

The Kathmandu Valley
A Study in Regional Geography¹

by

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The Relief

The contrast between the wooded frame of mountains ringing the Valley (dissected by V-shaped valleys, summit elevations between 2000 and 2500 m) and the broad, flat valley bottom (\pm 1300 m) - with its rivers, expansive fields under cultivation and large cities - appears striking and plastic to the eye of anyone studying the landscape of the Kathmandu Valley. To be sure, the Kathmandu Valley, measuring approx. 30 km in length and some 17 km in maximum width, is a good deal smaller than the Kashmir Valley; nevertheless, it was here that the three largest cities in Nepal arose and developed: Kathmandu (340 th. inhabitants), Patan (142 thous.) and Bhaktapur (122 thous.). More than half of the over 600 000 inhabitants of the Valley, however, continue to live in smaller rural settlements, and have transformed the fertile valley bottom - to a great extent artificially irrigated for much of the year - into the most intensively cultivated area in the entire country. The principal reason for the fact that the Kathmandu Valley is among the oldest settled areas in the Central Himalaya most probably lies in the exceptionally favourable natural environment, a feature it shares with the Kashmir Basin (see J. Depuis 1962).

The valley bottom owes its genesis to the draining of a Pleistocene lake. Even though the exact dating of the origin as well as the emptying and filling-in of the lake has not been clarified in all details, it is still possible to establish that the "Kathmandu Basin" represents a Tertiary valley system covered by fluvial and lacustrine sediments. Isoclinal valleys of the pre-Quaternary landscape, which tower up to 150 m above the

1. This paper is intended as a geographical interpretation of the topographical Kathmandu Valley Map (1:50,000) published by the *Arbeitsgemeinschaft für vergleichende Hochgebirgsforschung*, Munich 1977. The following English translation is a slightly revised version of an article entitled "Zur Karte des Kathmandu-Tals", which was originally published in German in *Erdkunde*, 33 (1979), 38-51. My thanks to Bill Templer of the Nepal Research Center for preparing the translation.

basin bottom, extend as narrow east-west-oriented basement ridges far out into the present-day valley bottom. The most striking of these bars formed of pre-Devonian rocks is the limestone ridge of Kirtipur, which extends from the western edge of the basin frame almost to its center, and gradually disappears beneath recent sedimentation and rock debris to the east of the Bagmati River. (see Fig. 1). A similar though much shorter basement rib is the ridge of Swayambunath, which likewise consists of limestone. The hilly area of Pashupatinath and Gokarna in the northern section of the Valley, on the other hand, consists of phyllites and slates. Proceeding out from the eastern edge of the Valley, a broad basement spur extends to Cangunarayan and separates off the partial basin of Sankhu.

There is little doubt that the formation of the lake can be explained tectonically (see Hagen 1960:77 f.). The sediments of the Kathmandu Valley, even after emptying of the lake, underwent a process of tectonic shifting continuing down to recent times, and the sediments which were originally deposited horizontally now slope at an angle of approx. 3° to 4° from the southern edge of the basin in a northerly direction. At the southern edge of the basin we find flat forms which can most likely be interpreted as terrace remains (they can be recognized on the map in the vicinity of Pharping) at an elevation of 1570 m, thus lying approx. 250 m higher than the central portions of the valley bottom.

The only river draining out of the Valley is the Bagmati, which leaves the Kathmandu Valley in the south and breaks through into the Mahabharat Range in an impressive antecedent transsection valley. Before its exit from the Valley, it cuts into the sediment filling of the basin at a depth of approx. 340 m, and in this way has exposed the total profile from the boulder beds to the most recent alluvial fan deposit at the edge of the basin (Fig. 1).

Of special interest is the arrangement of the recent river network. All source rivers of the Bagmati, including those from the area of the southern frame of the basin, flow centripedally toward the center of the basin, collect to the south of Kathmandu in the Bagmati, and then leave the basin in a north-south-oriented valley. It is peculiar that the basement ridges are not circumvented by the rivers, but rather transected in ravine-like (epigenetic?) narrow valleys near Gokarneswar, Pashupatinath and Cobhar.

Aerial photo 1 clearly shows the fluvial dissection of the valley bottom sediments in the central portions of the Valley. Terrace valleys - on the average some 20 to 30 m in depth - and the resulting alteration

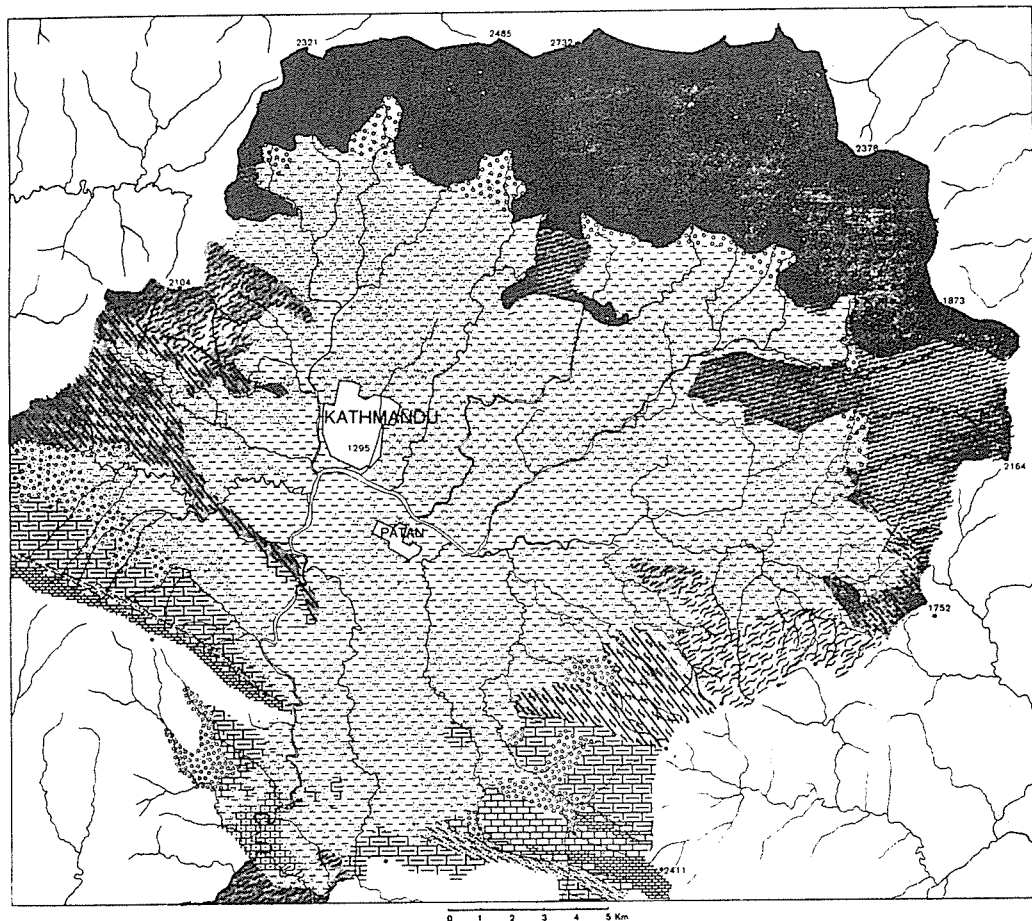










Fig. 1


Kathmandu Valley Sediments

-  Recent alluvial sediments (mountain wash and talus)
-  Lacustrine sediments (coarse sand, fine sand, sandy clays)
-  Carbonaceous lacustrine clay (Pleistocene Kalimati)
-  Preglacial (?) conglomerates (boulder beds)



Godavari Series

-  Greenish and pinkish crystalline limestone with shales and quartzites
-  Marble, purple and greenish (fossiliferous)
-  Darkgrey limestone

-  Ripple marked limestones, quartzites and shales occasionally calcareous

-  Micaceous hematite, quartzite, shales and sandstones

Chitland Series

-  Quartzites and shales occasionally calcareous
-  Slates, quartzites and white crystalline limestones and calcareous quartzites, pyriteferrous

-  Granites, migmatites

Bhim'edi Series



-  Phyllites, schistose sandstones with the bands of crystalline
-  Phyllites, shales and quartzites

Figure 1: Geological Map of the Kathmandu valley (based on S. P. Nautigal and P. N. Sharma, Geological Survey of India)

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Aerial Photo 1: Aerial photograph of the eastern part of the Kathmandu Valley. Typical is the contrast between the unsettled highwater basins of the rivers, which are utilized as paddy fields, and the dry and densely settled terraces which are used for rain-fed agriculture.

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between floodwater-endangered valley floor and floodwater-free heavily settled terraced ridges are characteristic. While the rivers have cut considerably into the lacustrine clay deposits, a cover-layer consisting of water-permeable sands and debris has frequently been preserved. Of decisive importance for the ecological structuring in the central sections of the Kathmandu Valley is the circumstance that the boundary between these water-permeable cover-layers and the water-retentive clay deposits lying underneath are tapped in the vicinity of the terrace slopes; this can result in a constantly moist spring and drainage horizon (see H. Boesch 1968:172 f.). Terrace surfaces lying below the drainage water horizon are suited for year-round cultivation, but remain uninhabited. The field areas lying above the spring horizon are cultivated especially during the rainy planting season, and lie fallow during the dry season. The spring horizon is also of importance for provision of drinking water for settlements located on the dry ridges (see Fig. 2).

The lacustrine clay deposits in the Kathmandu Valley yield fertile, hydrous soils, and furnish building materials as well as fertilizer clay and fuel. Their pronounced susceptibility to earthquakes, however, remains a disadvantage. The geological reason for this can be found in the low degree of stability of the recent valley bottom sediments (see Auden a. Ghosh 1934:215). Although the actual epicenter of the last major earthquake in 1934 was located in Bihar, entire sections of the cities of Kathmandu and Patan were destroyed, along with 75 % of all structures in Bhaktapur. On the other hand, the settlements (such as Kirtipur) and temple complexes (Pashupatinath, Swayambunath) located on basement ridges inside the Valley suffered only minor damage (Auden a. Ghosh 1934:231).

Climate, Drainage System, Vegetation and Soil Utilization

The Kathmandu Valley, with an average elevation of ± 1350 m, lies at an exceptionally favorable altitude in terms of climate. The temperatures during the hot season are very pleasant when compared with the extreme and unhealthy heat in the Terai to the south (average max. 33°C); during the winter, there is only occasional frost (abs. min. -2°C). The basin is located in the cool-montane (and thus malaria-free) zone, but the winters are so mild at this elevation that year-round vegetable cultivation is possible. Only the lowest-lying areas are threatened by frost, especially the wide river valley floors. On the slope of the mountainous frame, the

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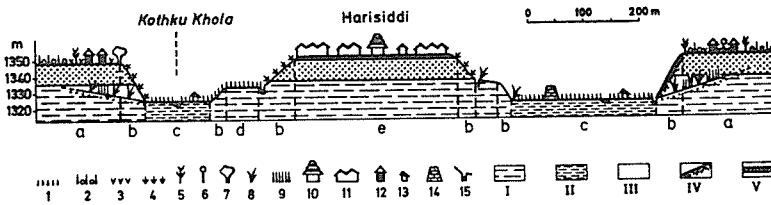


Fig. 2: Simplified topographic schematic profile in the vicinity of the Newar village Harisiddhi

a) Older terrace plateau with V-shaped valley b) Terrace slope c) Flood plain with high groundwater table d) Younger terrace plateau e) Older terrace plateau covered by brick debris from repeated destruction of the settlement by earthquake 1) Paddy fields 2) Rain-fed fields (maize and soybeans) 3) Horticulture 4) Pasture 5) Fodder tree 6) Fruit tree 7) Road tree 8) Bamboo 9) *Arundo donax* 10) Pagoda 1) Newar house 12) Indo-Aryan house 13) Watch house 14) Brick kiln 15) Well near the springline between fluvial and lacustrine sediments II) Lacustrine basin sediments with high groundwater table III) Fluvial basin sediments IV) Detritus on terrace slope V) Brick debris from repeated destruction of the settlement by earthquake

There are considerable ecological differences between the terrace plateaus and the valley meadows. Terrace plateaus have a covering layer composed of fluvial, water-pervious sediments, and are free of high water. They are settled, but are suitable only for rain-fed agriculture. Valley bottoms (meadows) have already eroded to the level of the lacustrine, water-retaining basin sediments. They are suited for year-round irrigated agriculture. The springline is located at the divide between fluvial and lacustrine sediments, and is important for drinking water supply and for irrigation. This springline can frequently be recognized by the presence of *arundo donax*. The narrow and moist (due to seepage) V-shaped valleys are the typical location for bamboo, sugar cane and *arundo donax*.

frostline is approx. 300-400 m higher than within the basin. Frost-sensitive plants, such as agrumes and bananas, are therefore found principally on the mountain slopes.

There is a very distinct precipitation gradient running from the valley edge to the center, and in the area of the mountain frame itself one can discern a reduction in the amount of precipitation from higher to lower altitudes. Vegetation reveals a distinct difference (exposure-determined) between the southern and northern basin edge. A belt of *Pinus roxburghii* runs along the northern edge (sunny slope), while evergreen deciduous forests reach down into the valley bottom on the southern basin rim (shady slope). The tropically evergreen fog forests begin above 2000 m. Here one

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can expect precipitation levels of at least 3000 mm, more than double that within the basin (Kathmandu, 1419 mm). The spring zone of perennial streams and rivers of the Kathmansu Basin is located within the area of these fog forests. They provide the large water reservoir for the many fountains and water-games of the Rana Gardens in Godavari, and are still of great importance for the drinking water supply of the large cities and for the waterworks located at Sundarijal. Precipitation is characterized by the typical monsoon regime; the rainy season runs from mid-June to early October. Approx. 80 % of total annual precipitation falls during this period, and the months of lowest precipitation are November to March.

The drainage system of the rivers reflects the annual course of precipitation with only a short delay. Flooding occurs during the months of July to early October. During the period from the middle of March to May, the riverbeds, even of the large rivers such as the Bagmati, Bisnumati and Hanumante, dry up almost totally. Nevertheless, the attempt is made during this period to divert the remaining river water for artificial irrigation, insofar as this is technically feasible. The lack of water and moisture during the dry months is considerable and constitutes the limiting ecological factor for vegetation and cultivation. Because of the relatively small catchment area of the Bagmati - which does not extend beyond the mountain frame of the Kathmandu Valley - and due to the limited water-retention capacity of the degraded soils, the fluctuation in the amount of water carried by the rivers is substantial.

Natural vegetation in this unusually heavily populated area of Nepal has been largely destroyed except for a few remaining relicts on forest-preserve areas. The abundance of frost-sensitive park-trees and bushes, which approaches the wealth of species found in insubrian gardens, is characteristic of the climatic nature of the Kathmandu Valley. The "Mediterranean" impression is enhanced by the presence of *Arundo donax* reed, frequently found on the boundary between the dry fields and the artificially irrigated farmland. The partially evergreen, macchia-like degraded bush-forest formations, which stretch like a fur coat over the gully-ridden and soil-erosion-prone valley slopes, are also an integral part of this picture. These bushforests are especially widespread in the extended vicinity of the Kathmandu Valley, except for the forest preserve area such as Phulcoki or the enclosed Royal Hunting Reserve. The reason behind the degradation of forest areas must be sought in the great demand for firewood in the cities, and in the traditional practice of forestgrazing economy.

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This can be explained by the fact that in the area of the valley bottom, which is intensively utilized as arable land, there is a great paucity of available grazing lands except for the winter stubble pasture.

Ethnic Differentiation of the Population in the Kathmandu Valley

The most populous ethnic group and the original creators of the urban culture of the Kathmandu Valley are the Newars, whose economy is principally based on commerce and rice cultivation. Paleomongoloid features predominate². The Newar language is classified as a member of the large group of Tibeto-Burman languages. The largest proportion of the Newar population is Hindu by religion. Nowadays, only a small number of craftsman castes (such as goldsmiths) are still followers of Buddhism. The exceptionally complex division into nearly 100 castes and subcastes and the associated wealth of patterns of social behaviors is unequalled, even in India. A religiosity influenced by Tantrism finds its visible expression in a plethora of magnificent and richly adorned temples, pagodas, chörten, stupas and sacred images. Nor is it only the religious structures which reveal such splendor in their manner of construction - the palaces of former kings and the patrician houses of wealthy citizens show a similar magnificence. An artistry of high excellence was able to develop, based on the generous patronage of the Malla kings and supported by a well-to-do Newar merchant class. The reputation enjoyed by Newars as temple-builders and woodcarvers, goldsmiths and silversmiths, and casters of bronze and brass is indeed unsurpassed.

City dwellers from other ethnic groups have presumably been living in the urban areas of the Valley only for some 200 years, after the Rajput prince Prithvi Narayan Shah conquered the Newar cities of the Kathmandu Valley and made Kathmandu into his residence and the capital of the Kingdom of Nepal which he founded. Since that time, there has been a foreign ethnic upper-class in the Newar cities, made up of high Hindu castes of Brahmins, Chetris and Thakuris. The Royal House and the Rana clan are part of this class; even today, members of these castes retain the top positions in politics, administration and the army. They also make up the landed

 2. Typically Mongoloid racial feature appear in an attenuated form among Paleomongoloids.

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capitalist upper class, which lives and governs in the city, but which is supported by its holdings in the manner of a rent-collecting feudal class.

A portion of Brahmins and Chetris are settled in the purely rural areas of the Kathmandu Valley. They also make up a significant percentage of the population outside the Kathmandu Valley as well, living in settlements up to the elevations of approx. 1500 m as rice cultivators and maize farmers. The exclusive membership of these rice cultivators among the high Hindu castes has innumerable and ramified social consequences; for example, they constitute a priori the social upper class (and frequently the economic upper class as well) in the mountain-cultivator regions of eastern Nepal, which have a highly heterogeneous ethnic population.

The third most important ethnic group in the Kathmandu Basin are the Tamang. They are a Mongoloid people principally engaged in the cultivation of maize. Dispersed Tamang settlements lie around the periphery of the Valley, on the relatively unfavorable slopes of the mountainous frame. The Tamang language is a member of the Tibeto-Burman language group. In their heartland, the Tamang have been heavily influenced by Tibetan Lamaism. In the Kathmandu Valley, they make up the economically significant group of laborers and coolies.

Topographic names and place-names

The situation in the area of cross-penetration of speakers of Tibeto--Burman and Indo-Aryan languages and the associated complex ethnic structure is reflected in the names for places and topography in the Kathmandu Valley (Fig. 3). Many settlements have several names, one from Newari and another from Nepali or even Sanskrit. Typical Newar place-name suffixes are *-dol*, *-khel* and *-tol*; typical Nepali suffixes are *-gaun* (=village), and *-pur* (= city). Tamang in origin are the designations *māne*, *bhote* and *lama*. Even if the etymology of Nepalese settlement, river and mountain names requires future systematic scholarly treatment, one can definitely make out definite place-name classes based on Höfer (see Fig. 3). Thus, for example, place-names which indicate a typical location of the settlement are frequent. Others point to the form of agriculture (*mulabari* = carrotfield; *makaibari* = cornfield; *khorsanibari* = chilipepper field); still others contain caste or clan names. They are a good indication that a large number of settlements, principally of dispersed and clustered formation type, can genetically be interpreted as clan hamlets.

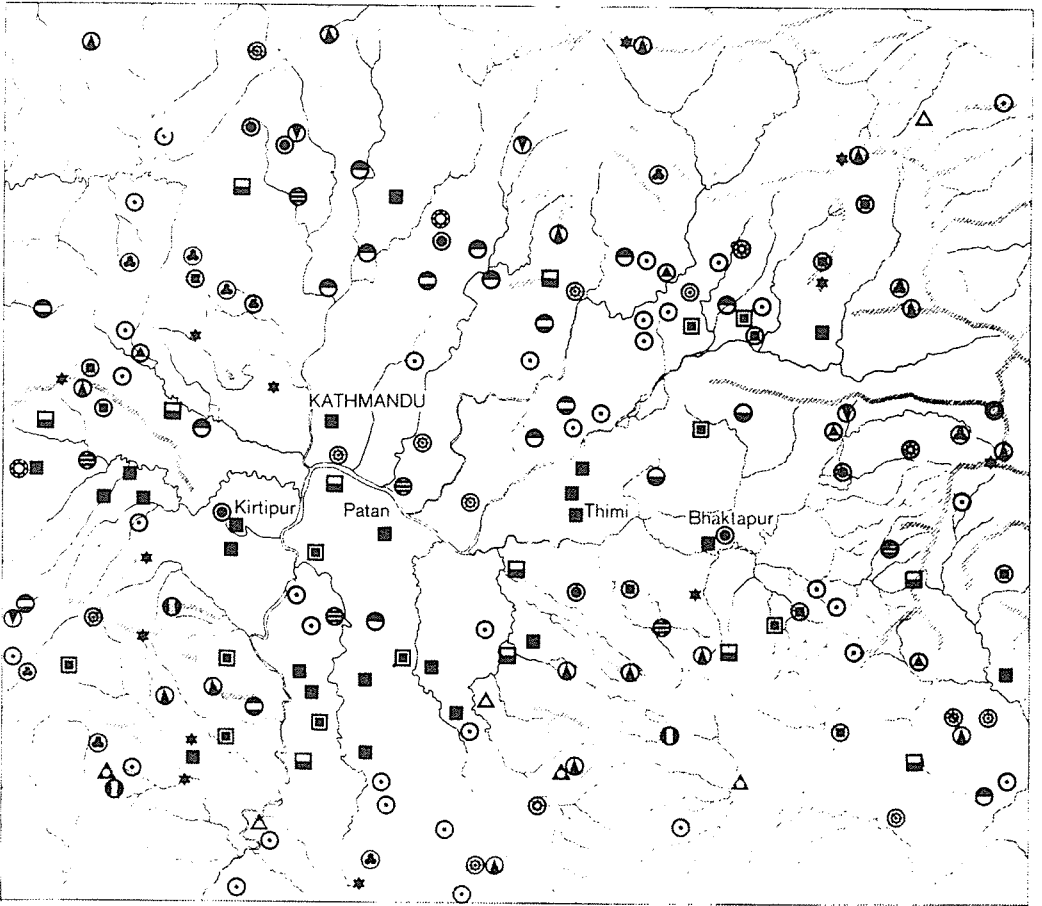


Fig. 3

Place-names and topographic names indicating:

Type of settlement

- ⊙ pur - city
- ⊙ gāũ - village
- ⊙ bās - settlement
- ⊙ kot - fort or sacted place
- ⊙ cok - courtyard
- ⊙ pāti - resthouse

■ compact Newar settlement

Agricultural utilization

- ⊖ bāri - dry field
- ⊙ thali - cultivated field
- ⊙ ban - forest

Religious significance

- ⊙ eswar/iswar - deity
- ⊙ iswari - sacred area

Topographic location

- ⊙ tār - elevated plateau
- ⊙ phedi - foot of mountain
- ⊙ dārā - mountain ridge
- ⊙ bhanjyāng - pass

- khel - place, grounds (Newari)
- dol - flat area "

- △ caur - flat incline (Tamang)

- māne - monument to dead, stupa (Tamang)
- ★ name of a deity

Fig. 3: Topographic names and names of settlements in the Kathmandu Valley

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The large cities have both a traditional Newari name and a Nepali name - nowadays, the Nepali name is more commonly used. The smaller compact Newari settlements have generally retained their Newari name down to the present time, though here too we encounter exceptions, as in the case of Harisiddhi south of Patan, the name of a Hindu goddess.

Finally, characteristic in the Kathmandu Valley are the large number of settlements, rivers and mountains which derive their names from gods and goddesses, principally from the Hindu pantheon, though also from Buddhist tradition. The exceedingly pronounced religious character of the cultural landscape of the Kathmandu Valley is thus expressed not only in the immense number of religious structures, but in the names of settlements, rivers and mountains as well. The Great Himalaya Range lying to the immediate north, likewise religiously venerated, forms the proper backdrop to this drama.

The Urban Settlements

The cities in the intramontane basins of the Himalayas are ancient settlements. The ancient urban settlements proved capable of developing into the largest cities in the Himalaya as a result of their especially favorable location in the basin. According to legend, cities existed in the Kathmandu Valley already during the Ashokan period (3rd century B.C.). Urban settlements are attested by stone inscriptions dating only from the 7th century A.D. Kathmandu, Patan and Bhaktapur were thus settlements founded during the 7th to 10th centuries. Along with the natural attractiveness of their location, the essential impulse for urban development was provided by the fact that the location facilitated control over mountain passes on one of the most important trade and pilgrimage routes in the Central Himalayas. This route led from Patna on the Ganges through the Kathmandu Valley, circumvented (either on the east or west) the Gosainthan Massif of the Himalayan Main Range and reached Lhasa in Tibet via Tingri Dzong and Shigatse. The route was no longer passable for pack animals within Nepal because of the difficulties of terrain, so that all loads had to be carried on the back of porters; however, the favorable location of the two mountain pass depressions in the Himalayan Main Range at only 2084 m (Kodari Pass) or 2133 m (Kyerong Pass) guaranteed year-round snow-free conditions. Along with the Kashmiri-Ladakh route, the path leading through central Nepal is of particularly great importance (as the shortest and easiest-to-travel land route between China and India) for all economic and

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cultural contacts between the regions on this side and beyond the Main Range. Long-distance trade and the location controlling the passes were undoubtedly significant factors in the Kathmandu Valley which promoted urban development, though one should be careful not to overestimate their importance. One should keep in mind that the very seclusion and remoteness of the Kathmandu Valley in a relatively inaccessible mountain region can be regarded as a principal factor behind certain specific developments in the cities of the Valley. In many respects, Nepal lay at the very periphery of the great world-historical events which swept over and changed the face of India: neither Islam nor the British colonial power ever exercised a powerful influence in the Valley. Thus, the cities of the Kathmandu Valley lack not only the minaret silhouette or the basic layout of dead-end streets so typical of a large number of north Indian, i.e., Islamic/Oriental-influenced cities, but are also without the European quarters dating from the period of British colonial rule and so characteristic of many Indian cities throughout the Subcontinent.

In summary, the following points can be maintained: the intramontane basin location combined with the exceptionally favourable natural environment, the favorable position controlling the passes in the contact zone between the Tibetan-Nepalese and Indian cultural areas, as well as the peripheral and isolated nature of its location in the mountains are the principal geographical factors, without which the origin and development of the urban settlements in the Kathmandu Basin cannot be understood. We have a fairly clear picture of the period of origin of the urban settlements of the Kathmandu Basin. It appears to be of great importance for the successful development of the cities of Kathmandu, Patan and Bhaktapur that their foundation in the 7th and 8th centuries coincides with the expansion of the Tibetan Empire, a point underscored in particular by S. Levi. The sphere of influence of this Empire extended down into northern India, so that commercial contacts between Indian princely courts and Tibet were intensified. However, little is known about the physiognomy of these early cities or about their inhabitants. If one is to lend credence to the report of the Chinese pilgrim Hsuan tsang (627 A.D.), and if one takes the references relating to this contained in the T'ang chronicles into account, then the houses were constructed of wood, and many-roofed structures, presumably pagodas, were already in existence. There was a king, along with merchants and, as Hsuan tsang emphasizes, there were skilled artisans, and both Buddhist and Hindu monasteries. Clearly then, these were residential cities

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with well-developed commercial functions and located in the immediate vicinity of presumably even more ancient independent Hindu or Buddhist temple complexes and pilgrimage centers. The most ancient stratum of Indian cities also belongs to this functional urban type, as N. Krebs, O. H. K. Spate and G. Schwarz have emphasized.

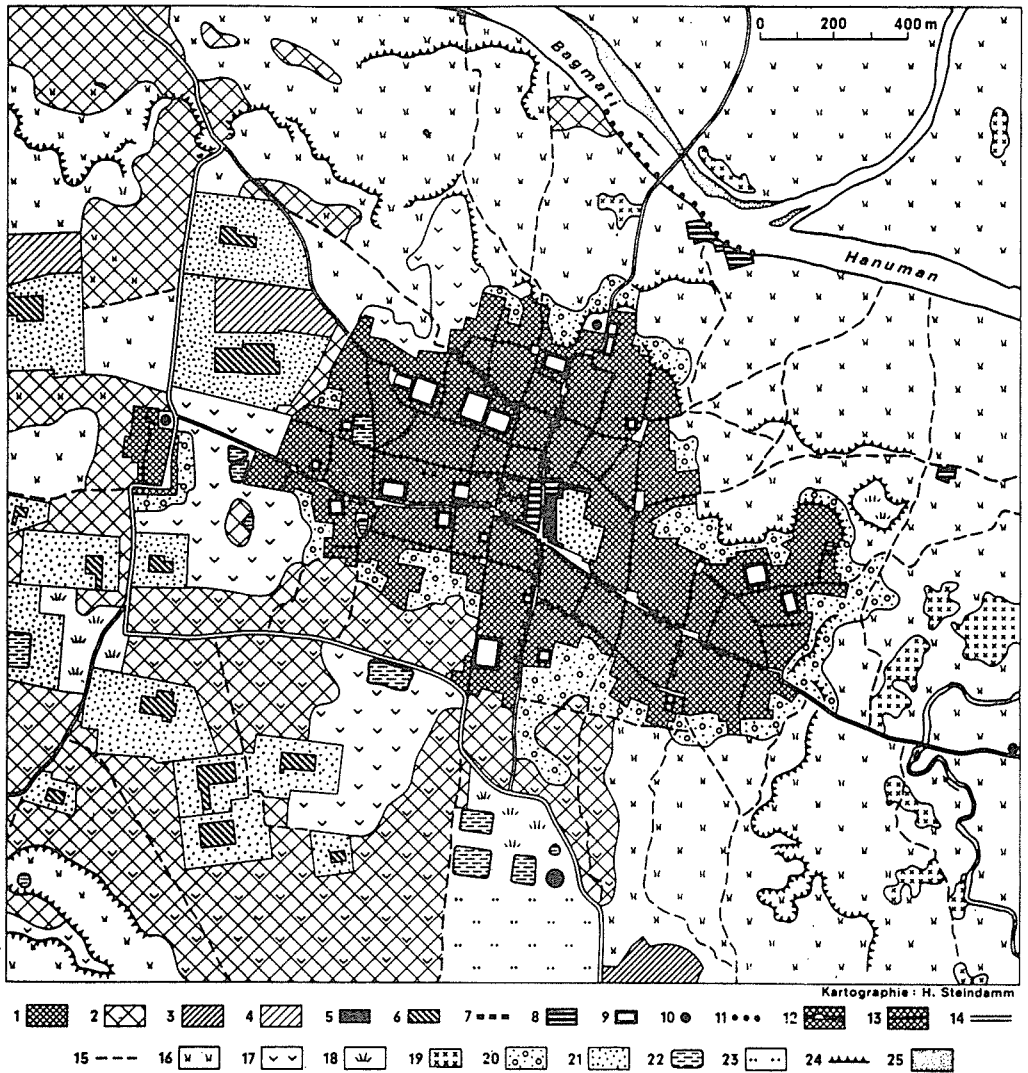
In Nepal, this type of residential city with well-developed trade and commercial functions has been preserved over the centuries in the cities of the Kathmandu Valley, and the Buddhist and Hindu temple areas still attract numerous pilgrims on important religious holidays. Aside from a few temples and religious structures whose nucleus dates from the 7th and 8th centuries, the present-day urban layout is considerably more recent in origin. The layout of the cities goes back to the time of the Malla kings, who ruled in the Valley from 1480 to 1768. In 1480, King Jayaya Ksamalla divided his Kingdom, which encompassed the entire Kathmandu Valley and the northern areas up to the Main Range with its most important passes, among his three sons. Kathmandu, Patan and Bhaktapur became residential capital cities of these three Malla kingdoms. Only beginning with this period do we have historical documentation relating to the creators of this urban culture, the Newars.

The outline of a Newar city is based on a definite concept of town planning. This can be illustrated using the example of Patan (Aerial Photo 2 and Fig. 4). In the center we find a temple square with the rest houses and a performance ground for the presentation of religious dances. The Royal Palace is also located in the area of the temple square in the former residential capitals. In the typical case, relatively broad main streets lead out in all four directions from the central temple square and palace areas to the gates of the city, which was fortified during the reign of the Malla kings. In Patan, these streets are laid in accordance with the width of the high-wheeled processional chariots, and end at the four Buddhist stupas located directly outside the city; these stupas are especially ancient in their form. The city quarters between the principal street intersections are divided up by the narrow sidestreets which generally cross each other at right angles. The main street intersection, which is oriented toward the Palace, along with its squares of sidestreets, reflects a planned city layout such as G. Niemeyer has described using the example of Hindu residential capitals in India. The plan of a Newar city, illustrated here by the example of Patan, corresponds in its basics to the rules for constructing a Hindu city as laid down in the Silpa-Shastra. Nonetheless,



Aerial Photo 2: Patan

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Sketch map after an aerial photograph of Patan

- 1 Newar town 2 Town of indo-aryan people 3 Small scale industry 4 Modern bugalows in former Rana palace
 5 Palace of the Newar kings 6 Rana palace 7 Bazar 8 Hindu temple 9 Vihara former Buddhist monastery 10
 Stupa 11 Ghat 12 Crossing of the main roads in the Newar town 13 Small lanes in the Newar town 14 Road
 15 Path 16 Irrigated fields 17 Rain fed fields 18 Pasture 19 Brick kiln 20 Horticulture 21 Rana gardens
 22 Tank 23 Military and parade ground 24 Terrace slope 25 Sandy fluvial sediments

it must remain an open question whether Patan was consciously laid out according to these laws deriving from the time before the birth of Christ. However, not only the external layout, but the functional, i.e., internal structuring of the city plan appears to follow a definite principle, and this principle is also associated with the type of the Hindu city: the bazaar area, divided up according to different trades, is strung out around the central temple square and extends along the wide streets. The remaining residential quarters are structured according to the hierarchy of castes and subcastes. The lower the status of a caste, the closer their residential area to the periphery of the city. The Newars distinguished a total of some 43 castes and a large number of subcastes. An additional differentiating factor is that certain castes profess Hinduism, while others are Buddhists; these Buddhists presumably adopted the caste system under the compulsion of Hindu rulers.

Using the example of Patan and Kathmandu, we also note that there is a new urban quarter attached to the ancient Newar city - this section is distinguished by the presence of palaces, military installations and relatively open residential areas. This more recent urban expansion, however, is not due to the Newar community, but is rather associated with an ethnic group which both in terms of race and culture is quite different in nature: this Nepali-speaking group of Indian racial origin conquered the Newar kingdoms of the Kathmandu Valley under the leadership of Prince Prithvi Narayan Shah in 1768. In the process, Patan and Bhaktapur lost their function as residential capitals; Kathmandu, however, became the capital and the royal residence of the newly established Kingdom of Nepal, which, beginning with this period, encompasses the entire Central Himalayas. The side-by-side juxtaposition of two ethnically conditioned primary urban quarters, i.e., a Newar old city and the more recent sections of the new city, principally inhabited by Chetris and Brahmins, is, to a certain extent, the reflection of this two-strata society of victors and vanquished, of Aryan upper class and Newar underclass, in Kathmandu and Patan.

The political dominance of the Rana clan, which attained absolute power beginning in the middle of the last century, is all-encompassing. The Ranas succeeded in banishing the King as a shadow monarch to the confines of his palace, and thus were able to usurp state power themselves for nearly 100 years. As an expression of their constant distrust of the Newar community, costly military installations, such as barracks, weapons arsenals and parade grounds, were constructed surrounding the city of Kathmandu. Gurkha

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regiments could thus move up into the center of Kathmandu and Patan immediately at the slightest provocation.

The members of the Rana clan constructed luxurious palaces with large enclosed parklike gardens around the turn of the century in an Oriental display of pomp and power. Thus, the cityscape of Kathmandu and Patan reveals extended palace complexes, whose style apes European classicism.

Only after the British pulled out of India in 1947 the regime which they had supported could not longer maintain itself. Since 1950 the country has once again been ruled by the dynasty of the Gurkha kings. During this period, Nepal has opened its borders and relinquished the strictly maintained policy of shielding itself from foreign influence, a policy which had been in effect for 150 years. Although even the most modest of reforms were blocked during the reign of the Ranas, a many-sided and indeed stormy period of modern development has now set in with the help of foreign aid. This aid, however, has been concentrated to a very large extent in the cities of Kathmandu and Patan.

In Kathmandu itself, we find that a quite extreme functional change has taken place during the 30 years since the overthrow of the Rana regime, most noticeable in the zone of ring of palaces dating from the Rana period. Behind the pompous facades today one finds ministries, developmental aid organizations, foreign embassies, hotels or libraries. In recent years, palaces have also been torn down more and more frequently to make room for bungalow areas, often for diplomats and foreign aid experts. Military installations have also lost their original function. In place of barracks, Kanthipath Road is today lined with public buildings, such as the GPO, the Telegraph Office, hospitals and a large number of foreign embassies.

Temple and Pilgrimage Complexes

The reputation of the Hindu and Lamaistic pilgrimage and temple complexes of the Kathmandu Valley extends far beyond the borders of the country. All the important temple districts are located outside the cities proper, their surroundings are especially attractive and prominent.

The Buddhist stupa of Swayambhunath looks out over the city of Kathmandu and far into the Valley. The Hindu temple complex of Canguarayan also lies on a mountain ridge which projects far out into the Kathmandu Valley and affords a magnificent view. The golden-roofed pagoda of Pashu-patinath, the Hindu sanctuary dedicated to Shiva, the highest-ranking deity

in Nepal, is situated at the exit of the Bagmati in a rocky transsection valley. The bank falls off steeply from the temple area down to the Arya Ghat. The devote Hindu takes his ritual bath in the river at this point, and here lies the cremation ground for the dead. The very extensive temple complex of Pashupatinath, with its large number of smaller temples, courtyards, votive lingams, etc., also contains resthouses for pilgrims and saddhus. Up to 100,000 pilgrims gather annually on the banks of the Bagmati on the occasion of the Shiva-Ratri festival in February, and many of these pilgrims have travelled for over a month from South India, and indeed even from as far away as Sri Lanka.

The temple complex of Pashupatinath is among the oldest in the Kathmandu Valley, and presumably dates back to King Pashupreksha in the 3rd century (see U. Wiesner 1976:212). It is possible that this temple complex, lying quite far from the ancient center of Kathmandu, was previously itself the center of an urban settlement and the residence of a Hindu ruler.

The most important temple complex in Nepal is the stupa of Bauddha, striking in its monumental dimensions. This temple area is located on the ancient trade route to Tibet, which is no longer used today, but Bauddha has remained a special point of attraction for the Lamaistic Buddhists of Nepal and the Tibetan living in the country. Originally, the ring-shaped settlement around the stupa was inhabited almost exclusively by Tamang cultivators, but many Tibetan refugees have settled here in recent years, and no less than six Lamaistic monasteries have arisen in the environs of Bauddha⁴.

The large temple districts of Patan and Bauddha are indeed a symbol of the unbroken religious tradition in Nepal. Over the past 25 years, however, they have equally become special points of tourist attraction. An estimated 60,000 to 80,000 tourists visit these complexes annually.

Just how little the true religious importance of a holy place is dependent on architectural beauty is reflected in the simple Dakshin-Kali Temple situated at the southern exit from the Kathmandu Valley. This temple - set in a wooded ravine and located on a fresh mountain stream - is one of the most frequented holy places in the entire Valley, and the blood of sacrificial animals flows daily here from the altars, in accordance with ancient Tantric rites.

4. See M. Grosse 1977, Map 1.

The Kathmandu ValleyRural Settlements and Agricultural Land Utilization

As is familiar from the region of the Himalayan foothills, settlements in rural areas of the Kathmandu Basin are also very open in their layout. The houses lie isolated or in small clusters in the midst of the dry fields. Here we encounter a transitional array of settlement types, from the dispersed settlement with isolated farmstands to the cluster settlement inhabited by a single clan or caste. Physiognomically, it is in general hardly possible nowadays to readily identify the village boundaries. With the exception of the areas used for wetfield cultivation, there is no settlement-free land anywhere in the area of the valley bottom (see Aerial Photo 1). To be sure, there are even larger rural settlements with an ethnically homogeneous population in the Kathmandu Basin, such as the compact villages inhabited exclusively by Newars like Capagau and Balambu. In structural and functional terms, the larger Newar settlements of Kirtipur and Thimi should be categorized as villages, despite their urban-like physiognomy and large number of inhabitants (see U. Müller 1978). In Thimi, along with an agricultural economy geared to local consumption, the potter's craft, involving some 500 workshops, is of supraregional importance. The establishment of the principal campus of the only university in Nepal in the immediate vicinity of Kirtipur, however, appears to have had only a negligible impact on this ancient Newar settlement. Salambugau is a village inhabited solely by Chetri farmers. Settlements with an ethnically mixed population are, however, more common and typical.

The Kathmandu Basin is that region in Nepal with the most varied pattern of agrarian utilization. The abundant supply of water and the favorable topographic conditions allow for year-round irrigation cultivation, an exception in Nepal. The natural soil fertility of the lacustrine sediments has been considerably enhanced by the use of organic fertilization (principally using human faeces), and, over the past few years, by the use of chemical fertilizers. Nearly all field operations are carried out by hand. This particularly labor-intensive form of cultivation in the Kathmandu Basin does not differ in its methods from that of garden cultivation, and is, among other things, a consequence of the size of farming units as determined by the high population density: these units average a mere 0.5 hectares.

In irrigation cultivation, one must be careful to distinguish between summer rice cultivation in flooded fields and winter grain and potato

cultivation with repeated artificial supplementary irrigation by means of which the insufficient precipitation during this season is supplemented.

The Kathmandu Basin, containing a largely compact rice cultivation area of nearly 26,000 hectares, is the most important area for rice cultivation in Nepal after the Terai. By Nepalese standards, the rice yields in the Kathmandu Valley are unusually high: in especially favorable locations, yields of up to 3000 kg per hectare are attained, and the hectare yields are generally always above 2000 kg, which on the average is almost double the normal yield per hectare in the Terai. High level of fertilizer use as well as cultivation employing a *kodali* (hoe), along with the careful control of weeds, most certainly also contribute to the excellent harvest yields.

The cultivation of winter grains is carried out in a far less labor-intensive manner than the monsoon rice cultivation. Hardly any fertilizer is used. Greater care is exercised in connection with the potato fields. Potato cultivation is a stage leading to the especially labor-intensive type of irrigation garden farming which supplies foodstuffs for the urban market of Kathmandu and Patan. The area in vegetables is larger in the winter than in the summer, since vegetables are planted in a part of the rice paddies located near to the city. The vegetable farmers are always Newars. The size of the units is exceptionally small, and the vegetable farmer is quite often only the tenant of the land. This form of horticulture, based on very small plots, but employing an extremely intensive, market-oriented manner of cultivation utilizing manual labor exclusively, is wellknown, in particular from practices in China and Southeast Asia.

The rainfed cultivation plots in the Kathmandu Valley are situated on the terraces far from groundwater and high water. Rainfed cultivation is also practiced on the ridges within the Kathmandu Basin (Kirtipur-Cobhar ridge, Cangunarayan ridge), and principally on the slopes of the surrounding mountain frame. In the main, maize is cultivated from April to July on the non-irrigated fields, and soybeans or millet are planted between the rows of maize. Maize here does not require artificial irrigation due to the convective spring rains, but principally as a result of the abundant monsoon precipitation. Another reason for preferring maize cultivation is that another follow-up crop, such as soybeans, bushbeans, chili peppers, peanuts or mustard seed, can be sown in the maizefields even before the harvest. Even if maize brings lower hectare yields than the wet rice, the difference is considerably lessened as a result of a highly intensive

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"cultura mista". Winter grain cultivation is widespread at elevations above 1500 m on the valley slopes of the surrounding mountains of the basin. For the most part, however, the rainfed fields serve as fallow pasture during the dry winter months.

Opening the Kathmandu Valley to Traffic

Up to 1956, the Kathmandu Valley could only be reached by portage paths: all goods coming from India were transported on the backs of porters or via a small aerial cableway for materials from the edge of the highway at the southern edge of the mountains over the Himalayan foothills up to Kathmandu. The ancient portage route up from the Indian border reached the southern edge of the Kathmandu Valley in the vicinity of Pharphing, and led from there to Kathmandu (today expanded into a highway). Proceeding from Kathmandu, there were several possibilities to reach one of the important passes in the Great Himalaya: one route led northwest into the Trisuli Valley (today likewise transformed into a highway), and then went on to the pass at Rasua Ghari; a second route went northwest via Sankhu; the 3rd most important route led to the east via Bhaktapur and Banepa into the Sun Kosi Valley, and on up to the Kodari Pass. The old portage path from India has lost its importance entirely, and with it the town of Pharphing as a bazaar center and reststop. The present-day highway, built by funds provided by India and through the Colombo Plan, was opened in 1956 and follows another route, reaching Kathmandu in the west near Thankot. In addition, a 40-km-long heavy-duty freight cableway, reaching from the foot of the Himalaya over the Mahabharat Range on up to the southwest edge of the city of Kathmandu, was constructed using American help. The especially important ancient portage and commerce route to Tibet, which runs past Banepa and through the Sun Kosi Valley to the Kodari Pass, was turned with the Chinese help into a modern highway, though it is difficult to assess the economic and politico-strategic importance of this highway. Although previously a minimum of ten days were required to cross the Nepal Himalaya on foot, since 1967 it has been possible to accomplish this same journey by automobile in 1-2 days, and even by scheduled bus.

While traffic (esp. trucks and busses) on the pass highways to India and Tibet remains moderate, the inner-city and intra-urban traffic - as a result of the steadily rising number of private automobiles, taxis, scheduled busses, motorcycles, bicycles and rickshaws - is gradually taking on the

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dimensions so familiar from other Asian cities. A certain amount of relief was provided in this connection by the Ring Road, which circles Kathmandu and Patan and was also built with Chinese aid.

Away from the small number of roads, the villages can only be reached by footpath. Since even today neither pack animals nor ox-carts are used, harvest yields, mineral fertilizers, etc. must be transported in the time--honored manner on the backs of porters.

Even before the Kathmandu Valley could be reached by highway, there was already a good-weather landing field for Dakota airplanes. By 1966, the airport - which was constructed in 1950 by India - had expanded its facilities with American aid to the point where now almost all types of planes can land.

In the meantime, we find that more than 160,000 tourists now visit the Kathmandu Valley annually, and constitute an economic factor whose importance should not be underestimated. The runways of the airport - whose dimensions appear unusually large on a map of the Kathmandu Valley - symbolically reflect this tourist boom.

The rapid manner in which Nepal - and the Kathmandu Valley in particular - have been opened up to traffic is an exemplary illustration of what this once isolated and xenophobic Himalayan nation has now become: not only a tourist attraction of the first magnitude, but a confident nation of the Third World, politically active abroad, a country which repeatedly has proved itself able to make use of its strategically favorable location in order to play off its two powerful neighbors one against the other, becoming in the process the beneficiary, among other things, of massive and essential development aid. Does it not speak well for the value and utility of this admirable diplomatic policy when one notes that Indians, Chinese, Americans and Israelis have all been involved in constructing roads, bridges, the airport and the aerial cableway into the Kathmandu Valley?

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