

**NEPAL RESEARCH CENTRE
MISCELLANEOUS PAPERS**

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**Settlements on the Southern Slope
of the Dhaulā-Himal**

**A Contribution to the Settlement Geography
of the Nepal-Himalaya
with Twenty-two Illustrations**

by
Matthias Kuhle

**Kathmandu
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Settlements on the Southern Slope of the Dhaula-Himal.

A Contribution to the Settlement Geography of the Nepal -Himalaya. with Twenty-two illustrations

Matthias Kuhle

1.

In 1976 and 1977 I undertook two field-trips, totalling a period of eight months, into the Himalaya. Besides longer sojourns on the N-slope of the Himalaya main range and the central Himalaya, I had the opportunity of travelling widely on the S-slope, especially in the main and side valleys of the southern Dhaulagiri range.

The following descriptions concern an area of this mountain range, situated between Dhaulagiri I in the East and the Gurja-Himal in the West, that is. an area extending between the Thak Khola in the East and the longitudinal valley closures of the upper Dhola Khola and Dara Khola. This region, the deeper valley sites of which already belong to the Athhazar Parbat (pre-Himalayan-chains), is segmented from East to West by the Thulo Khola, Syano Khola, Mayangdi Khola, Konaban Khola, Dhola Khola (Murigad Khola), and the Dara Khola (Ghar Khola) as the most important main valleys of first and second order. The most significant of the numerous side valleys will be mentioned as their importance arises in the text and therefore, need no complete listing at this point.

2.

The permanently inhabited areas in the valleys of the Athhazar Parbat are linked to the uninhabited regions of the High Himalaya by a zone of seasonally inhabited terrain. This zone is an area of mountains segmented by steep valleys with increasingly higher drainage, where above Dharbang in the Mayangdi Khola and Gastkarker in the Thulo Khola there are scarcely any valley floors.

Thus, only a few level sites of tectonic or morphologic origin, often in the form of valley shoulders flat enough for terracing, are available for settlement purposes. Because of prevailing crystalline gneiss beds, but more often beds of soft and easily slipping mica shists, frequent land slides and slips cause secure settlement sites to be scarce and undermine the fields (cf. fig. 1).

The great mountain rivers descending from the glaciers carry an abundance of water during the whole year. In all probability, the intensive monsoon rainfall guarantees more than 2000 mm of rain per year at an altitude of over 2000 m above sea-level (cf. precipitation chart by Chr. Kleinert, 1973, p. 11). This, then, means that the lower drainage areas on the valley flanks also receive sufficient water. This precipitation caused high, dense, evergreen mountain woods (composed of *castanopsis indica* and, on ridges and dry habitats, *pinus roxburghii*) to grow at the permanent settlement level; below 1100m are tropical deciduous wood (with *shorea robusta*).

Because of the southern position (about 20° 30'), no distinct sunny or shady terrain is to be observed in the area under investigation. The air flow here, in comparison with the Thak Khola, is slight, usually directed down the valley with a contribution of chilly glacier wind from the main range.

The most intensive sun irradiation occurs during the winter season coinciding with the largest daily temperature amplitude. The precipitation and dense cloud covering during the summer contribute to the stability of the course of temperature throughout the year.

3.

Because of considerable difference in altitude (the main summit of the Dhaulagiri and the settlement of Dharbang in the Mayangdi Khola are separated by 7000 m of vertical distance as opposed to merely 35 km of horizontal distance) the dimensions of the drainage area in the upper valley and significant precipitation on the weather side, which further increases with growing altitude, a rapid progressive depth erosion sets upon the maximal gradient of the valley slopes.

Extensive glacial erosion in the pleistocene, which in the main valleys was effective down to 1400 m above sea-level and sporadically even below that (cf. M. Kuhle, 1979, in preparation), removed older products of weather erosion and accumulations and left behind large terraces below the position of the ice margin. In the upper courses, however, merely eskers and kames of small proportions were formed which, to a great extent, were removed again during the holocene. The result is a relief limiting the available sites for settlements and inevitably requiring the construction of terraces.

Above 1500 m, only a few single settlements find suitable locations on low holocene accumulations, or near the valley floor where they are safe from flooding. This applies to the Mayangdi Khola above Muri and to some seasonal settlements at the valley exit of the Dhola Khola.

Generally, only a few plots are to be found on the alluvial land close to the isobath (cf. figs. 2 and 3). Preferred are elevated remains of terraces which

are, however, scarce, appearing sometimes on wedges formed where side valleys join, as in the case of the entrance of the Syano Khola into the Thulo Khola, where the location of the easily accessible valley exit joins the slip-off slope of a preserved terrace (cf. fig. 3). In rare instances a gravel fan permits settlement on the valley floor. In the upper Thulo Khola the small village of Fedi with sufficient farmland could be established on such an accumulation.

In only one instance on the entire S-slope of the Dhaula-Himal is there a flattening of the slope due to remnants of eskers high above the valley floor affording space for settlement. This is the case of the village of Muri (cf. fig. 4) in the middle part of the Mayangdi Khola situated at about 2000 m above sea-level, that is, 500 m above the valley floor.

The most frequent locations for settlement are on structurally effected flattenings of the slopes or on slopes which, on the lowest third of the valley flank, are predominantly level.

Typical examples of scattered settlements on this type of location are Bagara, in the upper Mayangdi Khola (cf. fig. 5), and Lumpi, in the middle section of the Thulo Khola. Examples of compact settlements on these locations are Nerbang, in the middle district of the Dhola Khola (cf. fig. 6), and Muna, in the Dara Khola, and Malkabang, in the Marang Khola (cf. fig. 7), which is representative of the larger settlements.

Settlement of only the right flanks of the Mayangdi Khola between Muri and Dharbang and of the Thak Khola between the junctions with the Ghar Khola in the South simply reflects the fact that the asymmetrical valley structure does not permit the settlement of the other flank and not a dependency upon exposure. Below 1200 m, in the region of the expanded lower courses of the rivers and the resulting holocene and subrecent deposits, chiefly the valley floor, with preference to terrace sites, is settled.

The seasonal settlements, being mainly single, double, and small scatter settlements without fields, or wood-pasture settlements with modest requirements of space, are situated on small level shelves in the upper valleys, on ridges and crests above the tree limit, or on clearings half-way up the slope. Examples for ridge sites above the tree limit, mountain-saddle and pass sites are to be found on the ridge dividing the Thak Khola and the Thulo Khola, alongside the abandoned path from Lete to Lumpi, which runs as high as 4500 m. Another pass site, the level shelves of the Jaljala (3500 m above sea-level), leading towards Dhorpatan, is also being utilized by several single settlements, but here, below the tree limit.

Four seasonal settlements are situated on late glacial or holocene moraines and pertaining terraces of rubble fields on the densely wooded valley floor of the Thulo Khola (cf. figs. 8, 9, and 10). In the upper Mayangdi Khola, numerous single settlements are situated on similarly recent glacio-fluvial accumulations, to some extent, piled up from side valleys; the piling up at the exit of the Konaban Khola being one example. The uppermost seasonal settlement in the Mayangdi Khola, a single settlement, is to be found on the outer slope of a lateral moraine formed in 1850 by a "reconstructed glacier" on the Dhaulagiri-W-wall above the natural tree limit, here lying, however, at only 3500m. Some of the seasonal settlements possess small pieces of arable land which are, to some extent, divided into lots or even terraced, but today are often no longer under intensive cultivation (cf. figs. 9 and 11). For these, larger clearings are needed, which have been attained by burning, deduced from singed remnants of tree trunks, and which are now kept cleared annually by grazing livestock.

4

In contrast to the settlements on the N-slope of the Dhaula-Himal, which reach up beyond 4000 m above sea-level, (for example Sangda, a winter village or permanent settlement in the middle district of the Cha Lungpa, lies 4100 m above sea-level and practices irrigated terrace field cultivation, yielding crops of barley and buckwheat), the permanent settlements on the S-slope only reach an altitude of 2150 m above sea-level (Lumsum, Bagara, and Muri in the Mayangdi and the Dara Khola, cf. fig. 5; or Lumpi and Fedi in the Thulo Khola, (cf. figs. 3 and 12). Most of the seasonal settlements are situated between 2200 and 3000 m. A few reach the forest and tree limit around 3500 m as on the Jaljala in the West or in the upper Mayangdi Khola, threaded here along the valley floor.

The uppermost seasonal settlements are situated at an altitude of 4250 m, thus extending 500 to 600 m beyond the timber line (cf. above), on the pass which separates the Thak Khola and the Thulo Khola. Further to the East, at 4370 m above sea-level, I found the uppermost mountain pasture of the S-slope on the left flank of the Thak Khola at the pass which, from the Tangdung Khola northward, past the Thulo Bugin, opens upon the upper Miristi Khola and the Annapurna-I-W-flank. Single wind screens and sleeping recesses with fireplaces can be found even in greater altitudes; but no more dwellings.

Inquiries showed that goatherds from Lete (Thak Khola) turn out their flocks to graze at altitudes of up to 4600 m in WSW exposure on the crest extending from the SSE-horn of the Dhaulagiri I, forming the left flank of the Thulo Khola. Reaching these pastures involves perilous climbing over sods of

grass on steep slopes with a gradient of over 45°, which is possible only in summer when the grass is fresh (cf. fig. 2).

The abundant growth of forests up to an altitude of 3500 m demonstrates that it is not for climatic reasons that the permanent settlement boundary is maintained so low. The duration of sunshine is shorter in the very steep and deep-cut courses of the upper valleys for two reasons: An abundance of shaded sites and clouds accumulating against the weather side of the main crest and hovering there. That, however, ought not be a hindrance to agriculture since, even as high up as on the lower plots of Muri, rice is successfully cultivated. It rather seems that the inaccessible steepness of the relief does not permit fields to be laid out. Therefore, the single settlement of Lipsiba in the Mayangdi Khola above Bagara at an altitude of 2200 m above sea-level, originally planned as a permanent settlement, could not be maintained because of an inadequate quantity of arable land. The site did not permit the establishment of sufficiently large fields.

One more unfavorable factor manifests itself and prevents further settlements on sites far up the valley, like Bagara or Lumpi, which might be utilized for the establishment of fields. The path of the road is extremely hazardous, leading along steep, exposed walls smoothed by glaciers. Only the widespread growth of grass makes it passable at all. A functional road must be practicable for Nepali cattle and water buffalo, as well as, for farmers carrying wide and heavy loads of hay or bamboo. The width that is thus required demands a certain amount of elaborate construction (cf. fig. 13) using slate or gneiss slabs, of steps, supporting constructions on hair-pin turns, of wooden bridgings at wall crevices, for example, below waterfalls etc. These structures are constantly being damaged by falling stones, minor mountain slides, snow, and rain and are continuously in need of repair. Beyond that, they present the risk of being cut off or of temporary complete impassability because of heavy snowfall and avalanche danger. These adverse conditions increase proportionally with the altitude.

According to my own observations in the winter of 1976/77, the temporary snow line reaches down below 2000 m above sea-level. This is also indicated by the corresponding deformation of the evergreen tree and bush vegetation in these valleys which is particularly vulnerable to heavy loads of snow.

Road problems also affect the temporary settlements. The coming and going, however, is less frequent and limited to the warm season.

Until recently, the upper regions of the valleys have been undeveloped and some of them remain so today. The natives have hardly played any role in opening up and pioneering these territories which, as yet, is not completed. This is

accomplished by mountain climbing and, in rare cases, scientific expeditions such as ours.

A good example of how the settling of a new territory is instigated by foreign mountain climbing expeditions, is the case of the Mayangdi Khola. In 1953 the Dhaulagiri expedition of the Akademischer Alpenklub, Zurich, explored the approach through the upper Mayangdi Khola (cf. K. Winterhalter, 1959) up to the valley exit at the Frech-Col, 5350m above sea-level, entered first, from the North, by the French in 1950. During the following years, several other expeditions used this approach through the Mayangdi Khola (Argentine-Dhaulagiri-Expedition 1954 and 1956, German-Swiss-Dhaulagiri-Expedition 1955, Swiss-Dhaulagiri-Expedition 1958, Austrian-Dhaulagiri-Expedition 1959). As it was necessary to make the upper parts of this glen passable for many hundreds of carriers, supply and communication runners, a more or less well-worn path resulted, including more substantial bridges across the Konaban Khola at 2600 m, across the Mayangdi Khola at 2800m, and over two left tributaries at about 2900 and 3150m above sea-level. Thus it became possible to drive cattle 13km beyond Bagara and Lipsiba, situated at 2100m, up to an altitude of 3600m. Over this distance there are now nine small temporary settlements consisting mainly of a single hut. Eight of these were erected in the woods or at its edges and one above the tree limit at the Dhaulagiri-W-glacier. Besides mountain and wood pastures, the new territory offers the opportunity for cutting bamboo ("Nigala") and represents an expanded recruiting area for lopped-off winter and stall fodder, as well as, for firewood and building timber.

In the adjacent Thulo Khola, this development began in 1977 in the early days of January by our first crossing through the upper valley in a very small group, reaching a height of 3700m. In March, a mountain climbing expedition followed our route. However, in this valley, the highest temporary settlement at the present is situated no higher than 2750m.

5.

In the area under investigation, six ethnic groups are represented: Magar, Chetri (Bahun), Tata, Newar, Gurung, and Thakali. The higher settlements, about 2000m above sea-level, are mainly inhabited by Magar. The Bahun dwell in the middle section of the Mayangdi Khola between the junction of the Dara Khola and the settlement Dharbang; the Tata and Newar around Beni, and further E-ward and S-ward mainly the Gurung. The Thakali are at home in all the bazaar settlements such as Dharbang and Tatopani in the Mayangdi Khola, as well as Beni and Kusma in the lower Thak Khola. Even the uppermost and new teahouse, in the upper

inhabited Thulo Khola at Gastkarker, is kept by a Thakali woman.

The contingent of Thakali merchants in the settlement is apparent from elaborately built houses, sometimes three storeys high, along the main street with shops on the ground floor, as described by Chr. Kleinert (1973) for the middle sections of the Thak Khola. As a typical example, Rato Dunger in the lower Mayangdi Khola may be cited. Other habitations do not seem to have tribe-specific characteristics.

The observation of Chr. Kleinert (1973) on the southern slope of the Annapurna group, that cluster villages predominate with the Magar, cannot be confirmed for the Dhaula-Himal-S-slope. Here the form of the village is generally dependent upon conditions of the slope on which the settlement is situated. Thus, particularly at the Magar settlements Khuikhani, Mal'kabang (cf. fig. 7) and Malambar in the Marang Khola or Khibang and Muri (cf. fig. 4) in the upper Mayangdi Khola, the houses are, for the most part, aligned with their broad sides strictly parallel to the slope. On flat settlement sites with the same type of inhabitants, cluster villages also appear with less exacting alignment of the houses. Gastkarker, in the Thulo Khola, presents an example (cf. fig. 2).

6.

The compact settlement forms prevail on the southern slope of the Dhaula-Himal. In the narrower parts of the valleys, above 1200-1300m, the aforementioned village forms, consisting of rows of houses parallel to the slope, predominate. These are strictly dependent upon the steeply inclined settlement sites (cf. fig. 7). This manner of arranging the longitudinal axis of the houses parallel to the isohypses results from the simple fact that less earth removal is required for setting down foundations.

Settlements of the cluster village type and the more recent outlying segregated farms can be found in the Thulo Khola (cf. fig. 2) as well as in the Dara Khola, e. g. Lumsum and Muna, or Nerbang (cf. fig. 6) in the Dhola Khola. All these examples are located on level shoulders on the slope or on terrace sites. For most of the villages with their short travelling distances and their entirely agricultural economy, it is only important to be in the vicinity of the main roads to be able to make any necessary use of them. There is no need for these roads to cut through the center of the settlement that forms a small trade center.

Realizing this in settlements which vertically cover an extended area, where

the houses are arranged parallel to the slope, can be considered next to impossible anyway, since traffic in these regions generally progresses horizontally. It is only in Malkabang where the road mounts vertically within the settlement, rising 100 m with the aid of steps, and leaving it again in a horizontal direction (cf. fig. 7). As a rule, the roads cut through a small part of the settlement (as in Khuikhani in the Marang Khola) or touch upon their fringes (as is the case with Khibang). At Gastkarker, however, the main road does not even come in contact with the settlement, passing by at some distance from the outskirts. Further down the valleys, in the lower sites below 1200–1300m, the number of cluster villages increases because of more level settlement sites. The importance of through traffic and of supplying the upper valley areas with provisions, increasingly growing with the distance down the valley, has resulted in a growing number of roadside settlements. The larger roadside settlements, located at the side-valley junctions, and thus at a resulting intersection of two main roads, acquire roles as centers. It is a question of bazaar settlements like Dharbang, Beni, and Kusma. Here, trading is practiced. The agricultural products of the surrounding area are sold and implements or handicraft products, as well as spices, are purchased in return. In addition, inns and teahouses serve the needs of travelers. Loggias accommodate travelers overnight. Especially the latter, the offering of services and provisions for travelers, is also undertaken by smaller roadside settlements as is the case of a small settlement south of Rahughat at the junction of the Rahughat Khola with the Kali Gandaki; or a settlement north of Parse at the Kali Gandaki; or Khanihaghat near Baglung. These small traffic settlements are situated at bridgesites and connect the local and distant road networks, lying at forks in the road.

Scatter settlements are as widespread as the compact settlements. Along the valley floors above 1300 m, hamlet-like settlements seem to be characteristic on the fringes of the permanent settlements facing up the valley. Bagara (cf. fig. 5) in the upper Mayangdi Khola, or Lumpi and Fedi (cf. fig. 12) in the Thulo Khola, and the permanent settlements in the Syano Khola, are of this type (cf. fig. 3)

At the boundaries facing the regions of seasonal habitation, single farmsteads are also common. In the more densely populated regions of the valleys below, the frequency of hamlets and single farmsteads is the result of a quite recent phase of settlement expansion away from the old closed village community (cf. figs. 6, 7, and to some extent fig. 2). Here, the pressure of a growing population in these mountains, a development similar to the conditions in the Alps before 1850, becomes apparent.

In the areas where the main valley bottoms lie below 1300 m, the compact settlements are situated preferably on rubble terraces of the valley floors;

whereas, on the valley flanks, at considerable distance from the main travel roads, hamlets and single farmsteads prevail.

Among the roadside settlements, a few small ones are conspicuous because of their temporary appearance. They consist of small wooden cottages of light construction, where food or just tea is sold. Such settlements can be found between Baglung and Kusma and even farther south. At the present time they are expanding and developing, indicating an increase in traffic. A similar settlement, but an exception in regard to its function is Tato Pani in the Mayangdi Khola. Situated near hot springs and thus affording bathing opportunities, it has developed into a provincial Nepal tourist resort.

7.

The dwellings on the Dhaula-Himal-S-slope show all the constructional details which Chr. Kleinert (1973) describes for the Thak Khola south of Kabre and for the Annapurna-Himal-S-slope. Several examples will be mentioned here.

In the upper Thulo Khola, the village of Fedi consists of well-built 1½ to two-storey houses with saddle roofs. The outer walls are constructed of masonry on a rectangular foundation. The loggia is likewise constructed of stone, often surrounding three sides of the house. The orderly layered masonry work consists of exactly split slabs of gneiss. The roofs slope gently and are covered with large leaves of slate. Characteristic of the roof construction is the highbuilt ridge. The eaves are extended to protect the walls of the house from rain. Lean-to roofs are attached to the gable walls. The walls of the ground floor are protected by the loggias. The upper storrey offers storage space. The ground floor contains the living quarters and cooking facilities, along with shelves and in some instances, bunks along the walls. The partly open loggia in front of the entrance of the house serves for drying corn or as a place for domestic activities like spinning or weaving bamboo matting. Often, we find one or more annexes of different degrees of sophistication. Some are constructed of stone, like the house itself, while others consist only of a wooden framework covered with bamboo matting not unlike the dwellings at the temporary settlements. They serve as store houses and stables. The window openings are without glass and can be closed with wooden shutters. On sunny days during the dry winter season, a slightly raised platform in front of the loggia, built of stone and smoothed with clay, is used for a working area. Beside it, five to seven posts measuring approximately three meters in height are erected for holding hay or straw which is put there for drying.

The yard is enclosed by one-meter high walls constructed of rough blocks and boulders (cf. fig. 12). Further down the valley, at Gastkarker for instance, are houses with steeper hip-roofs thatched with straw or grass. But there are

also thatched saddle roof without a hip. The interchanging of covering material on the same house, of grass or stone slabs, between the main roof and loggia, can be observed. (cf. fig. 4). To the west, in the Mayangdi Khola and in its side valleys, a number of houses are daubed with loam (cf. fig. 4).

Another peculiarity are two-storey houses with loggias covering two or three sides reaching over both storeys (cf. fig. 15). They do not extend outwards, forming instead, a second outer ring of walls. A combination of forms occurs, however, in houses where, in addition to loggias integrated into the outer walls, there are built-on loggias as well (cf. fig. 16). Wood, as building material, is used predominantly in the form of supporting beams and for ceilings, and occasionally to close off loggias (cf. fig. 15). Wooden outer walls occur only on small houses as, for example, at Bagara (cf. fig. 17). Besides the large houses constructed of solid quarry-stone walls, there are, especially in the small villages in the upper districts of the valleys, small dwellings constructed from wooden posts, a ridgepiece, and coverings of bamboo matting (cf. figs. 18 and 5). A floor of smoothed clay stretches between a knee-high stone foundation. . The outer walls consist of bamboo matting or freshly cut unwoven bamboo. The dwellings of the temporary settlements are built in this same manner. Two types are to be distinguished: One with more or less raised foundations which can even reach the ridge at the gable ends; and another completely without a foundation (cf. figs. 10 and 8). When a temporary dwelling is abandoned, the bamboo matting, since it can also be used in the permanent settlements, for instance, for closing off loggias (cf. fig. 16), is taken along and is transferred to the winter dwelling or the next temporary settlement. Besides caves and recesses in the rocks, grass roofs, leaned against the slope with one end and supported by two posts on the other, serve as night shelter for herdsmen and farmers engaged in cutting bamboo (cf. fig. 11).

Stables, hay barns, and small store houses are constructed similarly to the temporary dwellings (cf. figs. 19 and 20). Goat sheds are often cleverly constructed. The animals are kept on a platform made of thin, round tree stems put side by side, leaving crevices through which the excrements fall, gathering on the ground below (cf. fig. 21).

8 .

Size, form, and site of the fields are dependent upon the relief. The fields are arranged in terraces and divided by supporting mortarless walls (cf. figs. 11 and 3). Such field terraces are to be found on slopes with a gradient of up to 25° (cf. fig. 7). Elaborate maintenance is required in the case of the irrigation culture terraces in the Mayangdi Khola, which lie below 1650m above sea-level.

They are carefully leveled out and contained within walls that are fifteen to twenty centimeters high (cf. fig. 1). In the Thulo and the Syano Khola, as well as the Dhola Khola, terraced fields have been allowed to lie waste or are used extensively as pastures. From afar, such areas can be identified by obvious shrub-growth and solitary trees (cf. fig. 22).

9.

The S-slope of the Dhaula-Himal maintains rain-field culture, and on sites below 1630m, irrigation-field culture (transplanted-rice culture). In addition, livestock raising and, in more central settlements, trade is practiced. Crops, other than rice, which is limited to irrigation-field culture, include maize, millet, barley, rape, peas, and flax. Near the settlements and the vicinity of the houses, citrus fruits, bananas, tobacco, sugar-cane, and large radishes, are raised for private use. The livestock consist of water buffalo, Nepal cattle, goats, chickens, and in lower sites, pigs and ducks. Many families receive financial support from a member serving in the Indian army.

10.

The strong population pressure upon the S-flank of the Himalaya results in a very intensive land use. The large vertical extension of the terrain necessitates the observance of a well-defined graduated system in the upper regions of the valley.

This graduated system can be illustrated using the settlement of Muri as an example (2000m above sea-level) in the upper Mayangdi Khola. Muri is a permanent settlement where farming is practiced over large vertical distances. Below 1650m above sea-level, down to the valley floors of the Mayangdi and the Dhola Khola at 1500m above sea-level, both irrigation field and rain-field culture are practiced; above that, up to 2300m, only rainfield culture is possible. Both involve diversified and elaborate techniques. Rice is planted early in summer and harvested early in fall. Subsequently, the dried lots are sown with maize which is harvested in January. In February, the livestock is driven upwards in the valley into the vicinity of Lipsiba or to a comparable wood pasture between 2100 and 2400m above sea-level. This corresponds to the stage reached by livestock in the European Alps in May (Maien Hsasess). A short time thereafter, the next seasonal settlement in greater altitude is sought and then another, so that, before the beginning of the monsoon in May or June, the higher pastures in the area of the timber line at 3300 to 3500m up the valley are reached. The meager mountain pastures, above the tree line, for example, at the Dhaulagiri-W-glacier, are simultaneously being grazed by flocks of goats. The goats even reach 4600m on the E-flank of the Thulo Khola (cf. above). At the time of

the monsoon and in the fall, the same steps are repeated in reverse by the herds on their way down. In addition, a certain coinciding up-and-down movement can be observed. One also seeks areas which were left unused in the Spring. In winter, the permanent settlement areas are reached once more, where the animals are turned out for one or two months on the after-grass pasture. After-grass pasture is also practiced from the temporary settlements on remote parts of the fields. At this time, the farmers carry down loads of lopped-off greens from the mountain woods in the vicinity of the settlement to provide additional fodder (cf. fig. 22). While the livestock is on the wood pastures, bamboo shoots of a finger's thickness are chopped and cut into strips for sale in the permanent settlements. In the post-monsoon season, even on greater than 45° slopes, the long grass is cut for use as additional fodder, often with the aid of rope ladders.

Thus, in the case of Muri, two land-farming stages can be observed; the irrigation-field culture and the rain-field culture. At least three stages of livestock farming are found; the after-grass pasture and the lower and upper wood pasture. The pasturing of goats in the alpine meadow region above the tree limit could possibly be regarded as a fourth stage.

In general, one has to deal with the same three-stage-system of migration as in the Alps. Here too, are permanent settlements, interseasonal pastures used both on the way to the alpine pastures and on the way down, and high mountain pasture which can only be visited during the warmest season.

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Fig. 1: The lower Dhola Khola, photographed from 1700m above sea-level, downwards to the SE across the lower-lying parts of the arable land of Muri. Rain-field terraces lie in the foreground and above to the right; the irrigation terraces begin in the background at 1650m above sea-level. The fields are damaged by schist fluctuation. (18.1. 1977, photo: M. Kuhle)



Fig. 2: The Thulo Khola, photographed upwards in a SSE direction across the settlement of Gastkarker from just below the Saurekhani settlement at 2200m above sea-level. The fields are located on terraces. In addition to the settlement of Gastkarker, outlying segregated farms can be seen. The steep flanks in the background, rising to 4800m above sea-level, are covered with grass and serve as pasture for goats during the summer. (14.1. 1977, photo: M. Kuhle).



Fig. 3: View from 2280m above sea-level to the north, across the village of Dwari, which lies on the intact remains of a higher terrace on the slip-off slope of the Syano Khola. In the background, the continually narrowing field-covered valley floor of the Thulo Khola with low terraces, (13. 1. 1977, photo: M. Kuhle)



Fig. 4: Section of the settlement of Muri in the Mayangdi Khola, 2000 m above sea-level, photographed to the south. The houses are built with their longitudinal axis parallel to the contour lines on the slope. For the most part, they are roofed with flagstones and the outer walls are daubed. They have one- and two storey high loggias which, in some cases, surround the entire house. (18. 1. 1977, photo: M. Kuhle)



Fig. 5: View from 2160m above sea-level towards the SE, across the lower parts of the scatter settlement of Bagara, in the upper Mayangdi Khoia. Even the smallest level parts of this steeply flanked valley are made into terraced fields. Besides larger two-storey stone houses (in the background), small one-storey houses covered with straw or grass and bamboo matting of a simple ridgepole construction can be seen in the foreground. The ever-green tree vegetation has been lopped. (20. 1. 1977, photo: M Kuhle)



Fig. 6: View photographed from 1800m above sea-level, upwards from the right flank of the Dhola Khola towards the WNW valley, across the settlement of Nerbang. The Gurja and Dhaulashri-Himal, both more than 7000m high, in the background. The site of the settlement takes advantage of the asymmetric valley structure, being located on the less inclined stratified slope. On the steep heads of stratified parts of the left valley flanks (to the right in the photo) the long yellow grass is sined. The houses of the compact settlement are thatched and form the old center of the village (left above). The more modern and larger houses of the outlying segregated farms are slated and of more recent origin (below right). (29. 1. 1977, photo: M. Kuhle)



Fig. 7: Eastward view taken from 2300m above sea-level of the settlement of Malkabang in the Marang Khola. Notice the arrangement of the houses strictly parallel to the slope. The trading road reaches the settlement before leaving it again towards the West. Every level surface on the opposite ridge with a slope of no more than 25° was used for terrace culture. Also in the vicinity of this settlement, outlying segregated farms of more recent origin can be seen. (16. 1. 1977, photo: M. Kuhle)

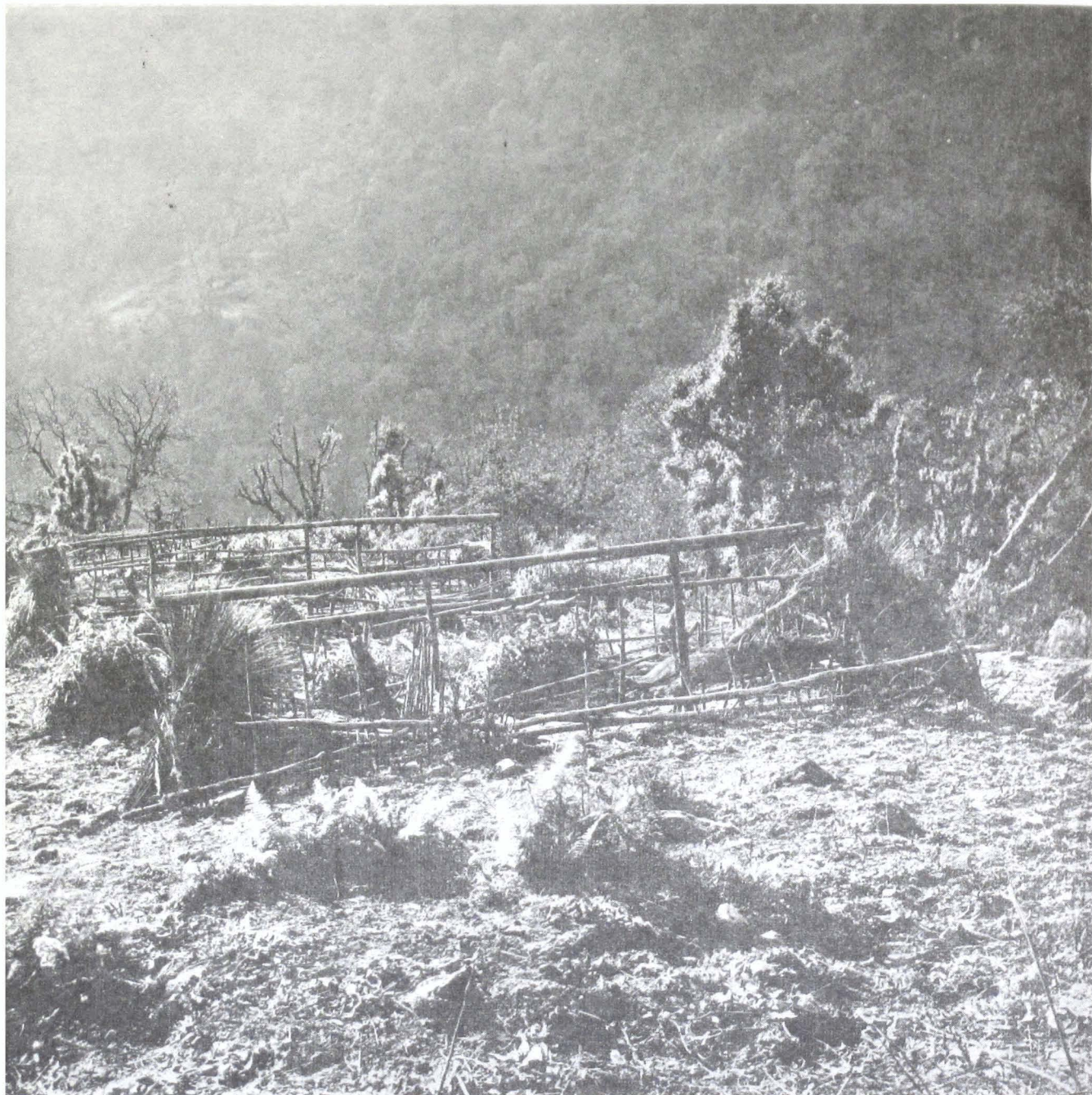


Fig. 8: Ridgepoles, ridgepurlins, and trestlework of two dwellings at a seasonal settlement, situated on a late glacial or even more recently levelled moraine, 2600 m above sea-level on the left flank of the Thulo Khola. The floors of these buildings are paved with stone slabs. The coverings of bamboo matting are taken along each time the houses are abandoned at the end of the season. (5. 1. 1977, photo: M. Kuhle)

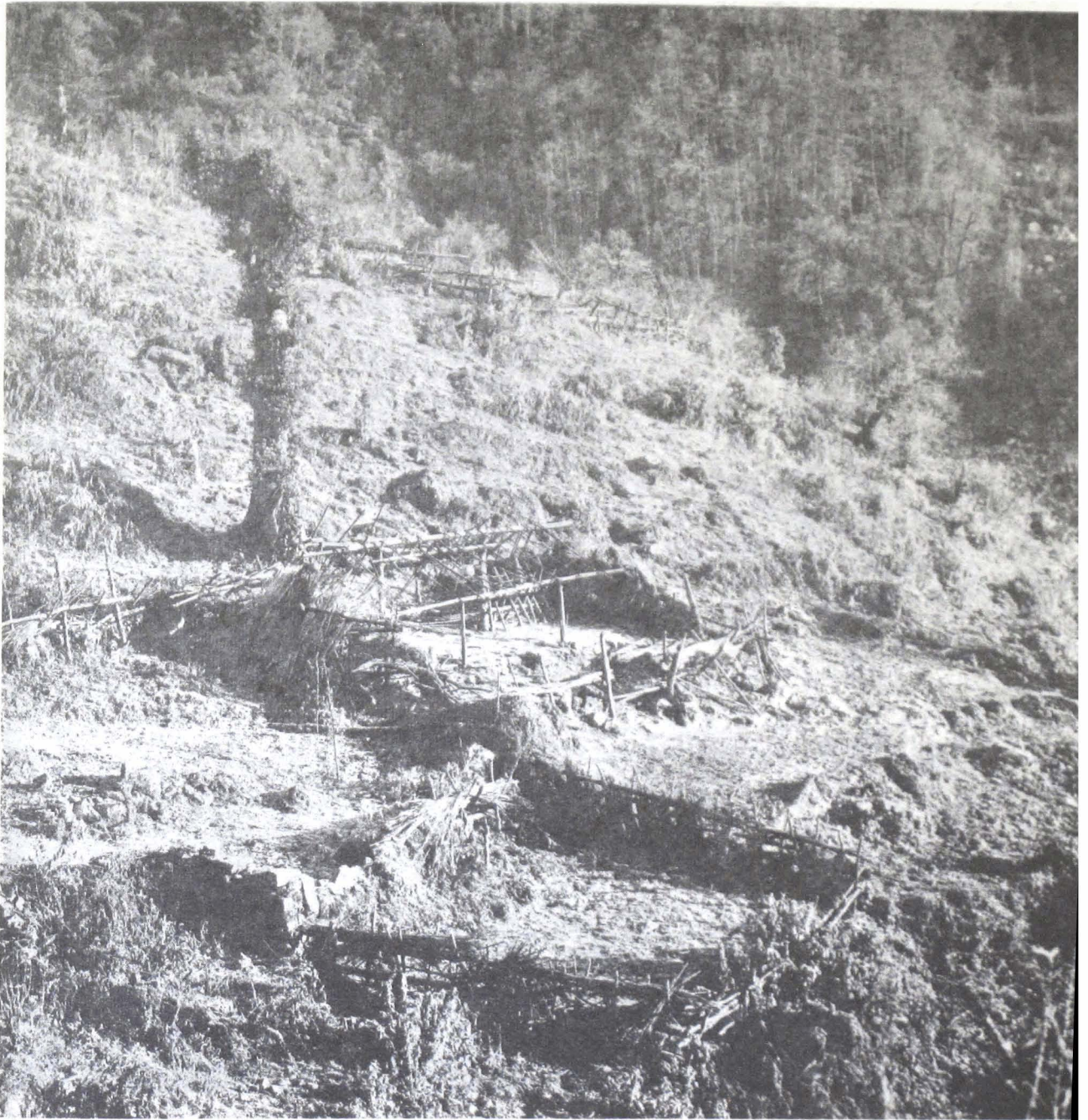


Fig. 9: A seasonal settlement found a little further down the valley than the one shown in fig. 8. This seasonal settlement in the Thulo Khola shows several terraced and fenced-in field sections and requires a greater clearing than the other seasonal settlements. Singed tree trunks indicate burning as the method for clearing. (5. 1. 77, photo: M. Kuhle)

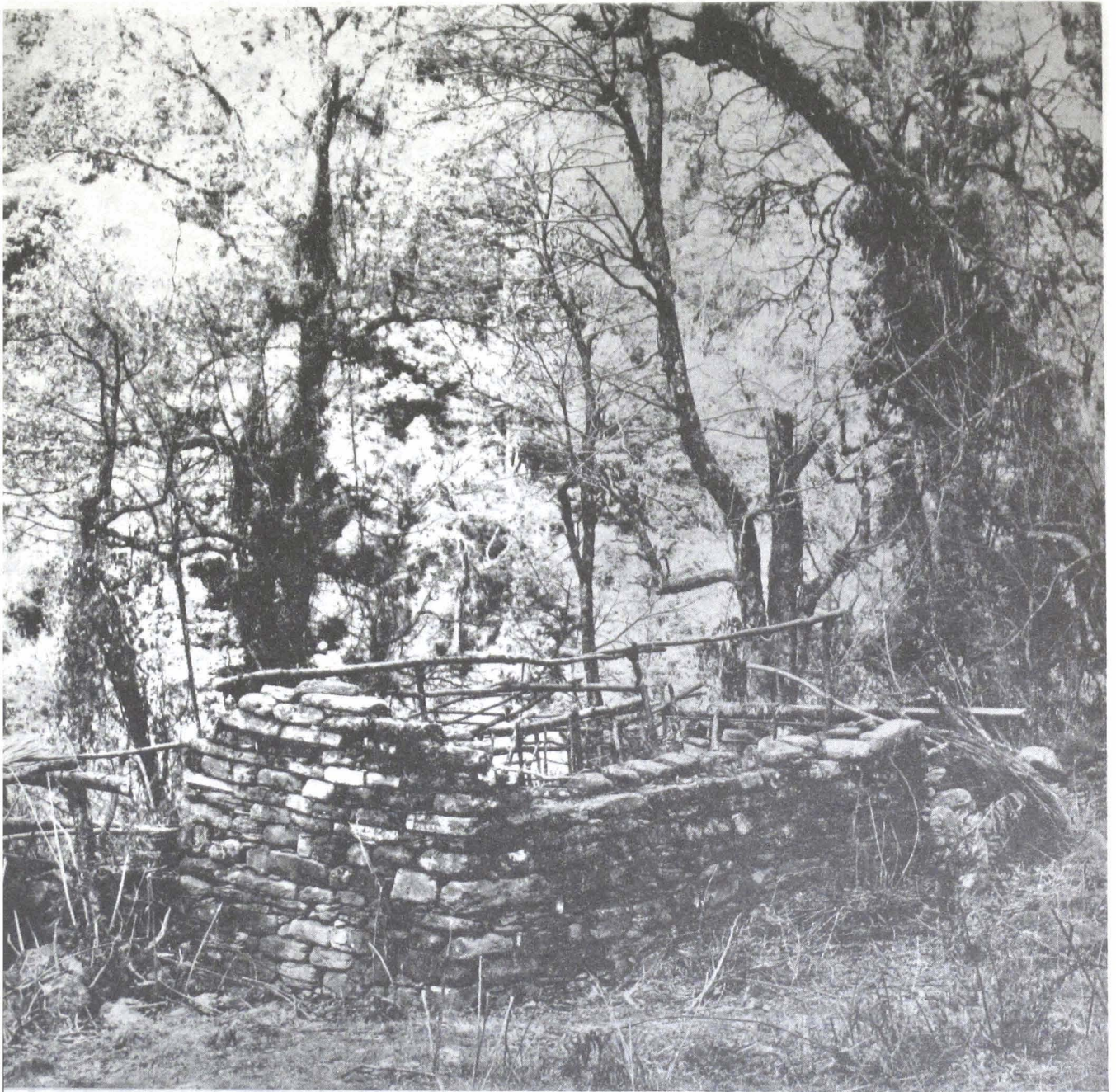


Fig.10: Dwelling at a seasonal settlement situated 2500 m above sea - level on the left flank of the Thulo Khola. Here, the outer walls are formed of stone without mortar, reaching up to the ridgepurlin in the rear gable. (15. 1. 1977, photo: M. Kuhle)

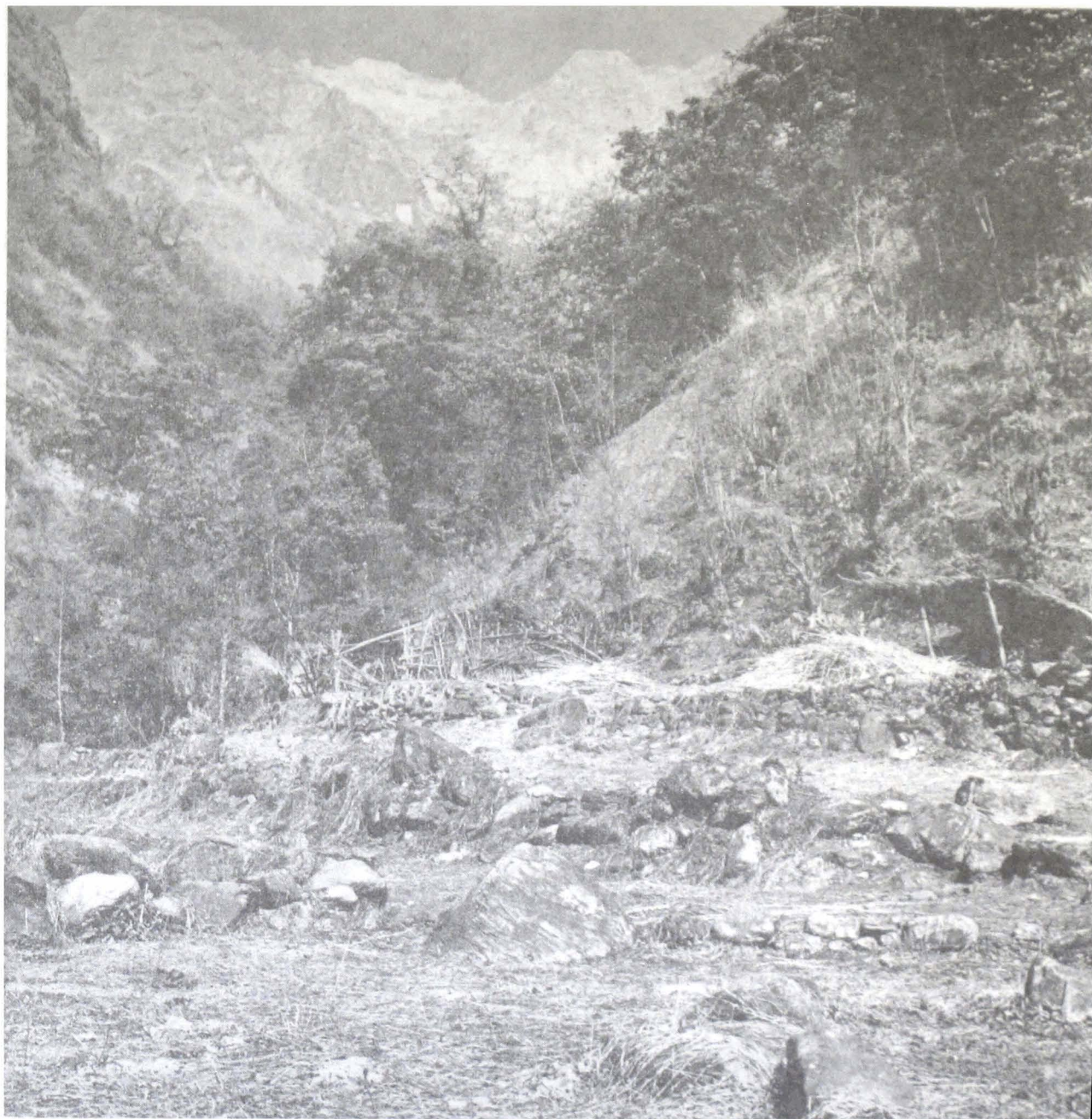


Fig.11: At a distance from the permanent settlement of Fedi upward in the valley, a piece of arable land, situated on a 20 m high accumulation terrace, 2270 m above sea-level. Seasonal settlement with a type of dwelling already shown, and a shelter consisting of a roof resting on the slope and two supporting posts (to the right). In the background are steeper areas of the upper Thulo Khola which lead to the Dhaulagiri. (11. 1. 1977, photo: M. Kuhle).



Fig.12: Farmstead situated at about 2180 m above sea-level and belonging to the settlement of Fedi in the Thulo Khola, photographed from the south. The outer walls are built of gneiss slabs, the roofs slated. In front of the loggia surrounding the living quarters is a raised walled-in working platform. The building to the right serves as stable and barn. In the foreground are stacking poles for drying straw. In the loggia, a spinning wheel is being used. (11.1.1977, photo: M. Kuhle)



Fig.13: The trade road branching off from the Mayangdi Khola and ascending the Dhola Khola; here between Nerbang and Arche, from where it goes on to Gurjakhani. At this point, 2000m above sea-level, the road is traced alongside a smooth slate wall with the help of elaborate artificial constructions. The steps are slabs of cut slate. The evergreen trees along the road have been lopped for live-stock fodder. (29.1.1977, photo: M. Kuhle)



Fig.14: Detail photograph of the settlement of Gastkarker in the Thulo Khola 2000 m above sea-level. We find a combination of diverse roof forms: comparatively flat slate roofs, steeper grass and thatched roofs with and without hips, thatched roofs with slated loggia or vice-versa. The high-built ridge is conspicuous on the slated roofs. Lean-to roofs are only attached to slated roofs. (14. 1. 1977, photo: M. Kuhle)



Fig.15: Close-up of the settlement of Malkabang in the Marang Khola situated about 2100 m above sea-level. Buildings are both daubed with loam and left undaubed. There are loggias on one side, but also loggias surrounding the entire house, sometimes one-, sometimes two- storeys high. The surrounding two-storey loggias form a second outer wall for the house. Loggias are often closed-in with wooden planks (cf. right). In the background the transition from fields to woods can be seen, the latter extensively degraded by use as pasture. (16. 1. 1977, photo: M. Kuhle)



Fig.16: House of a single settlement in the Mayangdi Khola, 1560 m above sea-level. Here is a rare combination of loggias integrated into the outer walls as well as an attached loggia alongside with a lean-to roof. The function of the large window front in the upper storey for air circulation becomes apparent. Under shelter of the attached lean-to roof corncobs are being dried. (19.1.1977, photo: M. Kuhle)



Fig.17: A small, one-storey house in the scatter settlement of Bagara in the Mayangdi Khola, 2150 m above sea-level. The roof is covered with grass, the walls are erected from vertical planks in the manner of a stockade. They rest upon a flat foundation of masonry. The house has a corner porch. (20.1.1977, photo: M. Kuhle)

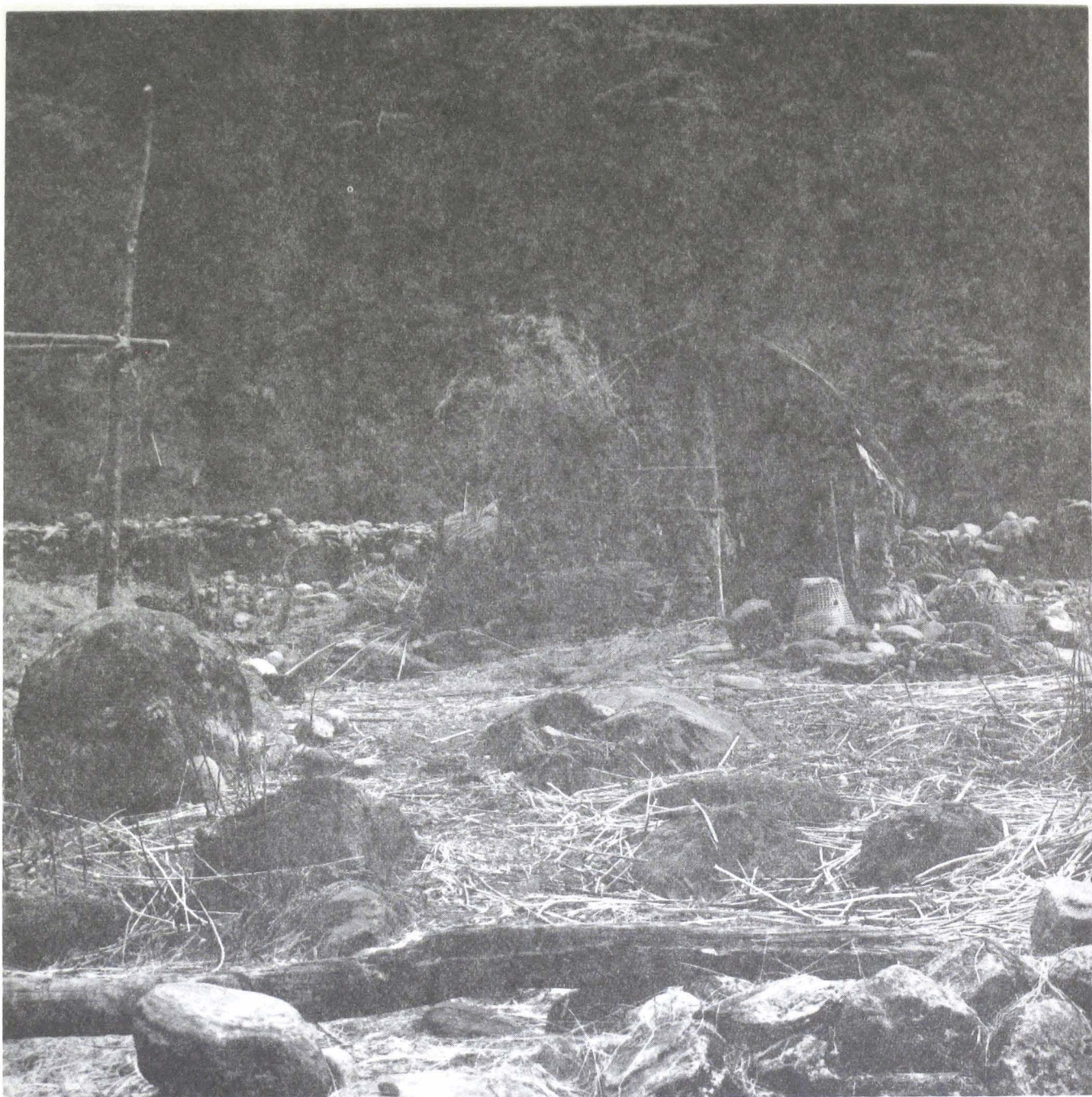


Fig.18: A small dwelling in the settlement of Fedi in the Thulo Khola 2170 m above sea-level. Although this is a permanent dwelling, its construction is the same as that of the seasonal dwellings. The rear gable is constructed of masonry, the one in front closed off with freshly cut bamboo. (11. 1. 1977, photo : M. Kuhle)



Fig. 19: Shed for water buffalo in the settlement of Fedi in the Thulo Khola, 2170 m above sea-level. The roof consists of bamboo matting, the gable fronts being enclosed with bamboo. Several wooden stems form a row of ridgepoles in whose forks several ridgepurlins are held. Several upright posts hold the struts that extend from them. The shed is open at the broader side. (11. 1. 1977, photo : M. Kuhle)



Fig: 20: Small house from the settlement of Bagara in the Mayangdi Khola, 2160 m above sea-level. This one-storey house has a grass roof and lean-to roof attached to the gable side which, like the loggia at the longer side, is covered with grass. The roofs of the loggia are supported by corner pillars of masonry as well as by wooden posts. In the background is a shed for firewood. (20. 1. 1977, photo : M. Kuhle)



Fig. 21: Goathouse in the settlement of Gastkarker in the Thulo Khola. The roof shows the common construction with ridge-poles, ridgepurlin, and pillars. The goats are kept on a platform of round beams between which the excrements fall through, the floor thereby remaining tidy. (14. 1. 1977, photo : M. Kuhle)



Fig. 22: Abandoned field terraces above Dwari in the Thulo Khola between 2200 and 2500 m above sea-level. The number and size of the bushes indicate that these fields were abandoned about ten to twenty years ago. The trees in the mountain forest close to the settlement are extremely lopped. (13. 1. 1977, photo : M. Kuhle) .

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