

**An Investigation into the application of the
Vaastushastra in the Residential buildings of the Malla period
(A case study of Newar manuscripts in the collection of National Archives)**

Research Report

Sudarshan Raj Tiwari

Professor

Department of Architecture

Contents

Abstract	3
Introduction	4
Literature Review	6
Research Objectives	9
Methodology and Methods	9
The Sources	11
Results and Discussions	13
Conclusions	32
List of plants and trees from the manuscript	34
Building terminologies from the manuscript	36
References	38

An Investigation into the application of the Vaastushastra in the Residential buildings of Malla period - A case study of Newar manuscripts in the collection of National Archives

Abstract: Classical Vaastushastra, the science of architecture, which originates from the ancient Hindu/Buddhist thoughts and practices, is believed to have been the basis of the architectural developments of the Malla period. This paper reads, translates and analyses the contents of a Vaastushastra document copied towards the end of the seventeenth century and seeks to identify innovations that were made in the classical documents that must have been responsible for the uniqueness of residential architecture of the Malla period which largely defined the ambience of the urban areas.

The document reveals that great importance given to trees and wood in Newar architecture and contains significant instructions on proper planting and care of trees as well as selecting appropriate wood for use in particular building components. It is seen that the absolute measures as well as the scale of measurement prescribed in the document differs from the scale and measure outlined in the general Vaastu documents pertaining to Nagara and Dravida traditions. Similar case seems to pertain to the Manadeva system applied to measurement of land, public buildings and religious buildings such as temples and bahals. A very extensive section on pattern and consequences of living in houses with particular design is another special characteristics of this Vaastushastra for residential buildings and the author is not aware of availability of such contents in comparable traditions in India. Although the general design and layout guidelines do appear directed by the principles stated in Brihatsamhita and such other classical documents, the some particular patterns and consequences are Newar/ Nepali innovations that make it quite distinct. The actual basis of prediction of consequences of design to different members of the residing family such as the owner, his wife, son or daughter is not known from classical sources and so appears as another innovation in the traditions. These seem to have worked as strong controlling/regulating measures that created a possibility of diversity in design while assuring stylistic uniformity so characteristic of the Malla towns.

Suitability of timber from certain trees for different parts and components of buildings have been discussed and possibly draw from Silpashastra traditions with modifications to suit local

vegetation. Further analysis may reveal the relevance of the rule to the property of the particular wood from the tree. The ecological sense of the society may be reflected in some of the trees that are recommended for plantation but stated as not suited for use as building timber.

It is very likely that it is such differences from the Nagara and Dravida traditions that Newar/Nepali architectural traditions could have earned the categorical name of Varata or Vesara, which we find mentioned in several classical documents but researchers have not been able to spatially or stylistically assign to any Indian region.

The document also highlights many terminologies used in architecture that were in use in Newar architecture but have since gone out of use or forgotten. Many of the words could not be found in the Newar dictionaries available to the researcher.

Key words: Vaastushastra, Scale, Measurement, Building Pattern, Consequences of Design

Introduction: The excellent architecture and urbanism of the Newar buildings and towns of Kathmandu Valley of the Malla period are amply and aptly recognized as achievement of universal human and cultural significance by its inscription by UNESCO as a World Heritage Site. The harmony and agreement of design and detailing of the residential house with the neighboring houses, street, neighborhood and the town itself is clearly not a chance occurrence but a result of a controlled and regulated design and planning intent. Led by the ideals of the Hindu/Buddhist classical society so pointedly expressed by the great thinker Bhartrihari from ca. 7th century AD that ‘all knowledge of what is to be done in this world stems from the word’ (Goswamy, 2007), Malla period was largely guided by the knowledge of the *shastra*, the written treatises on various aspects of life and living. Yet, this urban architectural heritage is so strikingly different from those of the other regions of the Indian subcontinent that it could not be a result of the direct/literal application of the Indic classical knowledge of *Vaastushastra* as handed down in Manasara or Mayamata or as per some *Puranic* literature necessitating us to expect development and use of adapted documents with significantly differing instructions. Experts have also observed that such classical achievements in practice would presuppose the development of “a long and glorious tradition of teaching and learning about art and science of architecture (*vaastukala* and *vaastushastra*) in Nepal in the past” (Vaidya, 1985). Since Newar

architecture displays distinct architectural and artistic character enriched with its as distinct skills and craftsmanship and there has been a wide spread tradition of written treatises in the late Malla period, it would be logical to expect the learned leaders and guides of the architectural theory and practice to produce reference texts and handbooks for the purpose of education and training and generally for the continuity of the tradition. Despite of it and possibly because of the rough use such documents would have had to endure at building sites and their consequent loss or still more likely as the custodians of such manuscripts lost sense of their importance and use as illiteracy overtook the caste group entrusted with the activities, there are very few manuscripts about the planning, design and construction of buildings written in Newar language now available in collection at the National Archives. While this paucity of manuscripts in the local language demands that the National Archives make a renewed drive to locate, collect and preserve more of such documents, it is also imperative that the knowledge carried by these few manuscripts be made accessible to the present society so that it may be of use in cultural conservation. Indeed it would be such studies that would most likely be able to explain the unique and differentiating characteristics and details of Newar architecture. Some of such key differentiating characteristics of Newar architecture are derived from its crafty use of brick and timber in construction and the overhanging tile roofs supported by struts. The importance and significance of the structural, architectural and decorative use of woodworks in defining and elaborating the characteristics of Malla period architecture would be obvious to anyone who has had its visual experience. Art and architecture historians have eloquently extolled the excellence of arts and crafts of woodworks and wood carvings and the meaning they instill in Newar architecture.

It is also equally true and deserves to be reiterated that the structural usage of timber has determined the engineering and the overall architectural form of this traditional architecture. The key role played by structural timber in realizing the overall form of the traditional temple architecture is particularly notable. Closely packed heavy timber beams placed under the upper walls carry its load outwards unto the lower and outer core and thus make possible the construction of the shifting walls constituting the receding cores of the temple. The structure as well as the understructure of the roofs is also of timber. The characteristic large scale of the deep sloping roof overhangs has been made possible by combined use of single piece projecting rafter and its counterpart, the struts that fly out to support it. Although the excellence of art and craft of

struts often masks its structural role in eyes of the lay observer, non-the-less it remains pivotal in affecting the form and feel of the traditional temple and palace architecture both of which aesthetically and structurally exploit the roof projection and its strutting to the maximum.

The street side Newar residential house, recognized for compositional as well as constructional excellence in its use of carved doors, windows and other woodworks, has been instrumental in defining the general character of the town and providing a background for its other grander expressions such as the temples and the palaces. Apart from the art and craft of woodworks on the exterior street façade, instrumental in the structural realization of the design are the timber floor and roof joists that span the rooms over the characteristic triple parallel wall construction system. The narrow rectangular spaces that characterize the interior of the Newar residential architecture, be it in the palace of the king or the house of a citizen, is another point of difference with the classical secular architecture in the region. Primarily, this appears as an outcome of use of many thin timber joists cut out of trees with limited height and girth, a feature of the local genus of trees and the valley's climate and geology. One of the objective of this research study has been to examine whether such facts about trees, building timber and carved wood were recognized, understood and rationally applied and accorded due importance in the practice of architecture and in the Vaastushastra literature which acted as design guidelines and byelaws in the Nepal Valley in Malla period.

Literature Review: Information and data for the study of historical architecture of the Malla period has been based on accessing and study of extant examples of the available heritage building type, manuscripts and other written historical documents and pictures, residual knowledge carried by artists, craftsmen, masons, carpenters etc. For the study of residential architecture of the Malla period, several heritage buildings have survived intact in private ownership and but these buildings are fast losing their historical character due to pressures of development and changing lifestyle of the Newar community. There has been no complete and scientific study of the architectural design and development of the residential building architecture as yet. Descriptive articles on specific design and construction characteristics based on some analysis of observation of extant residential buildings and available historical information can be found in 'The Newar Art' (Macdonald & Stahl, 1979), 'Newar Towns and Buildings' (Gutschow, et al., 1987), 'Nepal Mandala' (Slusser, 1998), etc. 'The Newar Art'

carries facsimile illustrations from manuscripts showing sketches of building elements making the architecture of the Buddhist monasteries and Chaityas. The text makes indirect inferences on design sketches and does not provide translations or educated readings of the manuscript pages to substantiate the inferences.

Traditional architectural practice in South-Asian societies was largely mediated by the classical Hindu/Buddhist *Vaastusastra* doctrinal documents with some of the provisions of the doctrine adapted by particular societies to evolve and affect departures and peculiarities in architecture specific to them. While most adaptations have been a result of using particular materials and methods of construction to realize the doctrinal designs, some have also displayed distinct stylization preferences or requirements. The harmony and agreement of design, detailing and construction of Newar residential house with the neighboring houses, street, neighborhood and the town itself is clearly a result of a controlled and regulated design and planning intent of doctrinal proportions. In Newar architecture, clearly, it is the use of brick and timber and the preponderance of the tiered roof in its stylization that make up the striking differences and the distinctions. It could not certainly be a case of just a direct/literal application of the Indic classical knowledge of *Vaastushastra* as handed down in Manasara or Mayamata or as per some Puranic literature and necessitates us to expect development and use of adapted documents with significantly differing instructions. Materials and methods of construction and roof stylization applied in Newar architecture differ greatly from the two mainstream 'styles' named in the *vaastushastra* as *Nagara* and *Dravida* traditions practiced respectively in the general area North India and South India. While Newar architecture uses wood and bricks, both the mainstream Indian architecture styles are based on stone, the tiered roof paralleling the *shikhara* and the *vimana* of the *Nagara* and *Dravida* traditions. It is very likely that the third style, named Vesara (sometimes also called Bharāta) in ancient *vaastushastra* documents referred to the forerunner of the Newar architectural traditions. Since it was usual for traditional societies to record such distinctions and departures from the classical rules in writing into the local *Vaastushastra* documents and since its more likely that the locally introduced design departures would be written and composed in the local language of the workmen and craftsmen, this research was designed with a focus on *Vaastusashtra* documents available in Newar language.

An early inventory study of the Newar manuscripts preserved in the National Archives (Vaidya, 1985) lists only three manuscripts on architecture. Enquiries with the concerned officers of the archives revealed that there are quite a few more manuscripts on architecture¹ have been identified in the Archives in subsequent years but while some of these are fully in Sanskrit others mix Sanskrit and Newar languages in the text and the script used are also either Newar and Devanagari. Essentially therefore, no new fully Newar Manuscripts dealing with the subject of Vaastushastra has been added to the collection at National Archives since Vaidya's inventory. Bernhard Kolver's "Constructing Pagodas According to Traditional Nepalese Drawings" presents a transliteration, translation and analysis of one manuscript on temple architecture available in the researcher's collection (Kolver, 1996). It is the first and only one of such study available now from which we may make an understanding of orientation, proportioning and patterning practices in the late Malla temple architecture. Kolver's work makes no reference to residential architecture as the manuscripts are about building temples. Tiwari has commented on some sections of Kolver's study in his book 'Temples of the Nepal Valley' (Tiwari, 2009). Manandhar presents a facsimile of several folios of a manuscript of residential architecture apparently in his own collection but gives no transliteration, translation or analysis of the same (Manandhar, 1992). In my own collection I have two copied architectural manuscripts (one on temple design and the other on residential buildings). The manuscript on residential building is similar to one used by Manandhar. Some sections of this manuscript has been translated, discussed and applied to explain some peculiarities of Nepali traditional architecture in the book, Temples of the Nepal Valley in the chapter on proportions and measurements of temple (Tiwari, 2009).

Shanker Man Rajbansi has published an article titled Vaastulaxana in Vedic Udbodhan, it being a translation of a manuscript copied by a lay person for his use in the year 969 NS and in private collection of Prof. Mukund Raj Aryal (Rajbamshi, 2008). This document lists the appropriateness or otherwise of site, assessment on the basis of the standard criteria of *astabarga* such as time in terms of month, lunar day (*tithi*) and solar day (*bara*), pattern of *naga* in site, auspiciousness of time of construction, foundation stone laying, laying of door sill and concludes it with information on *vaastuchakra* and *rashichakra* (zodiac) and plan of foundation. The

¹ A comprehensive inventory of Vaastushastra manuscripts in the collection of National Archives has since been published by Department of Archeology of Nepal Government.

Vaastulaxyana document is wholly dealing with residential architecture. The author limits the article just as a translation only and makes no analysis or discussion of the content of the document.

Research Objectives: The main objective of the research is to study the provisions, use and implications of the *Vaastushastra* in the development of residential architecture in the traditional towns of Kathmandu Valley based on the study of Manuscripts written in Newar language and in collection of the National Archives. Specifically, it aims to seek out changes and adaptations made in the classical *Vaastushastra* that can explain the key distinguishing features, differences and departures of Newar residential architecture.

This research proposes to study a selection of such manuscripts on residential architecture through transliteration, translation and analysis. In particular, this research is based on the study and analysis of the manuscript “*Griha Nirmana Vidhi*”, manuscript number 1-654 listed under the subject Dharma (*Karmakanda*) title number 668 and Reel number A443/41.

Two other primary documents have also been studied, namely, “*Grha Nirmana Vastulekha Samgraha*”, manuscript number 5-1101 listed under the subject Dharma title number 216 and Reel number B407/5 (a *thyasaphu* with 25 leaves) and a lately copied (*thyasaphu* with 30 leaves) manuscript of similar content in the collection of the researcher. These two documents have been used to study comparative change in language and have been useful in interpreting some of the old terminologies and words.

Methodology and Methods: The key methodological strategy followed in this research is interpretivism and uses the strategic approach of document analysis. The analytical approach has been comparative and the interpretations are also largely guided by information from compared resources. Apart from the cross-comparison between the three manuscripts, other literature on *Vaastushastra* in general and such early classical documents as *Mayamata* and *Manasara*, has also been referred to.

The research activity started with the copying of the manuscripts (numbers A443/41 and B407/5) from the National Archives. As it was observed that the manuscript no B407/5 (hereafter called Document B) as well as the manuscript in the researcher’s collection (hereafter called Document C) had identical content and appeared copies of limited sections of the document *Griha Nirman*

Vidhi (no A443/41), only the *Griha Nirman Vidhi* document was transliterated. The preliminary transliteration of the document from Newar to Devanagari was done by Sukrasagar Shrestha. It was further read, corrected and edited by Kashinath Tamot, a noted expert in Nepal for classical Newar. The Devanagari and Romanized transliteration as finalized by Mr Tamot was used for translation into Nepali and English. The translation is also acknowledged to Mr Kashinath Tamot. Four dictionaries of Newar language e.g. *Newar Towns and Buildings* (Gutschow, et al., 1987), *Newar-Nepali-Angreji Sabdakosh* (Shresthacharya, 2054BS), *Nepal Bhasa Sabda-sangraha* (Tuladhar, 1948) and *Nepalbhasaya Vastukala-Khagvah Puchah* (Tamot, 2035BS) have been consulted. For source words in Sanskrit, Monier Williams' *A Sanskrit-English Dictionary* has been used. Still, quite a few words could not be translated as they are not in current use and so meaning of certain sentences have been difficult to access. Similarly it has not been possible to figure out present Newar, Nepali or English equivalent for quite a few proper names (such as names of trees and flowering and fruit bearing plants). A few architectural terms were also not possible to translate for the same reasons. In all such cases, the original word used on the document has been Romanized and shown under inverted commas.

This translated document was analyzed for its content and sections dealing with different aspects delineated. A comparative study was made of similar sections in other Vaastushastra documents, e.g. *Brihatsamhita*, *Manasara* and *Mayamata* for purpose of translating as well as discerning meanings in the case of words and phrases that could not be translated. Contemporary commentaries on the ancient texts such as *Sthapatya Ved-Vastu Sastra* (Gaur, 2000), *Puspacintamani* (Misra, 1966) have also been consulted for translation and correction of readings. The comparative study was also used for interpretation of meanings and clearer understanding of the content. These were also used for elaboration. However the key objective of comparative study has been to draw out the distinctive changes that have been incorporated in the document that can establish the unique developments in Newar architecture of the late Malla period. The key classical sources accessed are *Mayamata* (Dagens, 1985), *Manasara* (Acharya, 1995), *Brihadvastumala* (Dwivedi, 2003), and *Silpashastram* (Juganu, 2000). *Brihadvastumala* and *Silpashastram* are themselves collection of extracts from ancient sources such such *Brihadsamhita*, *Naradiya Vaastushastra*, *Silpashastra*, etc.

The sources: The key source for this research is the document “Griha Nirman Vidhi” itself. It is a *thyasaphu* (leporello) type of document, the form used in Newar Manuscripts dealing with matters of everyday practice and usage. The whole document appears copied at between NS 811 and NS 822 and shows, at least, three dates in different sections of the document. Although the catalogue lists this document as having 101 folios, there are only 81 folios in the microfilm and the technicians confirmed that the original document also has the same number of pages. In terms of pagination, it appears as a set of two documents, one paginated 1-20 and the other paginated 1-61. The smaller document, dated to NS 811 Aswin Sudi 9, is a roster of men and materials mobilized for the Dasain of that year (*Mahaniya labiya lyakha*). The first two folios of the second document describe the different parts of a building and the associated divinities thereof (*Grihe devata seye*). This followed by seven folios of a documentation of construction of a temple that started on NS 764 Baisakh Sudi 13, an action that happened almost fifty years before that of the festivity accounted in the other section. Folio 10 has content of relevance to residential architecture and appears as a misplaced part of the “Griha Nirman Vidhi” which follows these folios. Folios 11 to 52 present the actual document that is referred to by the title “Griha Nirmana Vidhi” of the catalogue. Even within this document, three sections are clearly discernible; first section dealing with trees and gardens (Folio 11-16) and the second section (Folio 16 – 25) dealing with architecture and the third section (Folio 26-52) containing 99 pattern diagrams of potential house forms and the consequences of their use.

The book of architecture (Folio 11-52) names Sri Bhupatindra Malla Dev as its sponsor. Since the manuscript also contains copies of architectural works dating back to NS 764 and also has standard measures of important temples such as Changunarayan, it is very likely that the document was prepared for Bhupatindra Malla to aid in his forthcoming campaign of master architectural works like the 55 Windowed Palace and Nyatapola and appears timed to his induction as co-ruler by his father Jitamitra.

Several dates are available in the texts of the manuscript. The earliest date mentioned is NS 764 Baisakh 13 Bright Fortnight, when the land was worshipped to build the temple of Sri Sri Sri Dhanadesvara. At this time, Jagatprakash, the grandfather of Bhupatindra Malla had just been enthroned at the age of five (Poudel, 2065BS). For all practical purposes, the Prime Minister Dhanade Singh was ruling and this explains the name of the temple in the text. The other date of

NS 811 Aswin 9 Bright Fortnight given in the records of Dasain activities possibly relate to coming of age celebrations of Bhupatindra Malla (born on NS 795 Kartik 6 Bright Fortnight). The manuscript can be dated to NS 812 Vaisakha Dark fortnight day 1 as it states that on that day the document was done as per the orders of Sri Bhupatindra Malla Deva.

‘Griha Nirmana Vidhi’ appears to be a selective compilation of standard approaches, rules and controls of the ancient Vaastushastra adapted for practice of residential architecture. Additional considerations seen in some later copies of Vaastusastra such as the “Vastulaksna” dated to NS 969 (Rajbamshi, 2008) therefore are taken to be related to issues and practices that were incorporated to meet the requirements of the changed society and as such may have been unimportant in the hey days of Malla residential architecture. The other two documents (Document B and Document C) have almost all contents similar (although the lesser number of house patterns are shown).

The manuscript displays impressive calligraphy of the period. Both its drawings and texts have been executed with style and accuracy. A facsimile reproduction of the relevant leaves of the manuscript is shown in Annex 3. As the document was prepared in the court of Bhupatindra Malla and on his orders, it is quite likely that the document contains all the standard contents of Vaastushastra used in practice of residential architecture.

The scribe of this book is not identified in the manuscript, but since it states unequivocally that this work has been sponsored/ordered by Sri Bhupatindra Malla (although officially only a prince² at that time, Bhupatindra was already assisting the king in affairs of the state), its place of publication is Bhaktapur.

The document was transliterated quite simply by the experts as the script was clear and very well executed. However, to assure accuracy, the reading and transcription was made by a specialist archeologist and then edited by specialist of Newar language with experience of Newar cultural research. Some of the difficult readings were decided on contextual grounds. Its translation however was not as simple as it contained quite a few words and phrases that are in contemporary use and also could not hint at potential Sanskrit sources. Since the document uses

² Bhupatindra Malla was enthroned on the year NS 816 (Bhandari, 2046BS). But Bhupatindra became active in the administrative affairs after his 16th birthday and his first major building project was the construction of the rest house Dathufale and nearby water conduit at Thimi in NS 811.

quite a few verbs derived from root words of Sanskrit (eg *sadarapa*, *jayarapu*, etc.) and also has words that continue the use of ‘double words’ echoing such parallels (eg *Lahata*, *Padapa* etc.), the manuscript must also be an early Newar manuscript on architecture. It is quite evident that major sections of the document are based on Sanskrit originals but sections that appear written from Newar sources and/or using local builders’ terminologies and verbs is also seen, particularly when dealing with details of proportioning rules.

Results and Discussions: Results of the research has been a number of discreet descriptive and interpretive narratives by sections (such as selection of wood, planting and care of trees, measurement and proportions, selection of site, study of soil, etc). These are presented below in the order of their presentation in the manuscript. Each thematic descriptive narrative is followed by an analysis and discussion of related issues.

As Newar manuscripts begin a treatise, chapter, new topic, or important paragraph with a symbol for ‘Siddham’, ‘Om’ or ‘Sri’, taking cue from such symbols used in the present document, it can be divided into several sections in terms of their thematic content.

Symbolism and Proportions: Section one starts in Folio 1 (Verso) with the symbol ‘Siddham’ and homage to Sri Ganesh (“?uṁ śrī gaṇeśāya namaḥ”). This section presents the residing deity of the various elements, components and spaces of a building. The god spirits named are worshipped in the assigned element or space during construction or during its inaugural i.e. during *Vaastu pravesh*. Since the corresponding Buddhist document is named ‘Sthirobhava Vakya’ (Sakya, 2028BS), it becomes clear that the purpose of worshipping the deities in their assigned space or element is to seek their pleasure and assurance of stability of the architectural element and the edifice in total. The residents of a house so propitiated and stabilized will gain good tidings and happiness at all times (Sakya, 2028BS). In Document C, the paragraph which gives the same information is titled “Grihe Devana Seya” which translates simply as ‘know the names of gods of the house’. The gods to be propitiated on different components of ground floor of a building are named as follows:

Dharani Varaha resides in Chedi (ground floor); Kurmasimha in foundation trench; Bhairava in threshold; Brahma and Vishnu in jambs of main door; in top sill is Srikanthanatha; bottom sill is occupied by Dharmavati; door shutters are Ganga and Jamuna; niche is Sarasvati; in (inner) door

jambes are Riddhi and Siddhi; in doorbolt is Kamesvara; in walls of ground floor is Adilaxmi; in the earthen water pot is Siddhiyogini.

In the door of the store in first floor, Vaisnavi is worshipped in threshold, Sri and Laxmi in jambes, Gayatri in shutter, Saraswoti in opening, Mahalaxmi in floor, Dharmalaxmi on the lock ring, Sthiralaxmi in lock and Mokshyalaxmi in the key. At the top center of the attic floor is worshipped Paramalaxmi.

Although the ‘Sthirobhava Vakya’ (Sakya, 2028BS) starts with the Buddhist creation myth of Swayambhu Purana and narrates it in length, the architectural instructions are attributed to Vishwokarma, thus, making it similar to the source manuscript studied. The god spirits worshipped in some parts of buildings are also differently identified here, e.g. Sheshnaga is propitiated in foundation, Mahadeva in ‘elohn’ base stone of posts, Bajrasatwa in post, etc. It is



stipulated that the ground floor (*chedi*) represent the nether world (*patala*), first floor (*matan*) is the world of the mortals (*martyamandala*), second floor (*chota*) conveys the spirit of heavens (*swarga*) and if there be an *agama* (unaccessed attic?), it is *moksyapur*, the world of the released. (Sakya, 2028BS)

Figure 1: The Eight Vaastu (as per the illustration from Document C)

Orientation: A new sub-section is indicated by the use of the symbol ‘Siddham’ in the new paragraph that starts in Line 9 of Folio 2 (Verso). The starting phrase (? *devarayā lakṣaṇa kāyayā*) sets the topic of the paragraph as standard principles of the temple design. It presents the rule of orientation of temple based on the caste of the builder and the sizing of the sanctum in ‘angula’ measures. This is an abridged version of the rules of orientation based on the theory of remainders as per Brihatsamhita and commentaries on it (e.g. Utpala’s commentary) also

discussed in modern works (Kramrisch, 1986; Kolver, 1996). A colour diagram showing the location of the eight Vaastu 'yoni' is found in Document C. The diagram shown in Folio 10, Recto also shows the directional location of the eight Vaastu under the title, 'the Characteristic Signs of the Courtyard'.

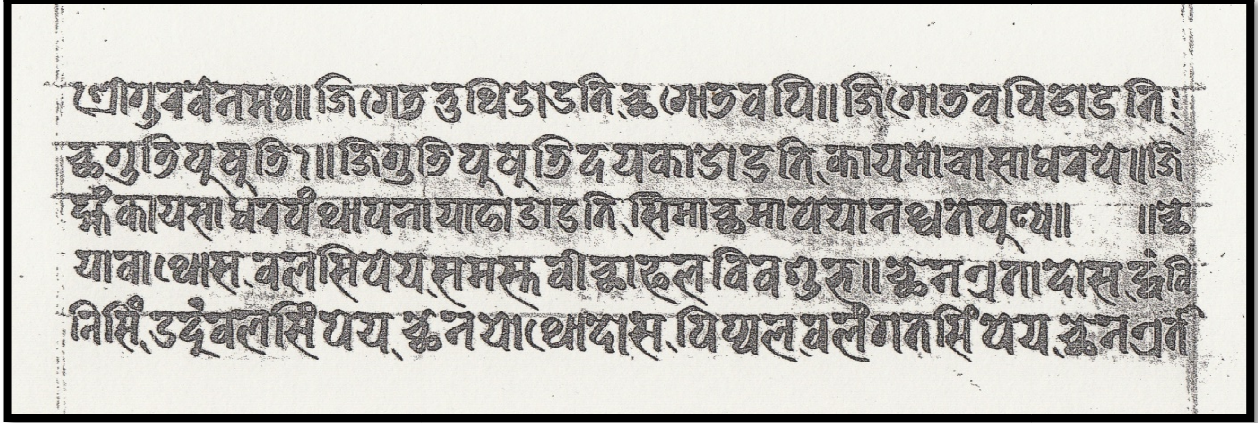


Figure 2: The second section starts by extolling the merit of planting trees, Folio 11 R.

Building coordination: Line 7, Folio 3, Recto starts with symbol 'siddham' and the phrase (?tavadhāna jyāyā betāri boyakāyā) and gives the proportional distribution of ritual drinks to various supervisors of works such as carpenters, iron workers, roof tile layers, stone carvers, metal casters (gold and silver workers), etc. while executing large projects.

The importance of wood and carpentry works in the building project is highlighted by the fact that the chief carpenter is given two portions of the one quarter measure, while one quarter measure is due to the brick/ tile layers. The last quarter is shared by various other trades such as stone carving, iron works, metal works, etc. The naming of the ritual as 'betāri boyakāyā', literally, 'handing over the turban', conveys the standard architectural practice of the client handing over the leadership/charge of construction to the craftsmen. It may also be because of such a practice that the design principles are set out in great detail so that design decisions are not required to be taken at site. For example, the proportioning of the main door has been stated to the detail of various components such as post, threshold, head and horns as well as trimmings and inner frames and shutters e.g. 'gu', 'tira', 'palivara' and 'dephali'.

Trees and Gardens: Folio 11, Recto, starts with the phrase (?śrī gurabe nama ḥ) and highlights the importance and religious merits to be obtained of planting trees. The different honorific

reference suggests that this section of the document comes from a different original source like Silpashastra (Juganu, 2000). The sentence reads as follows:

jigoḍa tuthio uti chagoḍa vapi || jigoḍa vatio uti chagoḍi puṣuḍi 1 || jigoḍi puṣuḍi dayakāo uti, kāyamocā sādharape || jimhaṃ kāya sādharapaṃ thāpanā yānāo uti, simā chamā peyāna thvate puṇya ||

It can be translated thus. “The merit of making one pit conduit is equal to digging ten wells; one pond is like making ten pit conduits. Raising a child is as meritorious as making ten ponds. The merit of planting one tree is tenfold as much as raising a child.” Thus, planting one tree gives as much merit as digging 10000 wells! For a urban design culture that developed and profusely used just the brick and stone paved streets and squares to make its public spaces and its urban landscape gray, such strong glorification and endorsement of the act of planting a tree may appear as a misplaced edict for the Newar architecture at first glance. Apart from the fact that this architecture itself would not have been possible without wood at all and thus the need to glorify the act of planting as well as nurturing trees to maturity so that they become fit building timber, the traditional urban house was actually also planned with a backyard, the kitchen garden or ‘keva’, which while hidden from public view covered over a third of the towns area. Planting the back garden with fruit trees, particularly the grapefruit (nep. *bhogate*) had been a cultural obsession of the urban Newar until recently. In the present *Vaastusastra* text, we find the following rules and recommendations for ‘keva’ in Folio 12 Verso 3 - Folio 13 Recto 3:

ekā yukula, yakūla, chena thvate, thāyasa kevā dayakarasā, kalaha, cittabhrānti, duḥkaphala rāyu || thvate kāraṇana rājāyā śubha, kāya chaya vodharapu yotā, yaṃtā, vaṃtā, thvate chena diśāsa kevā dayakāna śubhaphala || ||

This can be translated thus. “If the garden is laid out to the south, south-east and south-west of the house, it will bring quarrels, wandering mind and sorrow. This is good for the king and will result in increase of sons and grandsons. It will bring auspicious results if the garden is laid to the west, north and east of the house.”

The text recommends planting of Vala-si (Banyan tree, bot. *Ficus Indica*) tree to the east of the house and is stated to be auspicious and fulfilling all wishes. The other auspicious trees are Dvambini-si, Udumvala-si (bot. *Ficus glomerata*), and Plaxyapalankha-si (Hindi Pakad), all to the south and Pippal (bot. *Ficus Religiosa*) and Valagata-si, both to the west. It is further stated

that fruit trees, which bear fruits with lot of seeds such as Vada, Rovayala, Kadalika and Dadimi (Pomegranate bot. *Punica granatum*), can be planted in residential plots. But trees of Laha-si, Kachanala-si, Slesmantakaku-si (Nep Lupsi), Arjjun, Karanjanraja-si are not recommended for planting in residential plots.

The document prohibits the planting of trees with thorns and milky sap and with or without fruits citing negative consequences such as bringing fear, loss of wealth or even loss of off-springs otherwise. Likewise Nilivam-si, Haridra-si (Hindi Haldu) and Haradi-si trees are not to be recommended for planting in residences as doing so will result in loss of sons and riches. It could be reasoned that all these trees make poor building wood because of their weakness, softness or knottiness. These edicts appear copied from Vaasturajavallabha (Dwibedi, 2003). The same document, however, states that Champaka (Nep Champa), Patal (Hindi Gulab), Kadali (Hindi Kela), Jati and Ketaki (Hindi Kevada) are auspicious (despite having thorns or milky sap?). Actually, Vata (Hindi Baragada) and Asvatha (Nep Pipal) trees, both with milky sap and Shalmali (Nep Simal), Plaxya (Hindi Pakad) and Udumbara (Hindi Gular) trees, all thorny, bring good tidings if planted in proper directions. According to Narada Vaastushastra (Dwibedi, 2003), the wood from the trees of Plaxya (Hindi Pakad), Adumbara (Hindi Gular), Chuta, Nimba (Nep Neem), Snuhi (Hindi Sehuda), Bibhitaka (Hindi Baheda), Bata (Nep Vara), Aswatha (Pipal), Kapitthaka (Kaitha), Agasta, Shigru (Hindi Sahajan), Tala (Hindi Tanda) Tantidika (tamarind) are to be avoided in buildings (residential plots?).

According to Barahamihira, flowering trees with glowing leaf should be planted in residences. For Brahmins, Devadaru, Chandan and Mahuwa is auspicious for residential use, for Chhetriya Neem, Pipal, Kahyara and Bel, for Vaisya Jivaka (Hindi Vijayasar), Khadira (Hindi Khayara), Sinduka (Hindi Mevadi), Syananda (Hindi Tinisha) and for Sudra Tinduka, Kesara (Hindi Nagakesara), Sarja and Arjuna. (Dwibedi, 2003).

Propagation, Planting and Care of Trees: The document goes to significant length to describe the planting, propagation, farming and care of trees in general and flowering and fruit trees in particular (Folio 13 – 18). Since such treatment of the subject of trees is not to be seen in the standard Vaastusastra documents such as Manasara (Acharya, 1995) and Mayamata (Dagens, 1985), this selection seems made particularly for the architectural practice that profusely use timber as is our case here in Kathmandu Valley. Comparative study shows that the manuscript

compilation is drawn from other classical sources (Misra, 1966); (Gaur, 2000); (Juganu, 2000); (Dwibedi, 2003). Clearly, to sustain an architecture that profusely used timber, a full participation of the society in the cultivation and nurture of trees must have been generated through creation of newer social, cultural and economic values. The emphasis given to trees bearing flowers and fruits in the document of architecture suggests that the trees for building were also selected on the consideration of the food and cultural value of flowers and fruits that the trees provided for several decades while maturing into building timber eventually. A flowering tree thus appears to have made a better building wood and the idea of auspiciousness may actually have developed from such practical considerations. Trees in the gardens and nearby towns may have been planted as much for such reasons as for wood. The use of fruit and flower value to raise social awareness and action for farming of building timber can be seen as a novel exercise in inculcated sustenance and eco-sensitivity of timber based architecture. The use of wood from fruit and flowering trees in traditional Newar architecture deserves high praises as it had considered the food and fruit values of trees along with its properties and value as a building material!.

Folio 13R has a sentence that states that trees grow better in level ground, near water and when the pits for planting trees are fed with green leaves and grass. It describes plants as *padapajati* – ones that draw water from its ‘feet’- and classifies them into four categories; (a) Vanaspati (trees that bear fruits without showing flowers), (b) Druma (that flower and then bear fruits), (c) Lata (with branches creeping on ground and rooting) and (d) Gulma (which give out many branches from a node). The Plants are propagated in three ways, through seed, branching and bulbs. Means and methods of propagation of plants, planting and nursing them, improving quality of fruits (such as Dhare, pomegranate is presented in great detail), preparation of nutrient (‘kunapa’), improving flowers (their flowering and scenting) such as Ketaki are then presented in detail. Methods of treating trees burnt by fire or hit by thunder-bolt are also presented.

Such elaborate description of the processes of propagation, planting and care of trees are rare in Vaastusastra documents in use in Nagara and Dravida traditions and so relates specifically to timber based architecture of Kathmandu Valley. It can be seen that Manasara and Mayamata dwell only on stone as building material although there are some chapter which deal with constructions that use timber.

Site Types by Shape: Folio 18, Recto, Line 3 starts with the symbol ‘Siddham’ paying respects to lord Viśvakarmā (? ūm namo viśvakarmāya). It is known from ancient literature state that there are two basic traditions in architecture, the northern tradition which followed Viswakarma and the southern tradition that followed Maya. This section of the document clearly comes from the architecture of Viswakarma as represented in such ancient documents such as Brihatshamhita, Muhurtamartandya, etc. The language used is Sanskrit although the script is Newar (for describing type of sites, scale and measurements and layout of building blocks) – this is quite unlike the previous section which used the Newar language presumably in the form as popular in Bhaktapur in late seventeenth century. It states the sixteen characteristics of sites (Vāstulakṣaṇa) and the consequences of the use of each as follows:

(1) Rectangular site ‘āyataṃ’ begets ‘siddhi’, or perfection (2) Square ‘caturaśra’ site begets riches (3) Circular ‘vṛhat’ read as ‘brittakar’ brings and increases satisfaction (4) Sites shaped like a master seat ‘bhadrasana’, leads to success in works, ‘kritartha’ (5) Arcuate sites, ‘cakra’ brings poverty (6) Site with unequal or unlike sides, ‘viṣamavāhū’ begets sorrow (7) Triangular, ‘trikona’ sites bring fear (of wrath?) of kings (8) Cart shaped (tapered and sloped as bowl) ‘sakatā’ leads to loss of riches. (9) Long and narrow sites ‘daṇḍa’ lead to loss of animals (10) Shaped like betel leaf ‘pana’ causes loss of eyes (eye sight) (11) Shaped like Damaru, ‘muruja’ begets death of wife (12) Multiple sided sites, ‘bṛhanmūkhaṃ’ cause loss of finance (‘arthanasa’) (13) ‘Byaṃjanaṃ’ (?) causes loss of jobs (14) A sitelike a hump with a high point in the middle and sloping all around ‘kurmmaṃṣṭa’ brings pain (15) Bow shaped sites, ‘dhanū’ bring fear of thieves (16) Shaped like a half moon, ‘surpa’ causes loss of crops (paddy).

The sixteen shapes of sites are standard references in Vaastushastra and the correction of readings above have been made as per *Rajmartandya* as quoted in *Silpashastram* (‘Juganu’, 1990). The properties of sites stated in this manner are attributed to Varahmihira (Dwivedi, 2003).

Measurement Scale and Standards: Then Folio 19, Recto gives the standard system of measurement in the stanza, thus,

‘goraja saptabhiryuktāṃ yukā sa ḥṭtabhiyo bhavet aṣṭayavai jyaṣṭāṅgulī
saptayevaimmadhyamāṅgulī pramāna īti kathyate’.

This may be translated thus; ‘Seven ‘goraja’ make one ‘yuka’, seven yuka make one ‘yaba’. Eight yaba make Jestanguli, seven yaba Madhyamanguli. This is said to be the standard of measure.’

Since the same stanza is repeated in the other two documents (B and C) also, the statement must reflect the standard in use Malla period. This standard of measure shows one important systemic difference with the measures recommended in classical Vaasusastra of Manasara (II. 40-48) as well as Mayamata – which can be seen by comparing the above with the extracts below:

In Manasara, II. 40-48, the system of measurement has been elaborated thus - “Eight hair-ends joined together make what is called a *liksha* (nit), eight nits combined together are called a yuka (louse), eight lice together are called a yaba (barley-corn), eight barley-corns combined together make what is called an angula (finger-breadth). Each of these (modes of measurement) is said to be of three kinds, especially with regard to (the increment of) yava-measurement. With six, seven and eight barley-corns are (distinguished respectively) the smallest, the intermediate, and the largest yava measurement. (Acharya, 1995)

In Mayamata, 5.3-6a, we find statement of a similar system of measurements – “Eight atoms are equal to a speck of dust and, in multiplying each time by eight, we go from a speck of dust to the tip of a hair, then to a nit, to a louse and finally to a grain of barley. Eight barley grains make a digit (angula) which is also called ‘matra’ etc. (Dagens, 1985)

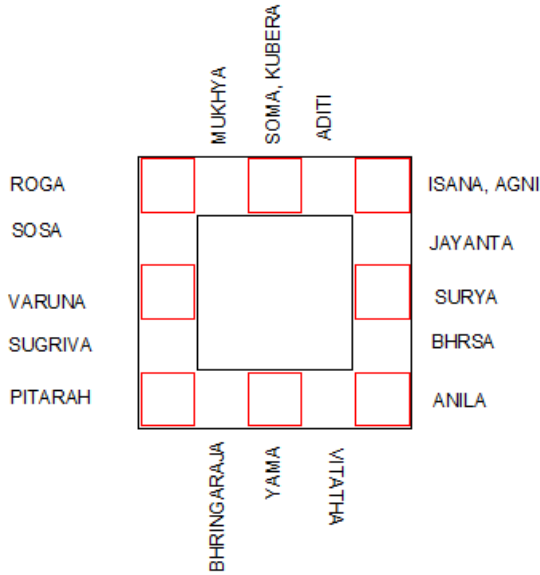
The term ‘goraja’ of this document is equivalent to ‘liksha’ of Manasara (as both as particles settle on hairs), the measure of one Jesthanguli as per this manuscript (JaN) equals (8 yaba= 8x7 yuka= 8x7x7 or 362 goraja, i.e. dust particles sized by cows cf. Godhuli, haze created by cows returning to village after a day’s grazing) where as one Jesthanguli according to Manasara (JaM) would be 512 goraja. This makes 1 JaM (Manasara or Mayamata-jestha-angula) equal to 1.414 or $\sqrt{2}$ JaN (Newar-jestha-angula). A discussion on this difference of measurement standard is found in ‘The Brick and The Bull’ (Tiwari, 2001) shows that the equivalent measure in centimeters of the Newar *angula* is much smaller than the Manasara *angula*. From the discussion based on analysis of other documents showing dimensions using such measures it has been computed that a Manadeva ‘Ku’ is made up 25 *angula*. It is known from Folio 22, Recto Line 2

that the ordinary Ku is made up of 24 angula and prescribes the use of Maṇadeva lakṣna for the measurement of land as well as religious buildings.

Over several lines in Folio 21 Verso, Folio 22 Recto and Folio 23 Recto and Verso, measurement systems and scales are presented. For residential works, works start by sizing the door. Here, the prime prescription is for use of Jestha measure while Madhyama measure is prescribed for Shrestha and Kanistha measure for low castes. To measure land, Manadeva measure is to be taken. The text gives a set of instructions for creating the Manadeva scale from the standard scale of 1 ku (which is 24 angula wide). Thus Manadeva measures can be arrived at by adding $3\frac{1}{2}$ and then 3, 5, 7 and 9 'angula' to the standard measure of 1 ku and the new measures named after the number of angula added eg 'svo-anguvo', 'nga-anguvo', 'nhsa-anguvo' and 'gu-anguvo'. At least other three systemic units are mentioned (e.g. 92 angula 2 yaba as Jestha, 77 angula 2 yaba as Madhyama and 44 angula 2 yaba as Kanistha) for use in a system called 'ubhaya dhara dhan'. It can be observed from the sectional sketch of Kankesvori temple in another manuscript (Kolver, 1996) that term 'dhan' refers to Manadeva 'ku' used in temple measures. Although the full sense of these measures and systems is difficult to be made out, still it is clear that these are not for use in measuring residential sites or land for such building. Also the fact that all the three measures are not whole angula and have an extra 2 yaba, this may signify some criteria of auspiciousness too. Thus the measure and proportions using Manadeva-angula is not fully clear, but still a series of such measures could be derived using the formulae ($24+3x+3n$ or $5n$ or $7n$ or $9n$) as needed ($n= 1, 2, 3..etc.$). Somewhere in this set, the Manadeva angula and its combination need to be sought, considering the variants of Manadevajestha angula (1 JaM equals 1.414 JaN or 11.3N yaba), Manadevamadhyama angula (1 MaM equals 1.414 MaN or 10N yaba), Manadevakanistha angula (1 KaM equals 1.414 KaN or 8.5Ny).

Location of building Blocks on site and its Consequences: The above set of measurement scale is followed by a number of lines (Folio 19 Recto Line 5 – Folio 20 Recto Line 1) that deal with the location of building blocks in the site and its consequences on the religious merit, health, wealth and life of the resident. From the Sanskrit composition of the sentences, it is obvious that the content is directly copied from classical texts. It seems that there is no addition or subtraction made in the material and meaning for local flavor at all, at least in these cases. The following summarizes this theme:

If there should be no block in the north-west corner, such a house will beget riches and property. Sould there be the building there, the residents will get ‘raja’ disease and will be perennially afflicted by illnesses. If there is no building on the west, it will be afflicted by drying of water (wells?). Residence with a west block will be cool, the resident being always studious and will amass riches and property. The east entrance increases the artistic qualities of men, whereas the north entrance begets riches. A passage from the west will cause loss of riches and south



entrance will bring fear of death. The house with no building block on the south is called Yamadvara and will reduce length of life, harm lineage and one should not stay even a night.

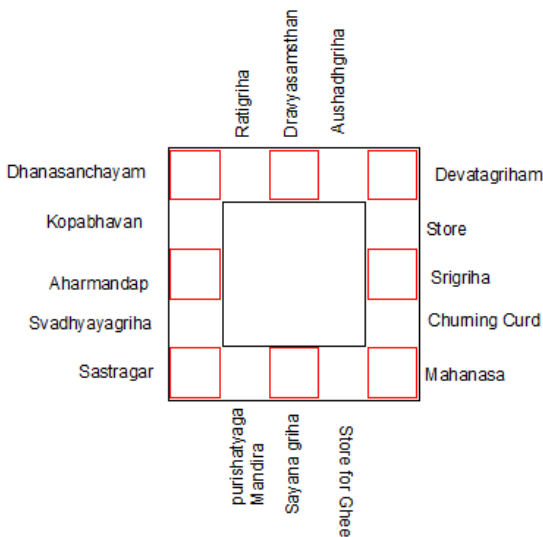
The text points out the consequences of only one corner block (the north-west) and the cases of not having each of the four axial blocks and also using those gaps for entrance. It is notable that not having the north-west block or not having the north block and taking entrance from there both result in gain of riches.

Figure 3: The ‘pada-devata’ of the Vaastupurushamandala

The relation of such consequences with other classical texts of Vastusastra, such as Brihatsamhita, which gives what it calls the ‘rule of sixteen houses’ is worth exploring here to unearth the system of predicting consequences. It is believed that the ground rules for laying out various functions and planning of a house in the later Vastusastra is a development of the standards set by these statements. As per this, the prescribed function of the north-west block is ‘dhanasanchayam’ which translates as ‘wealth store’ or granary (and that of the north block is said to be ‘dravyasamsthan’ i.e. the treasury. It would appear that not having a block in the space results in accretion of results that is commensurate with the functions prescribed there! At least this seems to be the case of NW and N blocks. In the third case of not having a west block (whose function is stated as a space for dining room or even as study and ‘rodana’ if a little to the south and north of the west), the consequences of dryness and loss of riches if the gap is used for entrance is difficult to tally. It appears more related to the location of ‘vrisa’ or ‘naga’, which

symbolizes water, in the west square of Vaastupurushamandala. The north square is the abode of ‘Kubera’ in the mandala and thus explains the gain of riches, which Kubera amasses and symbolizes too. Similarly the east and south entrances stated to respectively augment artistic qualities or cause loss of life are places of blocks for the function of Srigriha and sleeping in the injunctions of the Brihatsamhita. In the mandala, the east square is of the sun and the south square of Yama.

The paragraph in the manuscript considers all of the four cardinal placements of entrances possible for a building. While the text only considers consequences of axial entrances made by omitting central blocks on the north, east, south and west sides of the square, the prescribed entrances are the ones in the east and the north while those on the south and west bring untoward consequences such as death and loss of riches respectively. The east and north entrances are the favored ones and offer artistry and wealth respectively. These prescriptions have been interpreted and expanded in later literatures and these prohibit taking the main entrance from the center of any direction. Venkatesan elaborates this aspect as follows:



“The main door of the house should preferably be located in any of the exalted positions from the North-east corner – either from North of North-east or from East of North-east. Doors can also be in the South of South-east or West of North-west but in no case, should the main entrance be from the center of any direction. Also the main entrance or door should be avoided in all the following four directions, namely, North of Northwest, East of Southeast, South of Southwest and West of Southwest. ” (Venkatesan, 2001)

Figure 4: Directional Assignment of Functional Spaces as per Brihatshamhita.

In total, the best entrance position appears to be the north-east bringing both wealth and artistry. In some more esoteric interpretations of Vaastu, it has been stated that openings in North-east let in and concentrate cosmic energy, which is said to flow from North-east to South-west. By the

same token, cosmic energy is said to be better retained in the house when South-west is closed. For these very reasons, chamfering or truncation in the Northeast should not be done nor should balconies be provided in the South-west corner and to its south or west.

The above discussions would seem to suggest that the consequences of building as well as omitting house blocks in site layout can be read through considering the prescribed function of spaces (Brihatsamhita) and the due place of the 'pada devata' of the Vaastupurushamandala (of which there are 32, twenty eight of them representing the Nakstra and four the universal cardinalities) and their symbolism and characteristics.

It seems that the lack of building in the corners and the axes are full of consequences that are related to the prescribed functions or the character of the resident deity of the directions of space. Using the gap for the entrance heighten the consequences, whether good or bad. It is notable and the consequences of having or lack of blocks in only one corner position (NW) and all four axial positions and the use of the gap in these axes as passage has been considered in the main texts. The 99 pattern plans shown in Folio 26 to 52 however extend the permutation and combinations to all the sixteen blocks. These cases are discussed below.

Patterns and House Design issues: The manuscript gives 99 house design options and all the patterns have been provided with a statement of consequences of residing in such houses. This appears like elaboration of the theme of layout of housing block in the site and the consequences as briefly presented in Folio 19 Verso and discussed above. Here each of the combination is graphically shown and the illustrations span from Folio 26 to 52. It is notable that quite a few of the patterns are not recommended and are said to lead to deadly, harmful or unpleasant consequences on the life of the residents. Such patterns have not been seen in other Vaastusastra documents coming out of India and these may be only one case of such prescriptions. It may have happened that the practice of Vaastusastra using pictorial diagrams rather than astrological charts took hold in Kathmandu particularly as the profession was dominated by craftsmen than astrologers. However, since the names given for many key patterns are in Sanskrit or derivatives of words in Sanskrit (mostly *tatsama* words), the origin of these patterns from earlier classical traditions is clearly indicated. But the many unnamed ones, these may have been derived or prescribed for purely local reasons. The patterns seem to be based on permutations and combinations of the 'sixteen block system' stated in Brihatsamhita, the most ancient of the

Vaastusastra and the consequences based on the directional squares of the mandala allocated to the spirits of the universe and their characteristic behaviour . According to Brihadvastumala (Dwibedi, 2003), the following is the proper usage of spaces in those blocks stated as the “rule of the sixteen houses”:

It is said that east house is Srigriha (house of Laxmi, treasure room?), South-east is Mahanasa (kitchen). South is sleeping house (shayana griha), Nairtya (southwest) is Sastragar or Ayudhasrayam, dining room on west, northwest house is for wealth store (dhanagar or dhanasanchayam). In north house locate dravyasamsthan (treasure?), in northeast is devatagriham (worship room), between east and south-east is griha for churning curd and house to store ghee between SE and S. Between S and SW is toilet (purishatyaga mandira) and between SW and west is svadhyayagriha (study). Between west and NW is kopabhavan (rodana), between NW and north is Ratigriha (kamopabhoga shamanam). Between north and NE is treatment room (chikitsa/aushad griha), between NE and east is all purpose store.

First, considering the blocks in the cardinal axes, the east, south, west and north blocks, for which the appropriate functions as per Brihatsamhita is respectively Srigriha (house of Sri, riches, treasures and also ‘yasa’ or fame), sleeping house, dining and ‘dravyasamsthan’ (the corporate place of riches, where riches are made). The ‘pada devata’ of the corresponding squares are respectively Surya (sun and fame), Yama (death), Varuna (water) and Kubera (riches). Again considering the corner axes, the north-east, south-east, south-west and north-west blocks, for which the appropriate functions as per Brihatsamhita is respectively Devatagriham (worship room), Mahanasa (kitchen), Sastragar (where arms are kept) and dhanagar (store for wealth). The pada devata of the corresponding squares are respectively Isa (God of gods?), Agni (fire), Pitri (lineage deities) and Roga (sickness).

Of the four possibility of laying out a house in cardinal axes, only one with the block on south is auspicious and is named Hiranyamukha (golden orientation to the north). Clearly this blocks Yama and provides a good space for sleeping and the consequences are increases of family and riches. All the other three are not good as the house with west block leads to loss of riches (facing west and named Paschimamukha), north house will cause death of owner (as it faces Yama and is called Yamamukha), east house will cause death of children (as it places its back to sun and is called Pretamukha).

Pattern number 5 has two blocks, on north and on west and is named Yamasurya and brings the consequence of death; in this case we can note the open south and infer that Yama is a strong actor and Surya can give no respite in matters of death! Pattern number 8, which has three blocks with only the north vacant, this is named Hiranya and showers every property and happiness. By contrast, Pattern 6, with blocks on all three sides with south vacant is named Churi and causes loss of riches and bereavement from wife. U-shaped houses with openings in east (Sukstra) and north are auspicious but with openings in south and west, they bring severe consequences like death and loss of riches. Pattern 10, which is a fully built rectangular courtyard house, is named Chuchako and is most auspicious of all the patterns so far with results of increment of long life, riches and family! Likewise, Pattern 11, which has two blocks with east and north open, is called Siddhartha and brings the fruit of riches and property. The reverse of this, Pattern 12, with south and west open is inauspicious and brings the wrath of state.

Pattern 16, which has all the seven houses in the axes and corners except the North-east, the house named Rudraksa, is auspicious and the owner becomes learned earning respects all round. Leaving out the north-east corner, where the head of the Isa is assumed located in the Vastumandala, appears to be the cause of auspiciousness. All the other three, 'seven houses' configured with vacant SE, SW or NW are inauspicious. Vacated space for Agni, Pitri and Roga are obviously not rewarding for humans. Pattern 20, which has six houses and vacant axes blocks on north and south is unauspicious. With both the space for Yama and Kubera open, this leads to loss of wealth and unhappiness; this suggests that the effect of Yama opening is moderated by leaving out the north axes block also as death appears avoided.

Pattern 21, which has all the blocks except the four 'khava' (blocks left of axes) is inauspicious and results in tension and loss of riches. The 'khava' squares in the four directions are spaces for medicine (north), curd churning (east), toilet (south) and crying room (west). As the 'khava' squares in the west is house of Yama, the inauspiciousness may be explained. Pattern 23, which has all the 'java' (blocks right of axes), brings long life, riches and wife. This goodness must be related to the deities of these spaces. If both the east and west sides have 'java' (blocks right of axes) blocks vacant and two blocks each ('khava' and axes), the resulting pattern 22, is auspicious with no sorrows, good behavior and possesses riches and sons!

Pattern 25 with a block in the center of the site is named Udako, it will bring the whole world under the power of the resident! Building of both north-east and south-west or just south-west along with four axes block will make the house auspicious (Pattern 29 and 30). Pattern 31 with all the eight blocks in eight directions is named Sarvartha and is auspicious for learning and knowledge. Pattern 32 with all the four corner blocks and a south axis block is named Suksntu and is auspicious bringing happiness, property and qualifications.

Auspicious patterns appear to relate to building on south axes (closing Yama), NE left open for Isa or built for learning and knowledge. Closing SW brings good tidings, riches etc. If all the axes squares are vacant and all the corners built, Pattern 35, is most auspicious. Pattern 40 which has all the blocks built around the court except the north-west and the north-east is as auspicious. It will bring riches, sons and will be loved by the world. Pattern 39 with all the blocks built around the courtyard except central square in east is named Udaya and is auspicious.

Patterns 41, 42 and 43 are presented as special large houses with auspicious results. Pattern 43 has three houses in the east and three houses in the west tightly built with sides(joined together), there is one house each in north and south tightly built with sides and also the four corners built and joined together, it will bring blessings, prosperity, no pains, riches and will learn the sciences! Pattern 42 with just the two houses in the north and the south and east and west side similar to Pattern 43 is named Bhadra and auspicious. Likewise, Pattern 41 with similar building all around but without the four corners built is also auspicious.

Pattern 49 with one block each in south and south-west, its very auspicious and is named Dharma. It brings long life, riches, sons and no diseases. Pattern 53 which is a courtyard house with all the sixteen blocks and is a welcome place for mother, bringing wealth, land, wheat and all wished for things! Pattern 58 with 14 blocks in swastika pattern is auspicious.

Patterns 61, 62, 63, 64, 65 and 66 all bring good results. East entrance gives good results as in Pattern 70. Pattern 83, 85, 89 and 90 also make auspicious houses. Pattern 99, which has all the corners and the axes blocks built as and all the left blocks are also tightly built, is auspicious and will bring riches and family.

From other 'vaastu' sources, the following character of the different spaces and directions is noted. Quite a few of the consequences appear related to this consideration of the elements, planets and stars of the space and direction:

- (i) East is controlled by Sun and is a source of male offsprings. It should not be blocked and so can be an entrance there.
- (ii) South-east represents fire and is controlled by Venus. The direction is a source of health, place of fire, cooking and food. Bed room for son is best located here.
- (iii) South is denoted by Mars, a planet of deeds and is a source of wealth, crops and happiness.
- (iv) South-west represents earth and signifies Rahu, which exerts vicious influences on psychological plane, is a source of character, behavior, cause of longevity and death. No door should be located here.
- (v) West is direction of Saturn, source of name, fame and prosperity.
- (vi) North-west represents air and signifies Moon, thus affecting emotional and mental well being. Room for daughter and new couple is well located here.
- (vii) North is direction of Mercury and a source of female children. Should not be blocked and is good for room for assets. An entrance does well here.
- (viii) North-east represents water and is a direction of Jupiter, magnanimous helper for learning/growing and also Ketu who is a source of health, wealth, prosperity and of male issue. Good direction for locating well, water hole and entrance.

The present document gives more patterns than the other two architecture manuscripts in Newar language studied for comparison in this research. However, as many as 141 different patterns and types of houses, stated to have been collected from a number of manuscripts on architecture (*Vastu Nirman Vidhi*), are found in the annex of the treatise 'Sthirobhava Bakya' (Sakya, 2028BS). Excluding the ten which actually describe the site type (and the current document lists sixteen site types as already presented above), it still names 131 types of house (*chen*) patterns and their consequences. It provides names in Sanskrit for many of the patterns shown but

unnamed in our document and therefore proves that these are not locally developed permutations and combinations. Although no diagrams are given, a few of the names use Newar words for directions and help in analyzing the pattern and consequences. The list is shown in Annex 3.

Suitability of Timber: It is recommended that due thought be given to choose particular systems and not use just any system while selecting wood for ridge beam, purlins, hip rafters, posts and beams in building temple, cow-shed, Vahiri (Bahil-type monastery), Vahara (Bahal-type monastery), Nimam (palace or nobleman's house), Mando (sattal in market place), Pura (important public towns' building), Chapara (feast houses), Phale (single storey rest-houses or Pati), Yata (Khat), Rathi (chariots), Vari, Vaha,. The wood from Dhunasi-si, Nyakhadi-si, these can be used in any situation. Likewise, wood from Sinhyadi-si, Gvache, Kudunikantha, these also may be used as per the system. Other wood shall not be used for all purposes. The 'system' referred here is clearly relates to structural use of timber.

The document makes specific statements on suitability of wood from certain trees for particular building parts considering their material performance. For example, it recommends 'the wood, Devadaru-si and Ca-si, these two, can be used exposed to water or to damp. Use Sva-si wood for support and Sura-si wood for heavy load. Dhare-si is also for heavy load. The two wood, Na-si and Pase-si, should be used for making Ghada (shaft for chariots?). Sura-si wood shall not be used in finial. Use Gudijhamal-si and Bvo-si wood instead. Si-si wood is also usable, use it towards the north and the east.' The document recommends use of 'good wood' for ridge beams and also while building Siva temple, Vishnu temple, Mandap and Pura. For important auspicious works such as making of laddle, cot, etc. used in worship, the timber from Baikankaka-si, Taka-si and Camara-si are recommended. For doors of houses, Singhali-si and Cha-si should not be used (Folio 23R). For Gutini, Kha-si wood should not be used. Palepati wood should not be used for lintel. Likewise Vala-si wood should not be used for joists in floors. There is a comprehensive statement on timber from trees good for building and their caste (Folio 23V). This is quoted below verbatim:

“Chha-si Chhetri, Pho-si (Katahar), Devadar, Madharasvan-si, Tha-si, Khayara-si Rishiputra Nala-si Vaisya class, Dhagusvan-si Bharadvaj Rishiputra, Che-si Gangaputra, Pase-si low caste, Gujamala-si Tamvata caste, Taka-si Rishiputra. Na-si Kochhu caste, Champa-si Nayini caste, Dhunisi-si Podhini caste, Nyakhadi Dobini-si Yetanga-si Kepoja Dudupakhara-si Gulini caste,

Khara-si Dvava caste, Fulasvan-si Gargavarishiputra , Shuvayaphola-si Kebatini caste, Karavira-si Gandhajati, Guda-si Ganchha caste, Papa-si Paringini caste, Kanthapho-si Konara, Chha-si Mohkana, Longavo-si Bhatini.”

Although what the classification is intended to indicate is not clear, it stands to reason to infer that the ‘Rishiputra’ classification may be hinting at better strength and weather resistance. However, the two of the best wood recommended earlier in rules of carpentry, Dhunisi-si and Nyakhadi-si, are classified as Podhini caste and Kepoja, both low in status in medieval Newar society. It is possible that the classification was used to socially manage access to timber for building. It is also likely that the wood of trees recommended for higher castes are stronger, long lasting and resistant to weathering in general.

Comparatively, in other classical Vaastusastra documents (Dwibedi, 2003), we can find statements which recommend wood from the following trees for building. But we were not able to relate the names of trees given here to those in the present document: Sriparni (Hindi Gambhara), Rohini (Hindi Kutki), Shaka (Hindi Shagaun), Sarja, Sarala (Nep Sal), Patang, Lodha, Shala, Taala, Arjuna (Hindi Koha), Shisham, Chandan, Ashok, Badari (Nep Vayara), Kadhuka (Hindi Mahuwa), Kadamba.

Rule of Architecture of Temples and Residences: For the finial, use the same proportion as of the door, half of that for ‘Dvata’, one –third for ‘kura’ works, roof should be four units of the proportional measure. All rafters and timber in upper roof should be of a single piece (not builtup). The hip rafter should be projected in 2:1 proportion. Proportion of the Door is equal to the image (linga). The base (Jalahari) of the Siva linga is a square of same dimension. The base of the finial is equal to the width of the door – this should be made in three layers over the flattened top. Over several lines in Folio 21 Verso, Folio 22 Recto and Folio 23 Recto and Verso, measurement systems and scales are presented. Some of this information have been presented above under ‘Measurement scale and standards’

For door post and head take 9 anguli, one-eights of door width for door post, six and a half parts for ‘parivara’, for five ‘gutini’ three and a half parts – this is how the system to work out the proportion of all parts of a door have been stated.

The proportion of the house, if the width is divided into four parts, the plinth is equal to one part, two parts is 'liphu' (bay). Half of Matan is taken as front yard (Cuka). For monastery, the proportion and measure is stated thus, " divide 'kera' into five parts and take one part of the five parts for 'dungala', for 'khadu' (threshold) eight, measure for Vahara is six parts, for 'gutini' three and a half parts, for 'parivara' five and a half and for lintel nine." This is said to be the measure for woodworks. The same system as of temples is used for monasteries and palaces also.

Folio 25 Verso Line 3 repeats that the plinth of the building is one fourth of its width. The width of the house is one-third of its length. The length of the threshold is a measure equal to length of hand with closed fist (muhtito). For the monastery building length is sixteen (it may also be 14, 12 or 10 in other cases) and the width is half of the length. One eighths of the width is taken as wall thickness. Half of wall thickness is length of Atapa (brick). This may also be taken as three-fifths of the wall thickness.

Site Investigations: To begin construction of any monastery (therefore of temples and palaces also), Tula and Mesh Sankranti are auspicious. It is advised that astrological advice be sought before foundation and other works are started. Land with white colour and with the smell of milk, ghee, 'dhari' is fit for Brahmins. With soil of red colour, with Marisvan flower, lotus, Uphola, Champsvan, Rupasvan (all flowers), such land is fit for Kstriya. With green soil and no smell and bitter taste like ginger, this land is fit for Sudras. Yellow soil with alkaline taste is fit for Vaisya.

To judge soil bearing capacity, dig a hole of one Ku and fill it back with the soil dug out. If the hole does not fill up, it is poor site, if in excess it is best, while if it just levels up, the site is medium. The document also prescribes other esoteric tests such as making a mandala in a pit of twice the size (two Ku) and placing white flower to the east, red flower to the west, yellow to the north and black to the south. Whichever flower remains in place after an overnight exposure to nature, the site is said to be fit for different castes. Further, similarly differently colored wicklamps are laid over sundried lamp holder plates placed on earthen pots and checked for the light that remains lit to signify appropriateness to particular castes. Likewise, land with Kusa grass is fit for Brahmins, Kase grass good for Kstriya and Kusala grass fit for Sudras.

Conclusion

It can be seen from the importance given to the propitiation of the variety of god-spirits in various parts of the buildings that architecture is portrayed as a cultural action of significant symbolic and ritual values. However, unlike in the ancient traditions, late Malla Newar traditions in architecture do not appear to have given much consideration for orientation as required by *sadaverga* computations. While the present document makes only a cursory reference to orientation, at least one published translation of a post Malla *vaastushastra* shows extensive reference to auspiciousness and orientation. It would appear that the Malla period practice was less dogmatic than post Malla times.

It can be seen from the above study that Newar Vaastushastra documents have given great importance to ancient canons of architecture specific to timber, their selection, use and properties and trees, their farming for fruits, flowers and building materials. Such a specialized content clearly relates to Newar architectural traditions, which differs greatly in terms of both material and form, from Nagara and Dravida stylization of Hindu architecture. It stands to reason to conclude that Newar architecture developed out of the distinct stylistic stream referred to classical texts as Vesara (sometimes also Bharāta) tradition. The most significant finding from this research is the fact that the farming of trees for building timber was economically and ecologically argued in the Newar society successfully giving productive meaning to the long maturation period of trees. As trees become fit for building wood only after decades of growing and maturing, our past society with such a grand architectural traditions in wood must have been quite sensitive to trees and vegetation in the valley. This must be reason why the profuse use of thin timber in Newar architecture did not cause deforestation and destruction of the valley ecology. Therefore, the expanses of paved streets and squares of Newar towns should not mislead us into inferring that the society and the architecture it practiced was not sensitive to trees. It is evident that the Newar Vaastusastra gives great value to all kinds of greenery, trees and creepers, be they *Banaspati*, *Druma*, *Lata*, *Druma* or *Gulma*! The present document shows that trees, building timber and carved wood were recognized and understood for different properties and such knowledge was rationally applied in the practice of architecture in the Nepal Valley in the Malla period. The list of names of trees and timber used in the document has been listed below.

The document shows that Newar system of measurement scale and standards was different and distinct from the scales and standards outlined in Manasara and Mayamata. Scales used for ordinary residences as well as for temples and monasteries were distinct and appear to have contributed in establishing distinct proportions in Newar architecture.

The current document presents a large number of patterns for design for houses and the corresponding consequences of living in such houses. The general principles of good design seem to conform to other known edicts from ancient *vaastushastra* and thus appear to indirectly incorporate orientation to spirits of the spaces and directions and nature of planets and stars. The elaborate rules and consequences of taking entry and layout of building blocks in a site given in the document have indirectly acted as bye-laws. Although the general design and layout guidelines do appear directed by the principles stated in Brihatsamhita and such other classical documents, the some particular patterns and consequences are Newar innovations that make it quite distinct. The actual basis of prediction of consequences of design to different members of the residing family such as the owner, his wife, son or daughter is not known from classical sources and so appears as another innovation in the traditions. These seem to have worked as strong controlling/regulating measures that created a possibility of diversity in design while assuring stylistic uniformity so characteristic of the Malla towns.

It is very likely that it is such differences from the Nagara and Dravida traditions that Newar/Nepali architectural traditions could have earned the categorical name of Varata or Vesara, which we find mentioned in several classical documents but researchers have not been able to spatially or stylistically assign to any Indian region.

The document also highlights many terminologies used in architecture that were in use in Newar architecture but have since gone out of use or forgotten. Many of the words could not be found in the Newar dictionaries available to the researcher. A list of architectural terms is given below.

The following **species of trees, plants, flowers** have been mentioned in the manuscript:

Aṃva	Arjjuna-si (Terminalia arjuna)
Arjun flower (Kahua, Karavira)	Baikamkana-si
Baka-si	Bhatupā
Bhoyusvāna	Bva-si
Byāla	Caṃpa-si
Caṃpasvāna (Campakam)	Candramā
Cavala	Ce-si
Chā-si	Dāḍimi (dhāre)
Devadāru-si	Dhaṃgusvāna-si
Dhāre	Dhāre-si
Dhuna-si	Dvaṃvini-si
Geyachāsi	Gu jhāmala-si
Guḍa-si	Guḍijhāmala-si
Gvācha	Haraḍi
Haridrā	Homa
Indranīla	Jaṃbūkāpase
Kaca nala-si	Kadalīkalīla
Kaṃṭhapho-si	Kanavīra-si
Karaṃjakarāja-si (Karanj, Pongamia Pinnata)	Karavira (Nerium indicus)
Kavamadarda	Kepoja dudupakhāra-si
Keśala	Ketaki (Kevada)
Khara-si	Kha-si
Khayara-si	Kudunikaṇṭa
Kuṃbhakāli	Kuṃkuma
Lāhā-si	Laṃbhā (garlic)
Laṅavo-si	Madharāsvān-si
Mahubase	Malisvāna
Nala-si	Nā-si
Nīlivaṃ-si	Nyākhaḍi-si

Nyāṣaḍi dovini-si	Pākkālu
Pale (Utpalam, Kamal, Lotus)	Parākhasi
Pāru (ginger)	Pāse-si
Pa-si	Pātulisvāna
Phākana	Phaṇase
Pho-si	Phūlasvāna-si
Pippala	Plakṣapa laṃkha si (Palaṃkhasi)
Prayaṃgu (Aglaia Rox burghiana)	Rovayala
Śaṃkha	Sighāli-si
Siṃ(hyā)di-si	Siṃghuvāra
Siraposvāna	Si-si
Sonapatā	Sleṣmāntakaku-si
Subhayaphola-si	Surana
Sura-si	Sva-si
Tagarāja	Taka-si
Thā-si	Tyaṃtulase Kayaṭha
Uduṃvala-si	Uphola (Karkalo)
Vada	Vakamhāra
Valaṃgata-si	Vala-si
Vayala	Vosikhaḍi
Yālā	Yetāñā-si

Building terminologies used in the document:

Anga: Wall	Atapa: Brick
Avāra: Roof tile layer	Avayā: Rafters
Ayama: length	Bā: Orientation
Bāhāra: Bahal	Bahiri: Bahil
Bya: width	Capāra: Chapa, Community feasts house
Cheḍi: Ground Floor	Chelidāne: Walls of Ground floor
Cuka: front court	Cukuli: Wedge
Culi: Finial	Damade dāte: center of the ridge
Damade svāhāne: Upper stairs	Damadedvāra: Trap Door to attic
Dāte: Floor of rooms	Devara: Temple
Dhali: Joist	Dharuni: Struts (to projected joists)
Dhūti: Timber Slats	Du: length
Dukuti: Store	Duśala: Foundation (trench)
Duvāra: Door	Etā, yautā: South
Etahā: ?	Govala: Cow-shed
Jhāla: Window	Jyā: Work
jyaṣṭhī, Jestha aṃguli: large standard measure	Kali: Carver
Karami: Craftsman	Kāti: Ridge
Khā khaṃṇāva: Opening of the door	Khada,u: Door sill (threshold)
Khāpā: Shutters	Kharmmasa: Door Jamb
Khasi: Door post (jamb)	Khatagvaḍa: Scaffolds
Khātānā: Door head (top center)	Kokhalu: Bottom sill
Kosa: ?	Kuna musi: Hip rafter
Kvaṃcilam: Niche	Lakṣaṇa: Standards, characteristic marks
Liphu: bay	Lohokarami: Metal(Iron) worker
lukhā: Door	Malāvasim: Ridge Post
Maṃdora: Mandap, Sattal	Matan: Bed room floor
Mūsi: Rafter	Nāya: Leader
Nimaṃ: Palace, Large residences	Nirāla: Beam

Pakhi: Eaves

Phaḍa: plinth protection (peti, phah)

Pura: Important Towns Building

Rathi:

Su: Thatch/tile

Svāhāna,e: Stairs

Tālacā: Key

Tarete: First floor

Thāma: Post

Tuthi: Well

Umuni: Rings for lock

Vārā: Silver/Gold worker

Vyayama: width

Yātā:

Paranga: Cot

Phale: resting platform, Pati

Puṣuḍi: Pond

Sikarmi: Carpenter

Surapata, śruvā: implement used in worship

Tāla: Lock

Talakhā: Trap door shutters

Thahālanāva: Opening over ladder

Thasamā: Ridge beam

Tvākara: Base block

Vapi: 'kuwa' (Nepali)

Vatho, vaṃtho: East

Yaṃtā: North

Yotho: West

Works Cited

- Acharya, P. K., 1995. *Architecture of Manasara, Manasara Series No. 4*. Reprint ed. New Delhi: Low Price Publications.
- Bhandari, D. R., 2046BS. *Nepalko Udbhav Tatha Bikashko Vislesanatmak Itihash*. Kathmandu: Prakash Prakashan.
- Dagens, B., 1985. *Mayamata*. New Delhi: Sitaram Bhartia Institute of Scientific Research.
- Dwivedi, R. N., 2003. *Brihadvastumala*. reprint ed. Varanasi: Chaukhamba Surabharati Prakasan.
- Gaur, N. A., 2000. *Sthapatya Ved-Vastu Sastra*. New Delhi: New Age Books.
- Goswamy, B. N., 2007. *The Word is Sacred, Sacred is The Word*. New Delhi: National Mission for Manuscripts.
- Gutschow, N., Kolver, B. & Shresthacharya, I., 1987. *Newar Towns and Buildings: An Illustrated Dictionary Newari-English*. Sankt Augustin: VGH Wissenschaftsverlag.
- Juganu, S. K., 2000. *Silpashastram*. Varanasi: Caukhamba Sanskrit Series Office.
- Kolver, B., 1996. *Constructing Pagodas According to Traditional Nepalese Drawings*. Berlin, Germany: Akademie Verlag.
- Kramrisch, S., 1986. *The Hindu Temple*. Reprint ed. Delhi: Motilal Banarasidass.
- Macdonald, A. W. & Stahl, A. V., 1979. *The Newar Art*. New Delhi: Vikas.
- Manandhar, R., 1992. *Self Reliance in Small Communities*. New Delhi: Oxford & IBH Publications.
- Misra, J., 1966. *Puspa-chintamani*. Kathmandu: HMGN Department of Archaeology.
- Poudel, B. N., 2065BS. Jagatprakash Malla. In: G. N. Poudel, ed. *Bhaktapurko Rajkulo*. Kathmandu: Aagam Prakasan.
- Rajbamshi, S. M., 2008. Vastulaxana. *Vaidic Udbodhan (Vaastu special)*, 16(17).
- Sakya, H. R., 2028BS. *Sthirobhava Bakya*. Yala (Patan): Surya Man Bajracharya.
- Shresthacharya, I., 2054BS. *Newar-Nepali-Angreji Sabdakosh*. Kathmandu: Nepal Rajkia Pragya-Pratishthan.
- Slusser, M., 1998. *Nepal Mandala*. Kathmandu: Mandala Books.
- Tamot, K., 2035BS. *Nepalbhasaya Vastukala-Khangyah Pucah*, Kathmandu: Faculty of Humanities and Social Sciences, TU.

Tiwari, S., 2001. *The Brick and The Bull*. Lalitpur: Himal Association.

Tiwari, S. R., 2009. *Temples of the Nepal Valley*. Lalitpur: Himal Association.

Tuladhar, S. D., 1948. *Nepal Bhasa Sabda-sangraha*. Banaras, Sarnath: Dharmodaya Shabha.

Vaidya, J., 1985. *Rastriya Abhilekhalayasthit Nepalbhasa/Newari Abhilekhgrantha*. Kathmandu: Research Division, Tribhuvan University.

Venkatesan, K., 2001. Vaastu - Ground Rules for Planning a House. *The Hindu*, 28 January.