eliminates the need for using smoke to preserve food and structural timbers. Some houses still
have the traditional "smoke hole" above the cooking fire (fig. 14), but now many houses in Marfa, including the one shown here, have a chimney (fig. 15). The chimney material is an example of recycling Nepalese-style. The chimneys are made from large flattened tins that are used for transporting goods in the mountains (fig. 16). Grain intended for immediate use is kept in a first floor area that has no updraft (fig. 8, #2). In 1973, when Marfa was first visited by the author, farm tools were kept in an enclosed and a semi-enclosed area on the third level (fig. 8, #13 and 115). Since that time, the owner has converted the storage rooms on this level into a guest room for accommodating trekkers. The house also has two rooms devoted to non-food storage. Most of the items kept here are blankets and clothing used in the cold winter months (fig. 8, 8). Such a large amount of non-food storage is unusual in Nepal, but necessary in Marfa where the severity of the climate requires more types of clothing and blankets than in most places. During the tourist season, the family sleeps in these two rooms and rents out its regular sleeping areas to trekkers. Both this and the renovation to the floor above are examples of how a changing economic situation can change living habits.

Because of its severity, climate has been more overtly influential on the Marfa house form than it has in most other parts of the country. The harsh winter winds require a house that keeps out the cold air but lets in light; hence, the central light well is the most distinctive feature of the Marfa house (fig. 8, #11 and #12). This allows light to enter the living quarters on the upper floor through the windows and doors that open onto it, while the exterior walls, which have small openings, act as a buffer against the wind. The light well penetrates through to the ground floor courtyard and provides light to the areas that open off it as well.
Using the light well "method" to bring light into the house means that a portion of the house on the ground floor is permanently open to the sky. This area is occupied by those in the household who would suffer least, namely, the animals (fig. 8, #1). The manure that is collected here is also an important source of fertilizer. The indoor cooking area where the family spends most of its time in winter, has a wood floor as the wood is warmer for sitting. The other rooms in the house, which are not used much in winter, have mud floors. Because Marfa has neither hot summer sun nor monsoon rains, the houses do not have the front verandahs described earlier.

Within most villages in Nepal, there is little variation in the floor plan, but in Marfa no two houses are the same. For example, in some houses the location of the winter cooking area is on the ground floor, in others it is on the second floor, in some on the back of the house, in others on the front. But regardless of its location, all visitors except low caste Hindus are welcome to come and sit by the fire. This is typical in all Nepalese Buddhist villages, which do not have most of the concerns with ritual pollution found in Nepalese Hindu villages. 15 Grain storage rooms in Marfa, however, are always in the most inaccessible part of the second level. One of the grain storage rooms is also a shrine room where weddings and other important family rituals are held. The size of the room, the placement of the storage bins, and the degree of cleanliness indicates the ceremonial functions of the room. Its placement in the nonpublic inner recesses of the house, where it gets no sunlight, also indicates that it is

15 Hindu, particularly of high caste, do not want any low caste or casteless person (which includes all non-Hindus) to come near the cooking fire and defile the food.
not for daily use and that it is only for family use (fig. 8, #9).

Within the house it has long been traditional for Panchgaun women to make rugs, some of which are now sold to tourists. Other activities, such as tailoring and blacksmith work, are performed by low caste Hindus who have migrated into Nepalese villages from India over the past few centuries. Even though they left caste-ridden India behind, they have retained their low caste status. In Marfa a few families still perform their hereditary trades, which the Panchgaulis now refuse to do, and for this they generally receive grain or cash. The kami (blacksmith) caste and the domai (tailor) caste farm their own land and work as laborers for others in the village. Since their opportunities for employment are limited, only one low-caste family migrates south in winter.

All the members of the family eat together in the ground level (fig. 8, #1) talk/sit room. The diet has changed quite markedly in the last ten years due to the introduction of fruit trees and vegetables by the Nepalese government agricultural station located south of Marfa. Whereas before the diet consisted almost entirely of grains (wheat, buckwheat, barley and corn), people now eat fruit (apples, apricots, peaches and grapes) and vegetables (carrots, cabbages, cauliflower, spinach, onions and potatoes). Because of increased income and demand from trekkers, rice, which is not grown in Marfa and must be imported from the south, has also become a substantial part of the diet. Animals are slaughtered and meat

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16 Since the kamis and domais are low caste, food prepared by them will not be taken by higher caste Hindus or Buddhists. Therefore, these castes cannot set up restaurants or tea stalls, the most common employment of the Marfa residents who migrate.
is eaten only on important occasions. Throughout the day people drink butter tea, which is made by placing salt, yak butter and tea in a churn and thoroughly mixing it.

The construction of the old Marfa house reflects a self-sufficient economy inasmuch as all the materials and laborers were local (if there is no trade, there is no way to import materials and artisans), but the houseowners did not actually build themselves because house building requires skills that only a few villagers possessed. The materials used in both the old and the new houses are the same -- limestone, wood and mud. More recently constructed exterior walls are roughcut limestone with mud mortar that has a high clay content that tends to shrink when dry and causes the walls to buckle somewhat. Wooden reinforcing ties were often put at the floor lines and other places that the carpenter considered stress points. The very old walls had no mortar and were stronger but more expensive because the dry stone required more cutting and fitting. Since the old walls were more expensive, people started using the cheaper kind of wall. The old style wall cannot now be obtained, because the present local masons have never built such a wall and have not learned stone cutting to the degree of skill required to make one. The local masons also did not use any sort of tape measure or plumb line, common elsewhere in Nepal; hence, they never built straight walls (fig. 17, 18 and 19). For this reason, the exterior walls are thicker than would otherwise be required. The interior walls are made of wattle and daub. Timber joists, with wood slats between them, support upper floors made of two to three inches of mud over a one-inch bed of straw and often finished with wood. The roof is similar to the floor but thicker, with four or five inches of tamped dry mud. In some houses, gravel has been placed between
the hay and the mud. The small pieces of gravel discourage rats from eating through the roof, a common problem in Marfa. The flat roof is graded to drain. Most houses have wooden waterspouts. A few houses have gutters made of the same flattened tin cans used in the chimneys. The building loads are carried on a separate system of interior columns, which are tied into the walls at each floor. This system eliminates total dependence on the stone walls. For a house the size of the one shown, accumulation of materials and construction would require about four months. Five carpenters, four masons and four unskilled laborers would be needed. The total cost for labor and materials would be about US $3300 (1979 dollars).

For new houses in Marfa, both the construction and the choice of site reflect increasing costs of labor, land and materials, changing tastes, and shifting migration patterns in which (a) Marfa residents now spend a long period in the south and no longer need a house that resists the winter wind and cold, and (b) the majority of the construction workers are now from other parts of Nepal and use different construction techniques. There is almost no change in the materials used because all non-local materials must be flown in, portered in, or carried by mule, all of which is very expensive and cumbersome (fig. 20).

The construction workers are now primarily people from other parts of Nepal. They can no longer support themselves by their construction and farming labor in their own villages and they supplement their income by coming to Marfa in the summer months when the monsoon rains are falling elsewhere. They are attracted to the Marfa area because there is a lot of construction in the region, particularly government work in Jomosom, the Mustang District Administrative Headquarters, and because the wages are higher. The migrant workers use the construction methods they learned in
their own villages. A plumb line is now common on the construction site. Generally, the walls are still made with limestone and mud mortar, but they are straight and of uniform thickness. The wooden reinforcing ties are no longer used. In some instances, to economize on labor costs, which have more than doubled in the last seven years, the walls are now made of tamped earth, using a slip form method of construction commonly found in poorer and more arid villages north of Marfa, instead of stone, which requires much more time and labor. The stones must be hauled to the site and then cut and fit, whereas the mud is simply dug and prepared right on site. The wood slats between the floor and roof joists are now sawn wooden planks, a more finished and more expensive detail, but the rest of the wood detailing for the doors and windows has become much more simplified. The old traditional Marfa window had a large elaborate wooden lintel which projected about 12 inches from the wall. It provided rain protection, helped distribute the heavy weight of the wall above more effectively, and was thought to enhance the beauty of the facade. This window style was subsequently replaced by a Kathmandu-style window that had a carved railing, and a very plain lintel. It was less expensive than the old style because the lintel required far less wood. The most recent style Kathmandu window now being built has a wider and shallower openig and a frame that uses even less wood. It has a small vent above that can be opened for ventilation when the window is closed, but it is almost devoid of ornament, reflecting increased labor costs. The difference in proportions in the newest style window is probably due, in part, to the fact that in Kathmandu longer pieces of wood now cost substantially more than shorter ones. The only new building material that has been introduced in any quantity is the tin that is used for stoves and gutters as well as chimneys. The tin is recycled tin cans used for transporting goods to Marfa; so the transport costs of the material
itself are nil. In a few houses, glass window panes have been installed and plastic vinyl sheeting, used for waterproofing, has been put on the roof under the mud.

In the new houses, built since the ban on building outside the village was lifted, the floor plans have also changed. In one house the changes were mostly cost-saving in nature. The house is one story, with only three rooms. The central courtyard is so small it functions mostly as an entryway, but, as the owner does not have any animals, a large courtyard was not required. The house is located on the trail that leads into Marfa so that the owner, a blacksmith, could attract more business. The other house is located away from the village in the owner's fields. He built there because he already owned the land and because he thinks it will be healthier away from the other houses. As the family spends only the warm summer months in Marfa, the owner is not concerned about the strong winter winds. There are large openings on all four sides and the central courtyard has been eliminated altogether.

In recent years a number of modifications have been made to the interiors of Marfa houses, mostly the result of exposure to new ideas. One is the introduction of furniture. Traditionally, people sat on the floor or on slightly raised platforms. The only furniture was very low "tables" used for eating and occasionally for writing (fig. 21). Since the men started to wear western-style pants instead of the traditional baggy ones, they found sitting on the floor uncomfortable and have started shifting to chairs and tables (fig. 22). There is now such a demand for furniture that a furniture "factory" has been started in a village across the river from Marfa. One practical change has been the introduction of stairs to replace ladders as means of access from the first floor to the second. When the ladders were
used the animals would occasionally knock them over and leave the occupants stranded on the upper floors (fig. 23). Another practical change has been the introduction of chimneys, mentioned earlier, and new types of stoves. Both were introduced by Tibetan refugees who settled in a village across the river from Marfa. In addition to the tin chimney, the Tibetans also used a tin stove because it radiated heat and cooked the food faster. This type of stove is now used by many of the Marfa families who stay for the winter. In the summer the tin stove is removed and a traditional clay chula is built. In some houses a mud "stand-up stove" is used, also a result of the Tibetans. They had a slightly raised chula that had four or five "burners" instead of the Marfa one that had only two. The people of Marfa modified the Tibetan chula, at first raising it to a level where the food could be cooked while sitting in a chair and finally raising the cooking level to a standing position. The women who have such stoves reported that it was easier and more comfortable to cook standing up, it was cleaner, children didn't get burned in the fire, and chickens were kept out of the food.

Because the materials used are impermanent, substantial maintenance is required in all the Marfa houses. Nearly all of it is done by the women of the household. The exterior face of the stone wall is whitewashed with lime every three or four years by one of the low caste kamis who also make the lime wash. The kamis do not do any of the interior work because being low-caste they are not allowed into the house. The interior wall face is finished with a mud and dung plaster, which makes the house more airtight and warmer in winter. The "plaster" requires periodic reapplication of moisture to keep it from cracking and spalling. This is done throughout the house twice a year. A finish coat of very thin red mud is applied to the base of the walls, portions of the mud floors, and all the woodwork. The
woodwork is remudded twice annually, but the base of the walls and floors is done every two to three days. The area around the cooking fire is done after every meal, partly for religious reasons and partly because the heat of the fire dries out the mud. The upper part of the wall is finished twice a year with lime wash. The roof has to be regraded two or three times a year.

The description of Marfa substantiates the earlier premise that house forms and settlement patterns in Nepal have responded to economic circumstances as well as other localized factors such as climate and site. In the case of Marfa it can also be shown that as the economic circumstances have changed, the house forms and the settlement patterns have also changed. Given the amount of change that has already occurred, it seems likely that much more will occur as the villagers become more prosperous and as more roads are built17 so that they can easily trade with other parts of the country. The people of Marfa will, undoubtedly, start using non-local building materials and buy more food grown elsewhere, especially since the cost of transporting goods by truck is much less than that of the modes now used. A road will also make it possible for Marfa farmers to market their fruits, which cannot be grown in the warmer and lower elevations, and their vegetables, which have a different growing season. As more land is taken out of grains and put into horticulture, more grains will be imported. The effect of this on the housing is that there will be less need for places to thresh and dry grains as well as less need for mule trains. The naws now used for these purposes will probably be converted to other uses. Since the household will be able to purchase grain on an ad hoc basis there will be

17 A motorable road from Marfa to Pokhara is scheduled for completion in 1995.
less need for large grain storage areas, and more space can be devoted to living areas and to housing tourists. Since produce will still be important to Marfa's economy, it is unlikely that much will be built on farm land. New construction is more likely to occur on the trail at either end of the village. A small hydro-electric project is presently under construction south of Marfa and is scheduled for completion in 1981. This will bring many changes in lifestyle and may also ultimately affect the house form. Twentieth Century technology has already made a small inroad in Marfa — a "hotel" recently constructed on the trail south of Marfa has a solar water heater and a diesel-powered electric generator.

In summary, economic self-sufficiency, cultural mores and the constraints of local building methods and materials, climate, and site were the main factors that shaped the old Marfa house forms. In the new houses these factors seem to be less influential than economics and exposure to new ideas. Nonetheless the new houses are still recognizably Marfa houses. In the future, however, the people of Marfa will be exposed to even more new ideas and will also have the logistical means to implement them — roads so that new materials can be easily imported, and electricity so that more sophisticated tools and machinery can be used. Given present developments and priorities, it seems likely that the houses of the future in Marfa may change beyond recognition.
FIGURE 1. NEPAL, MARFA LOCATION MAP
FIGURE 2.
MARFA MUSTANG DISTRICT, DHAILIGIRI ZONE

□ DWELLING □ NAW □ COURTYARD
□ PUBLIC BUILDING □ SHOP OR INN

28° 45' N/83° 42' E ELEVATION 2545 MSL (~ 8600')
CONTOUR INTERVALS 3M
SCALE 1:3200 (1"—240' 0")
Looking down from 900, one can clearly see how the growth pattern begins and continues up the hill.
Figure 4. The main lane in Marfa
Figure 5. Formerly all washing and bathing were done in a diverted channel that runs the length of Marfa. The channel is still used for irrigation and garbage disposal.
Figure 6. Now all items are rinsed, people bathe, and all drinking water is taken from one of six taps installed in 1977. The water is piped from a source about three miles above the village.
Figure 7. A gatehouse is located at each end of Marfa. They were built to protect the village from ghosts and spirits and to bless the travelers who pass beneath. With the large annual influx of trekkers, the gatehouses now serve another function.
FIGURE 8
A TYPICAL MARFA HOUSE - HABITAT

FIRST LEVEL
1. WINTER COOK/TALK, SIT
2. STORAGE
3. ANIMALS
4. SUMMER COOK/RICE WINE DISTILL
5. POT STORAGE

SECOND LEVEL
6. GRAIN STORAGE
7. TALK, SIT/GUEST SLEEP
8. MISCELLANEOUS HOUSEHOLD STORAGE/SLEEP
9. SHRINE ROOM/ GRAIN STORAGE
10. WEAVING
11. TERRACE/CENTRAL LIGHT WELL
12. OPENING TO COURT YARD BELOW

THIRD LEVEL
13. FARM TOOL STORAGE
14. MEAT DRYING/STORAGE
15. GUEST SLEEP/FARM TOOL, STORAGE
16. GRAIN DRYING

Scale: 1:225 1" = 16' 0"
SECTION A
FIGURE 9.
SCALE 1: 150 (1" - 10'-0")

SECTION B
FIGURE 10.
SCALE 1: 150 (1" - 10'-0")
Figure 11. This house was originally two houses. The right portion is over a hundred years old. The left portion was the back of another house. It was purchased and rebuilt as an addition to the old house by the present owner.
FIGURE 12 SHADED AREA SHOWS THE AMOUNT OF FLOOR AREA USED FOR FOOD RELATED ACTIVITIES.
FIGURE 12. SHADED AREA SHOWS THE AMOUNT OF FLOOR AREA USED FOR FOOD RELATED ACTIVITIES.
FIGURE 13. SHADED AREA SHOWS AMOUNT OF FLOOR AREA USED FOR STORAGE.
FIGURE 13 SHADED AREA SHOWS AMOUNT OF FLOOR AREA USED FOR STORAGE.
Figure 14 The traditional Marfa house has no chimney. Instead, there is a ventilation hole above the cooking fire that also functions as a skylight during the daytime.
Figure 15. Many families have replaced the traditional stove with a tin one which also has a chimney. The tin radiates heat and makes the space much warmer in winter.
Figure 16. Many houses in Malta have chimneys made from large tin cans. A chimney requires five tins and takes about two days to make.
FIGURE 17.
ATYPICAL MARFA HOUSE-STRUCTURE

1. WINTER COOK/TALK, SIT
2. STORAGE
3. ANIMALS
4. SUMMER COOK/RICE WINE DISTILL
5. POT STORAGE
6. GRAIN STORAGE
7. TALK, SIT/GUEST SLEEP
8. SLEEP/MISCELLANEOUS HOUSEHOLD STORAGE
9. SHRINE ROOM/GRAIN STORAGE
10. WEAVING
11. TERRACE/CENTRAL LIGHT WELL
12. OPENING TO COURTYARD BELOW
13. FARM TOOL STORAGE
14. MEAT DRYING & STORAGE
15. GUEST SLEEP/FARM TOOL STORAGE
16. GRAIN DRYING

Scale: 1:225 1" = 15' 0"
SECTION A
FIGURE 18.
SCALE 1: 150 (1"-10'-0")

SECTION B
FIGURE 19.
SCALE 1: 150 (1"-10'-0")
Figure 20. Transporting goods to the construction site.
Figure 2. Traditionally, people sit on slightly raised platforms and eat off low tables.
Figure 22. Chairs and tables have become increasingly common as the men began wearing Western style pants and found sitting on the floor uncomfortable.
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