The Royal Buildings in Nepal

1981

Nippon Institute of Technology, Research Mission

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A Report on the Old Royal Palaces of the Kingdom of Nepal

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for the study of old royal palaces of the Kingdom of Nepal

Published by NIPPON INSTITUTE OF TECHNOLOGY
900 SUGA, MIYASHIRO-MACHI, SAITAMA-KEN, 345, JAPAN
Produced by CHŪŌ-KŌRON BIJUTU SHUPPAN
Printed by TOSHO PRINTING CO.

Foreword

In the publication of *The Royal Buildings in Nepal—a report on the old royal palaces of the Kingdom of Nepal*, I express great delight and gratitude to the Nepali Government for its willing consent to our proposal, to the Department of Archaeology of Nepal for its giving us the rare opportunity for investigation, to the Ministry of Education of Japan for its financial assistance, and to the Ministry of Foreign Affairs of Japan for its accommodation that made the researches in Nepal, and also to all the people concerned for their cooperation.

The research which our NIT Research Mission to Nepal made is said to be fundamental and firmly incorporated in the stream of the study of Oriental architectural history. We believe that such a fundamental study is especially important for the technical approach to architectural history and also for students' field study.

I do hope that this research should give a significant contribution to various fields of architectural study.

October, 1981

Yukio Miura
President
Nippon Institute of Technology

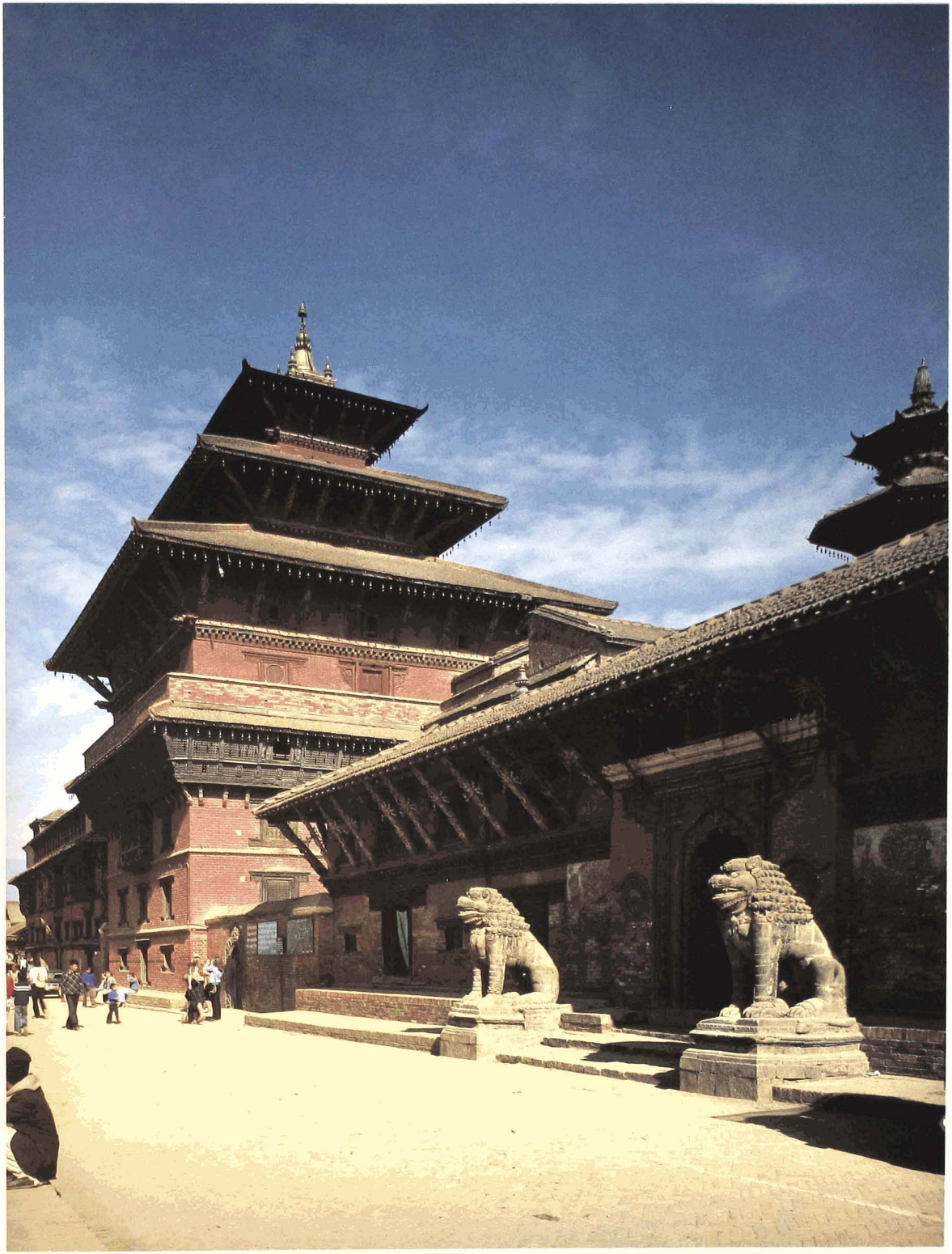
Address of Thanks

It was in 1977 that we began to make materials of surveyed maps by using photographic survey of the old royal palace from the architectural historic point of view with regard to traditional Nepal architecture and we made the first preliminary investigation with the help of Toko Gakuen, the administrative body responsible for the Nippon Institute of Technology and Tokyo Technical High School and their groups concerned. In the next year of 1978 we commenced the main survey patronized as cost of foreign investigation of science study cost by the Ministry of Education. In Nepal we could work smoothly with the help of Mr. Ramesh Jung Thapa, Director General, and Dr. Shaphalya Amatya, Chief Exploration Officer, of the Department of Archaeology and with the help of Mr. Soorya B. Bista and Mr. Bodh N. Adhikari of the National Planning Commission. We could rely on the great aid of the Nippon Institute of Technology in order to make this report. On this occasion of making this first investigation report we want to express our thanks to the above persons concerned and to the groups concerned from the bottom of the heart.

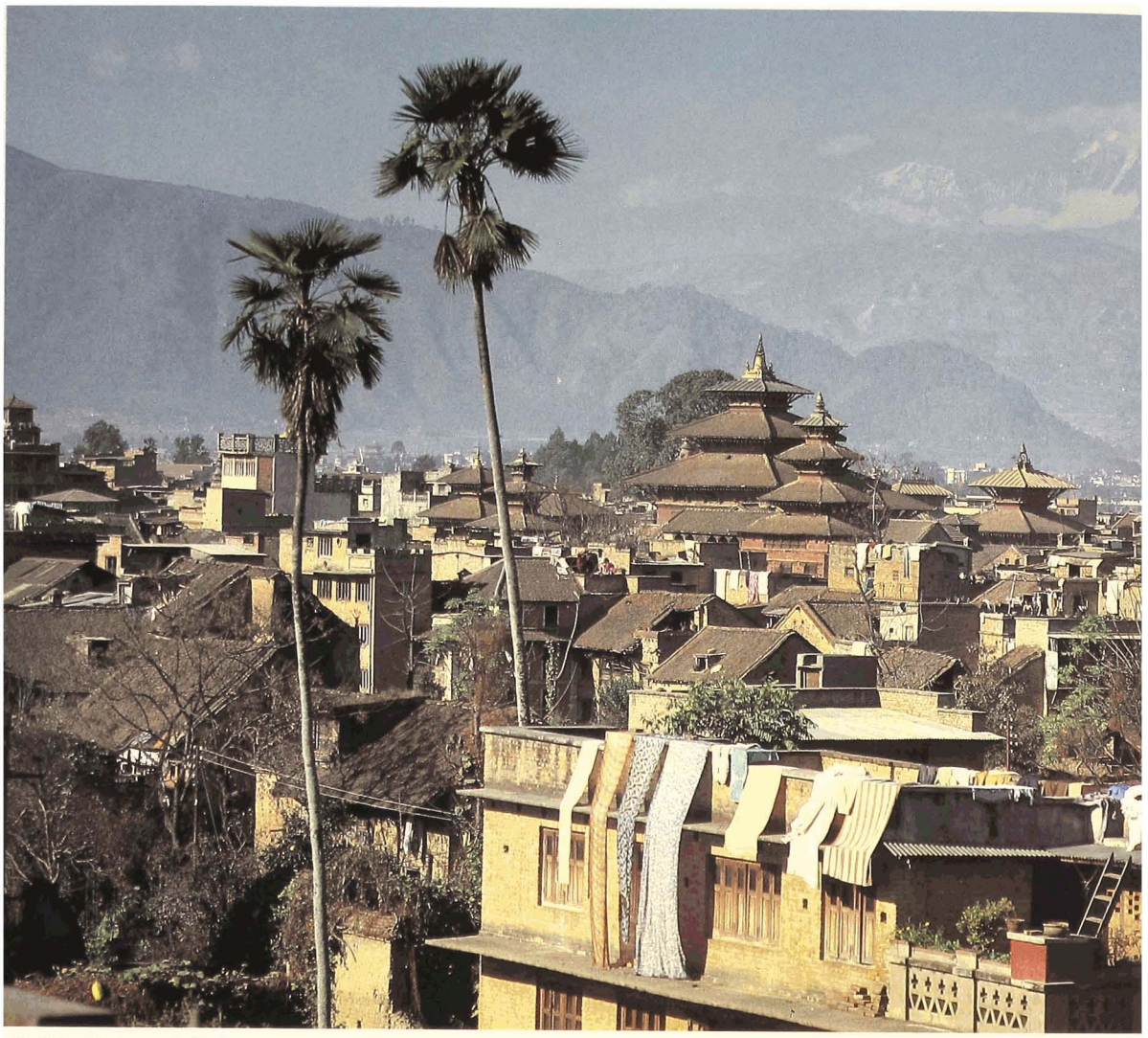
October, 1981

Michio Fujioka

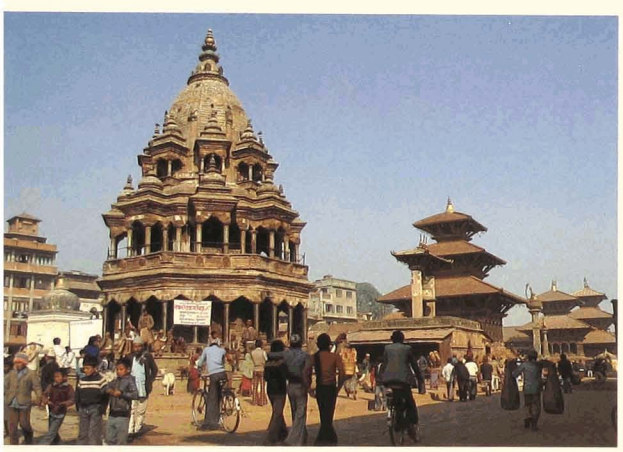
Katsuhiko Watanabe



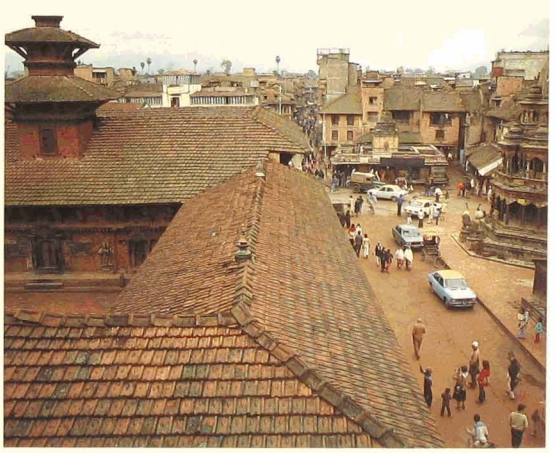
1 Patan Darbar



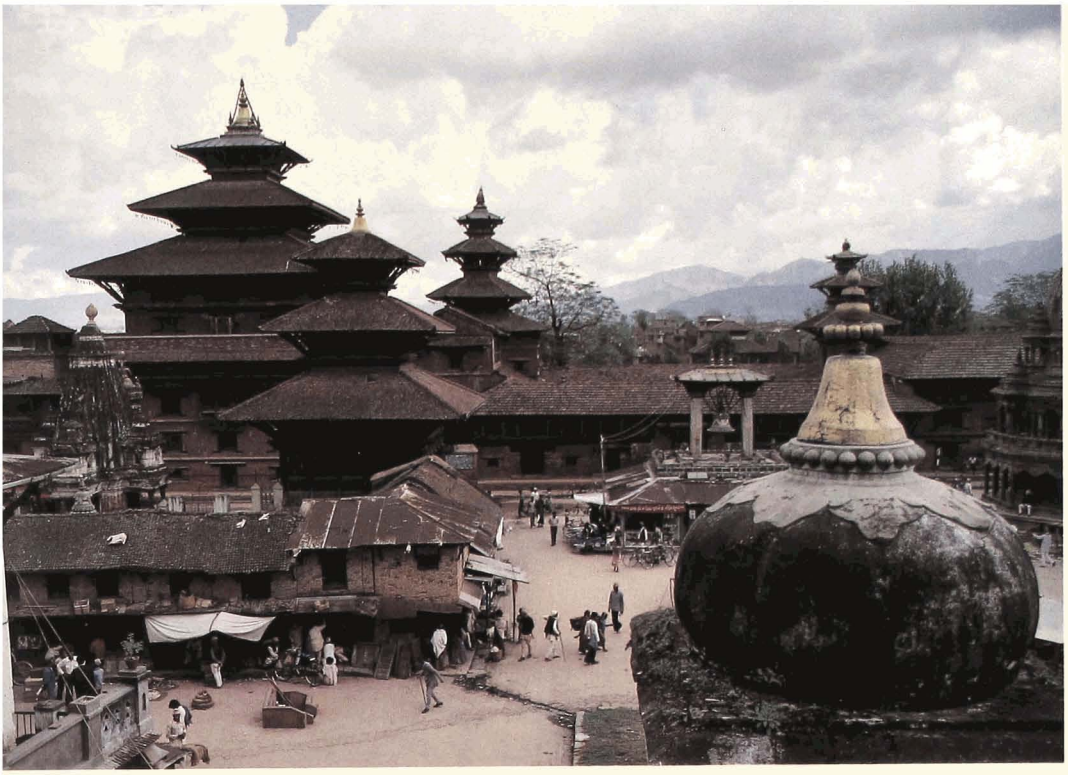
2 Patan Darbar and the Town



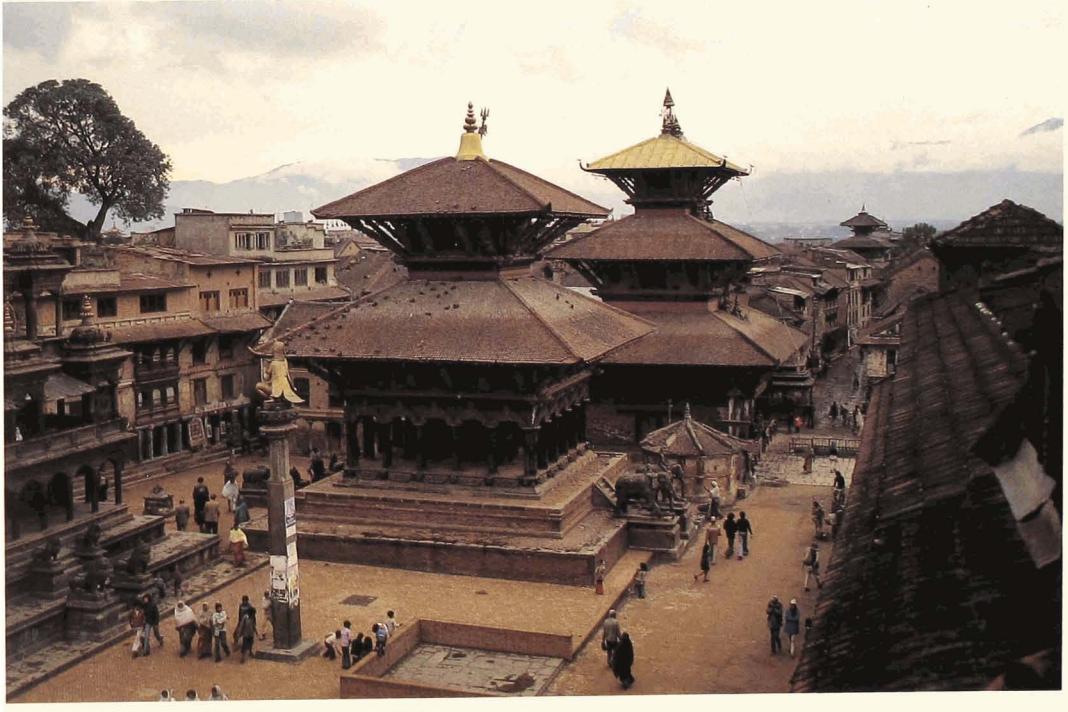
3 Darbar Square



4 Mul Chok and Darbar Square



5 Darbar Square and Patan Darbar



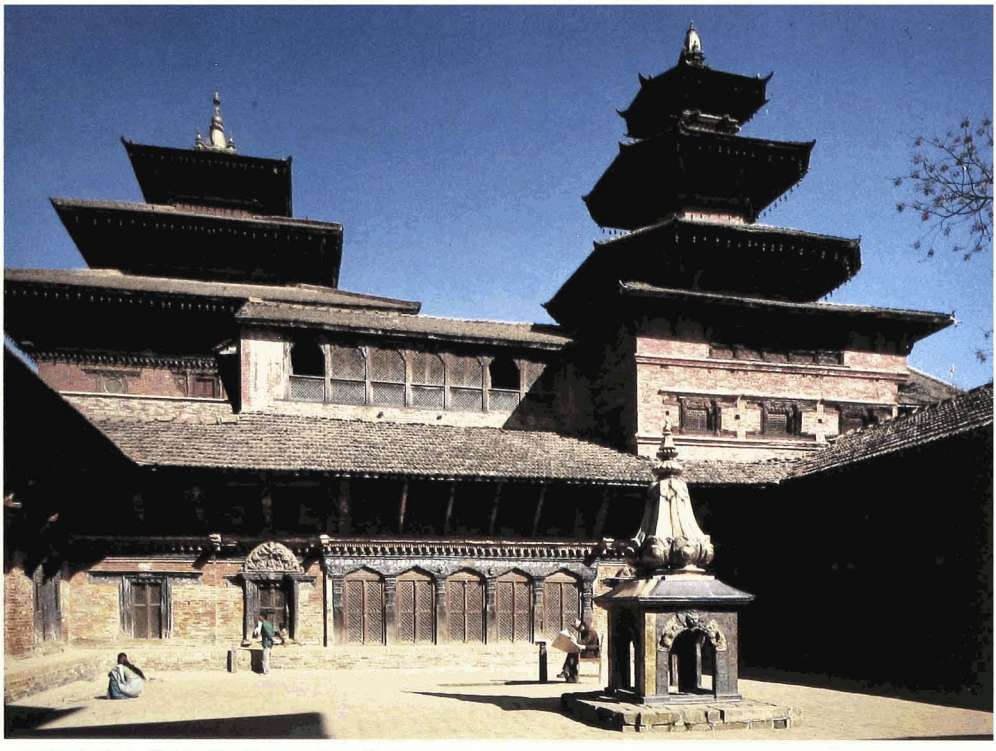
6 Darbar Square and Mani Keshav Narayan Chok

7 Sundari Chok

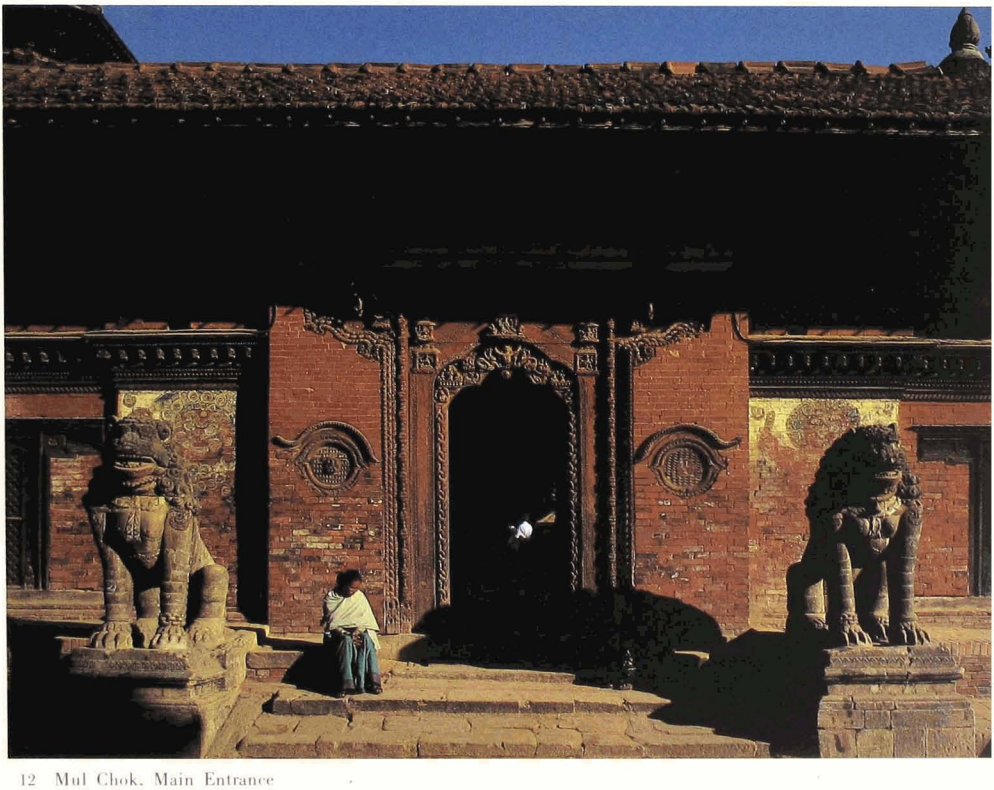
8 Mul Chok, Agan Mandir and Sundari Chok

9 Sundari Chok, West Wing

10 Sundari Chok, Main Entrance



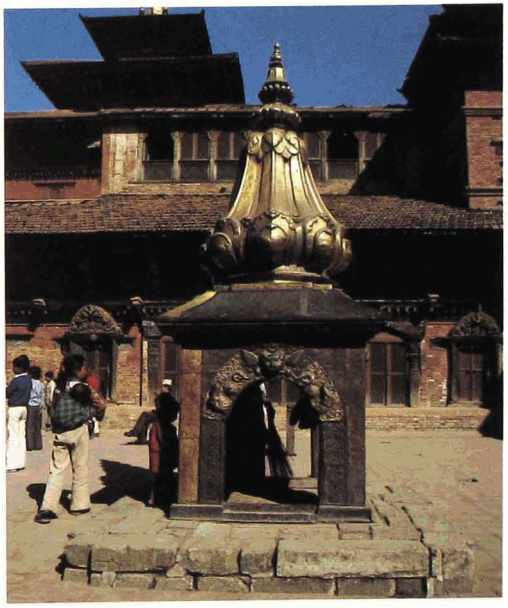
11 Mul Chok, Taleju Mandir and Degu Talle



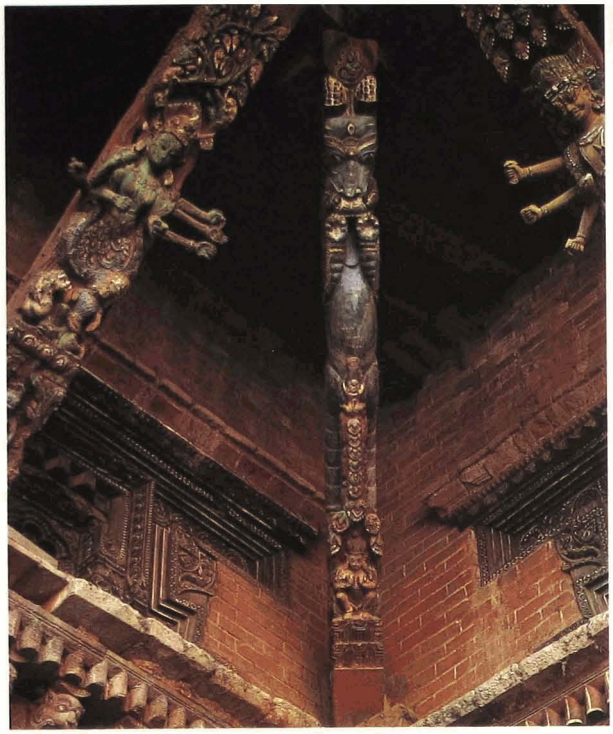
12 Mul Chok, Main Entrance

13 Mul Chok, South Wing

14 Mul Chok, Agan Mandir

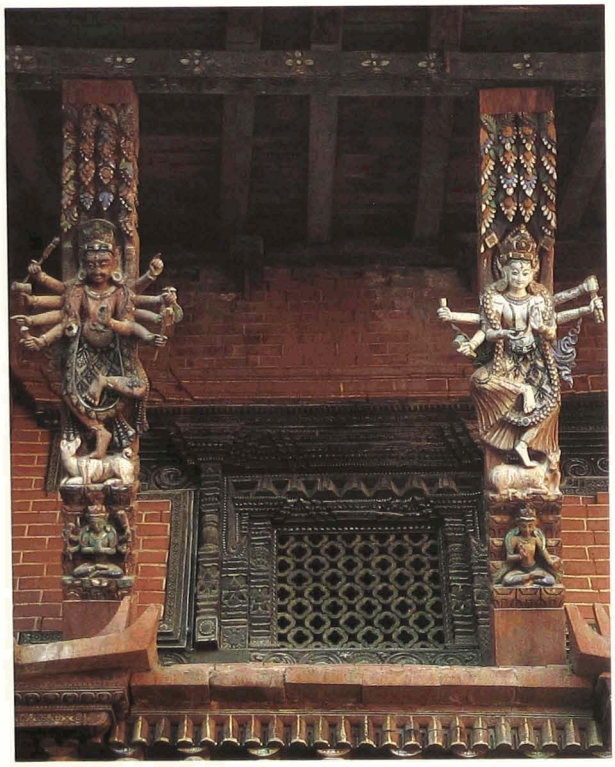


15 Mul Chok, Sanctuary

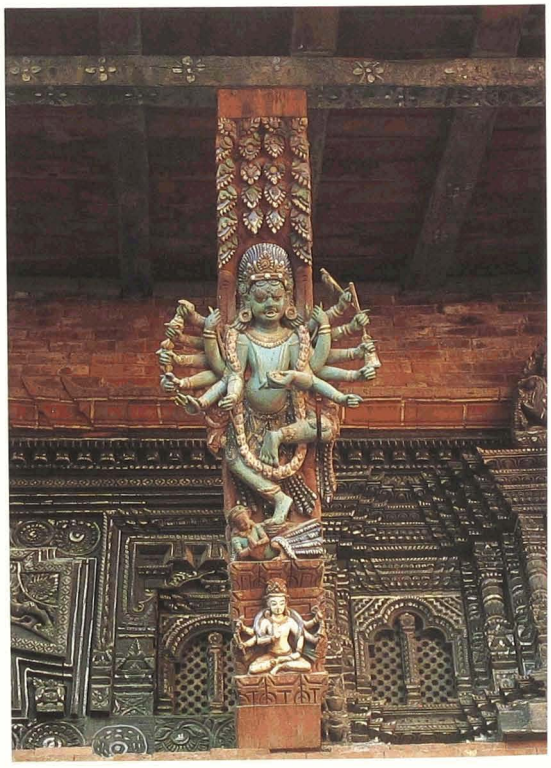


16 Mul Chok. South West Corner Strut

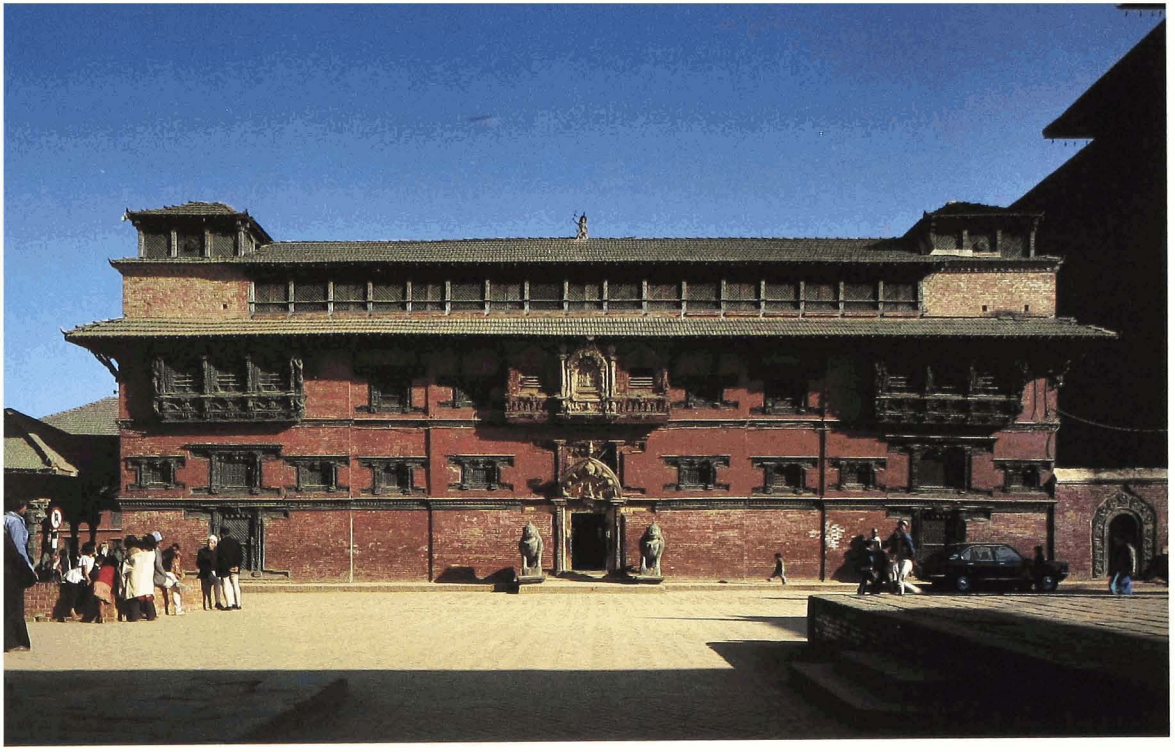
17-1 Mul Chok. West Wing. Struts



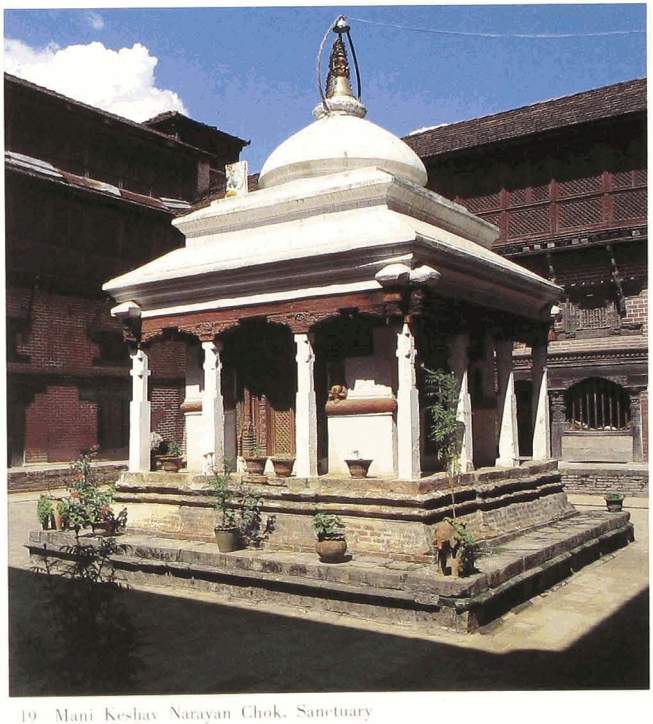
17-2 Mul Chok. West Wing. Struts



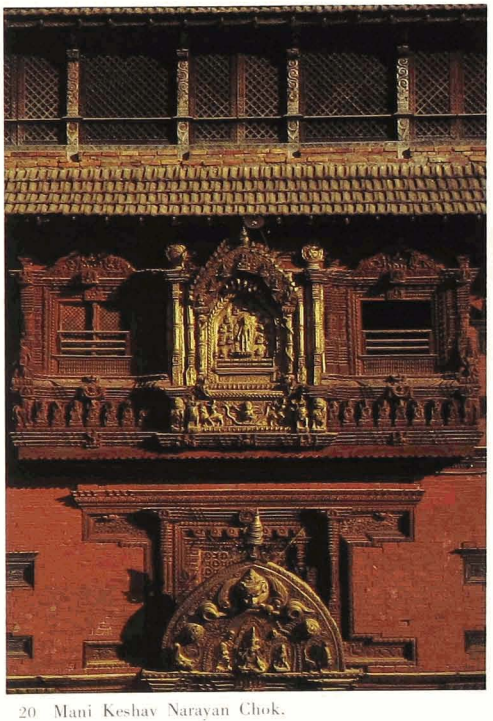
17-3 Mul Chok. West Wing. a Strut



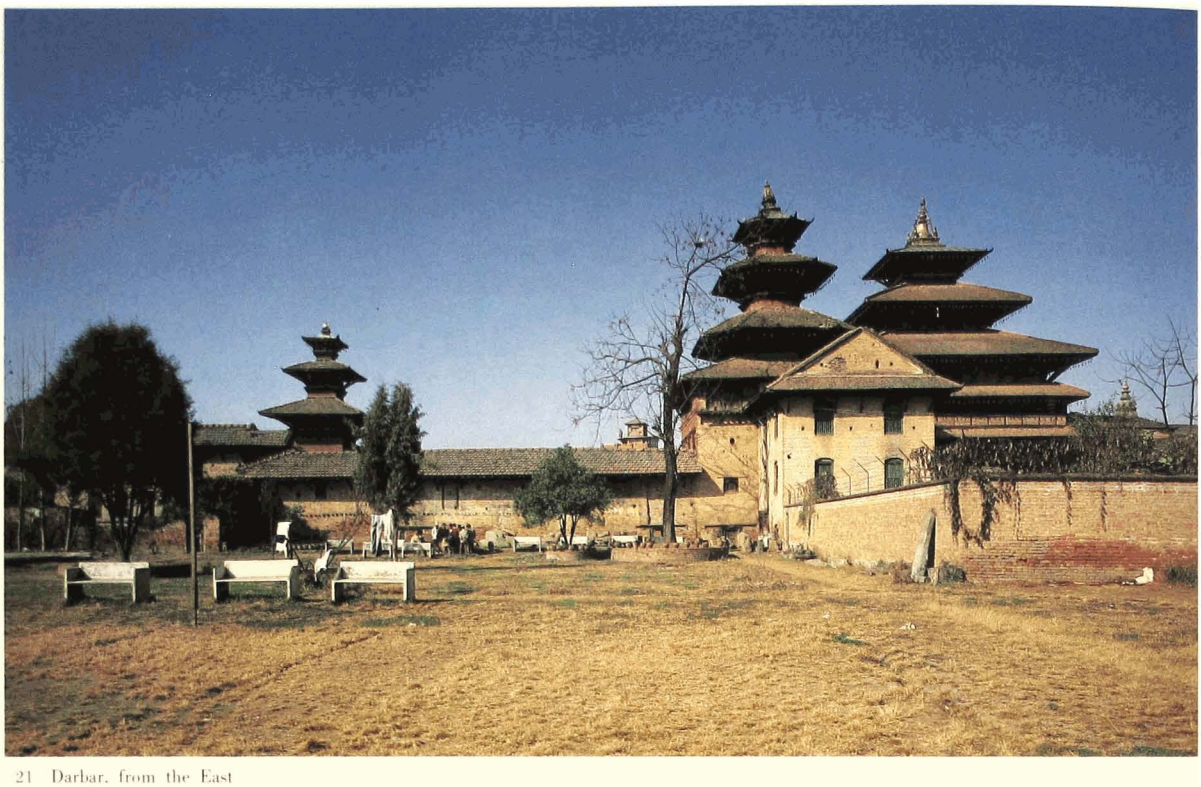
18 Mani Keshav Narayan Chok



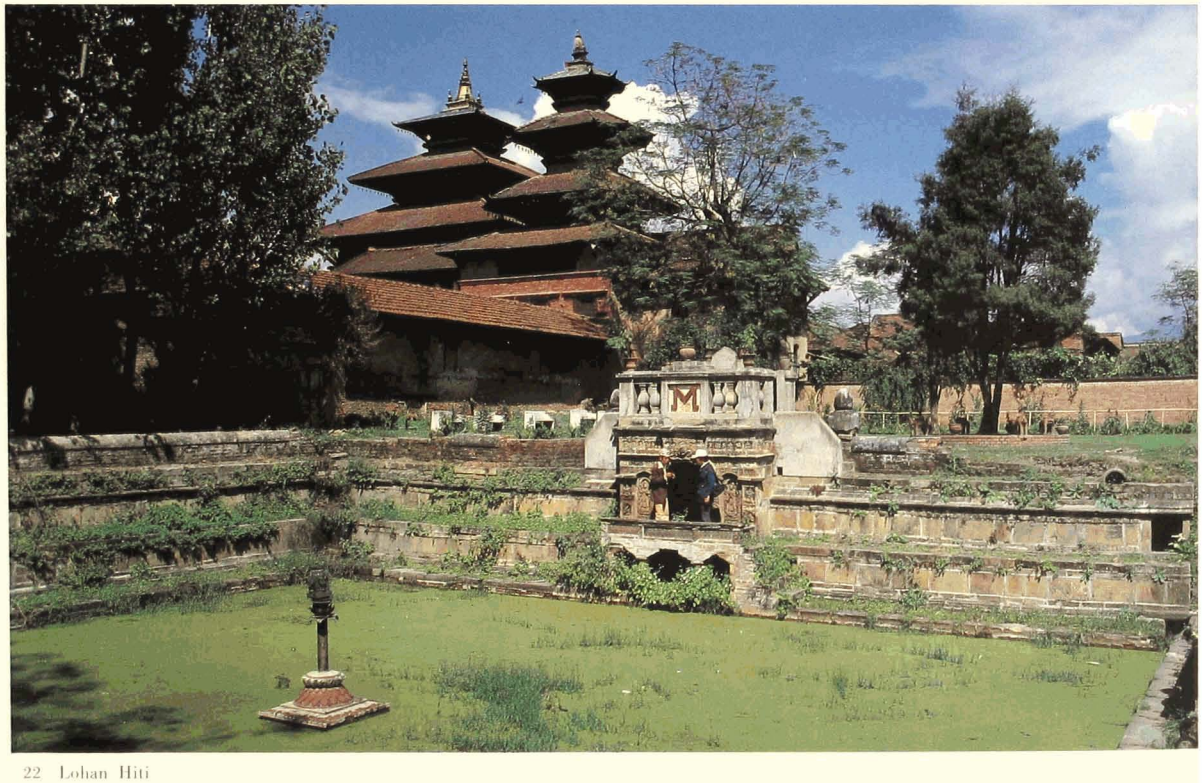
19 Mani Keshav Narayan Chok. Sanctuary



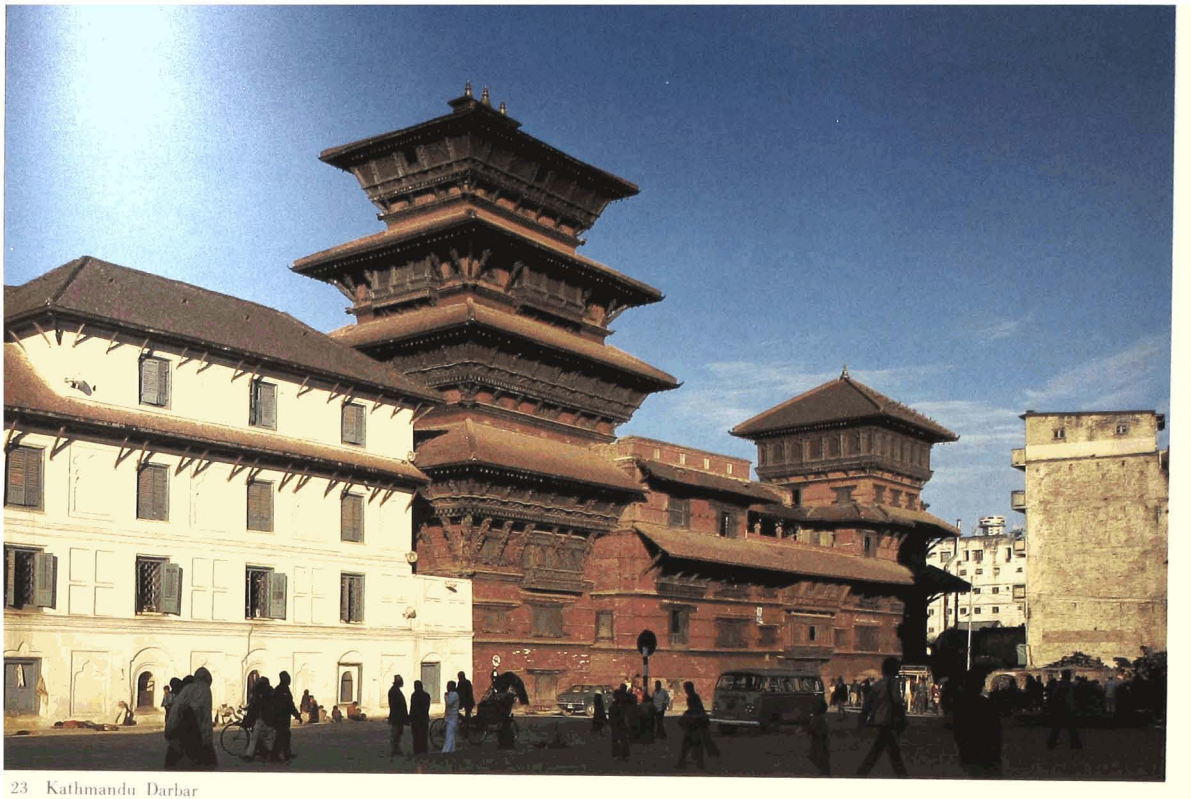
20 Mani Keshav Narayan Chok.
Windows of the Front Facade



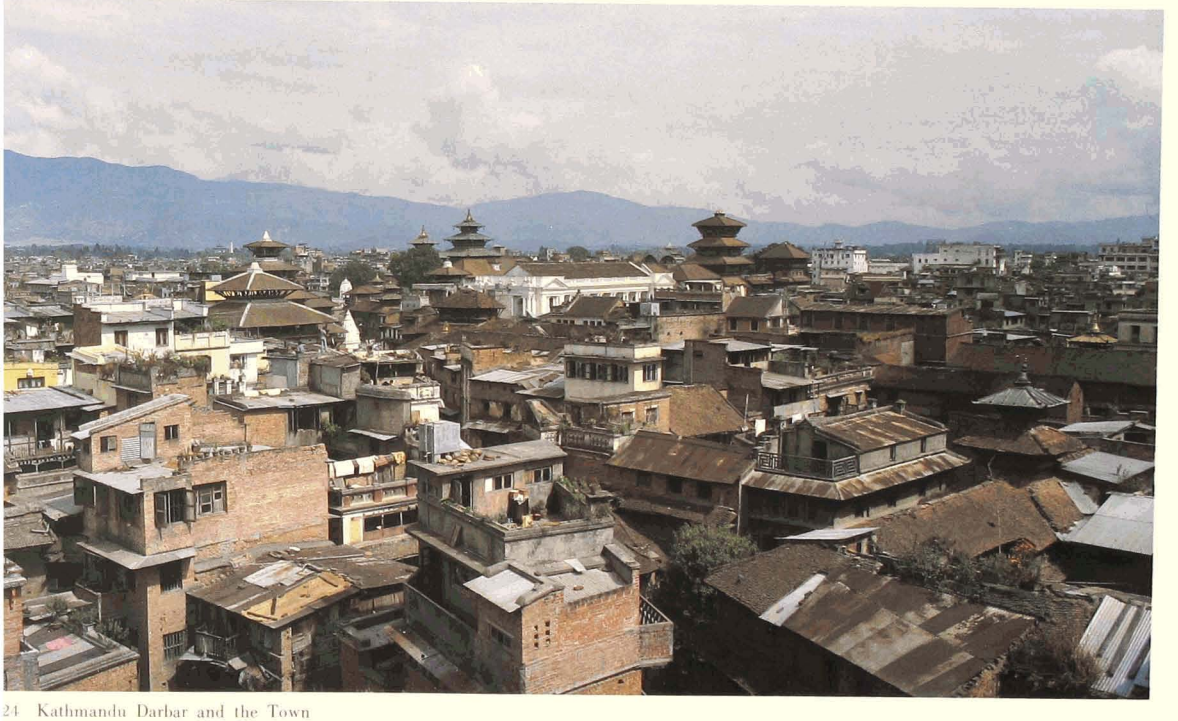
21 Darbar, from the East



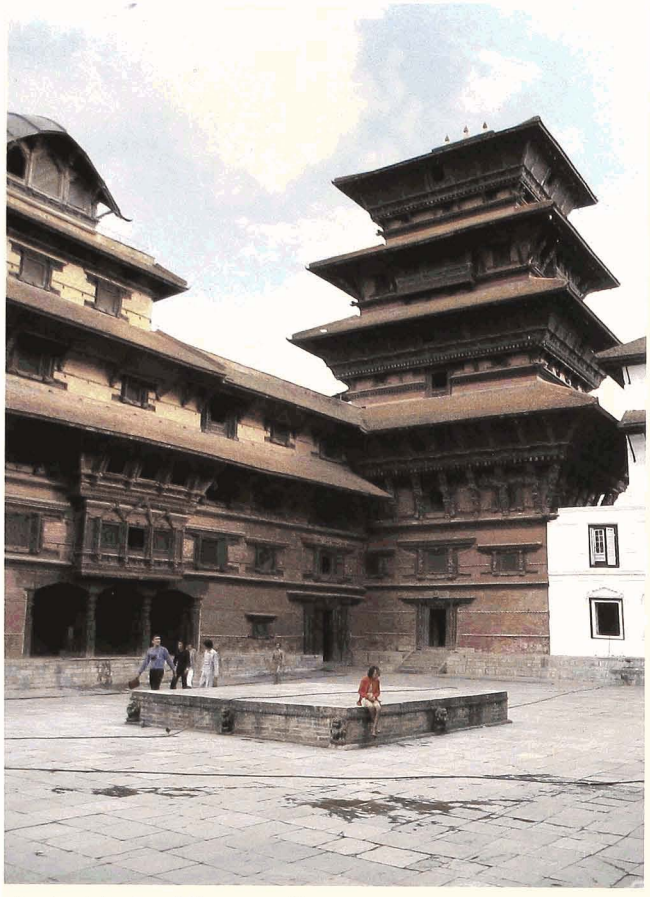
22 Lohan Hiti



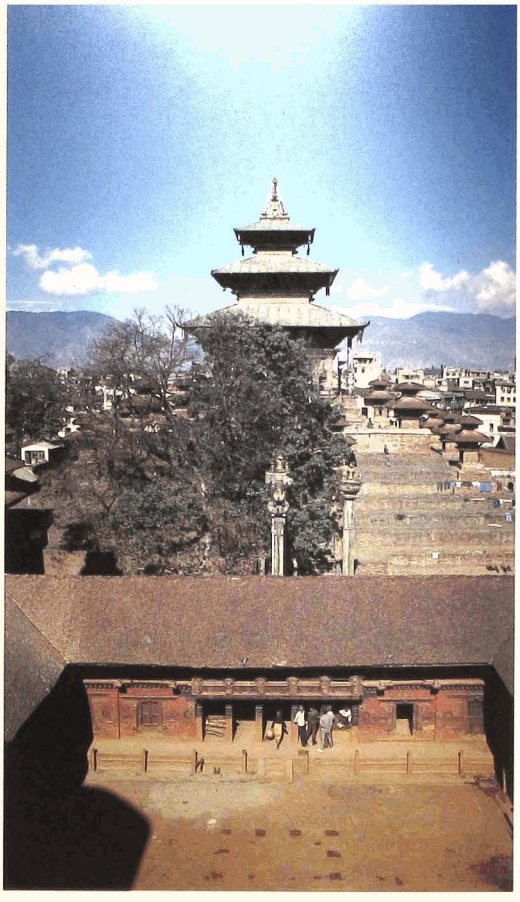
23 Kathmandu Darbar



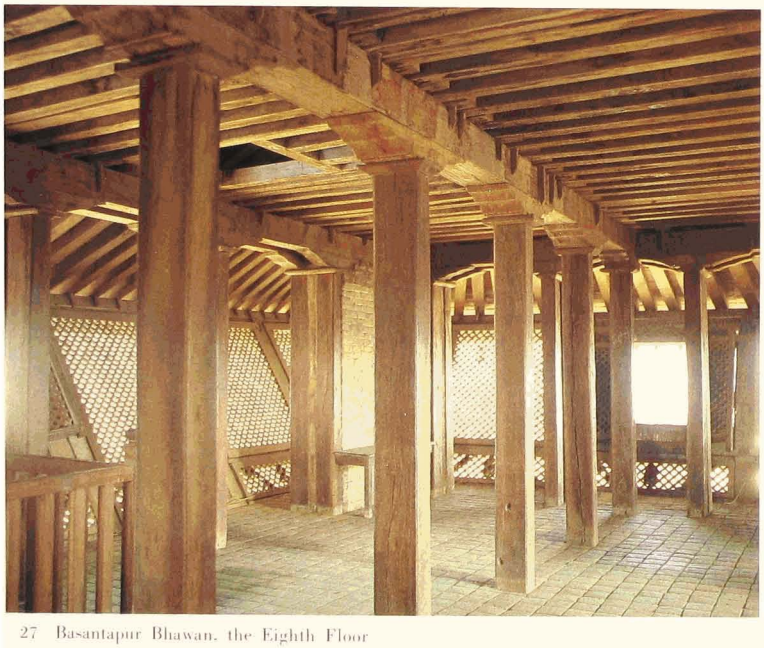
24 Kathmandu Darbar and the Town



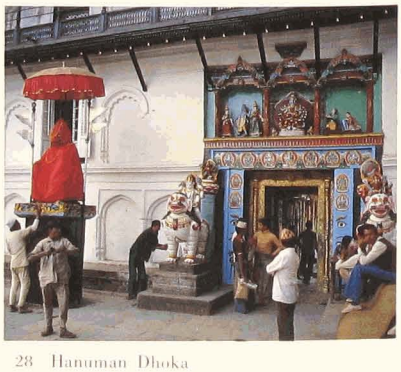
25 Nasal Chok and Basantapur Bhawan



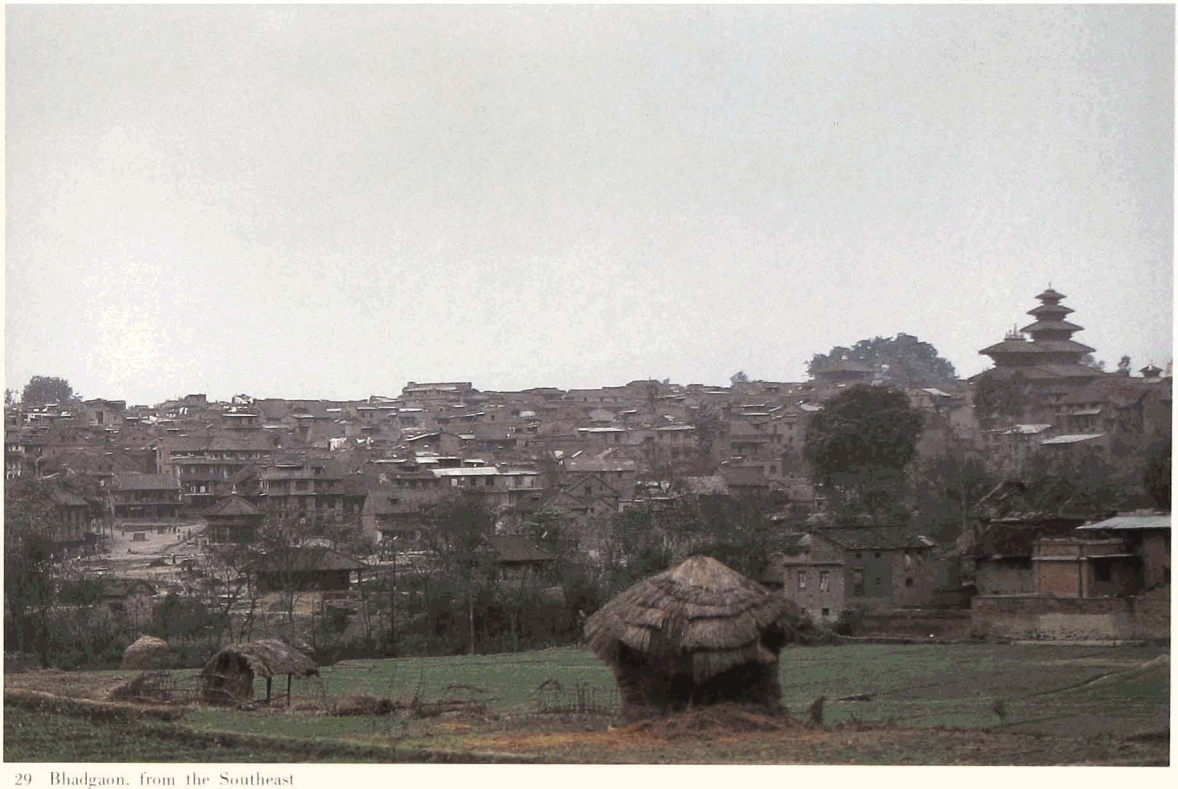
26 Mul Chok and Taleju



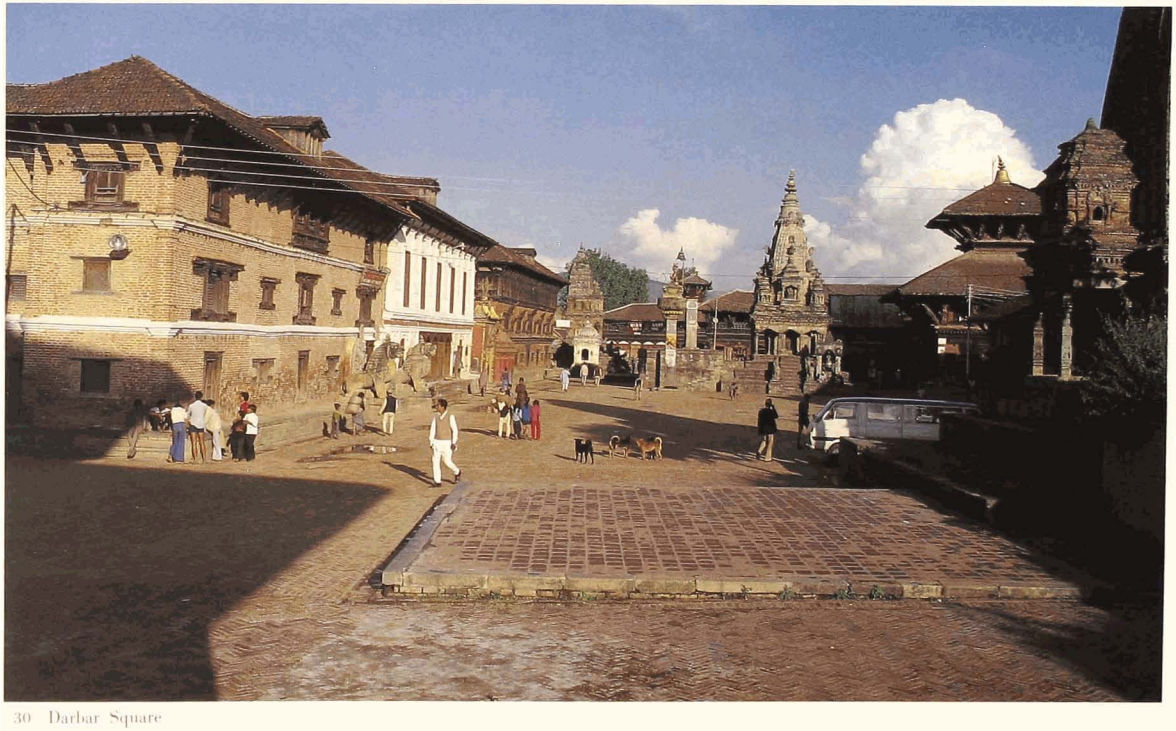
27 Basantapur Bhawan, the Eighth Floor



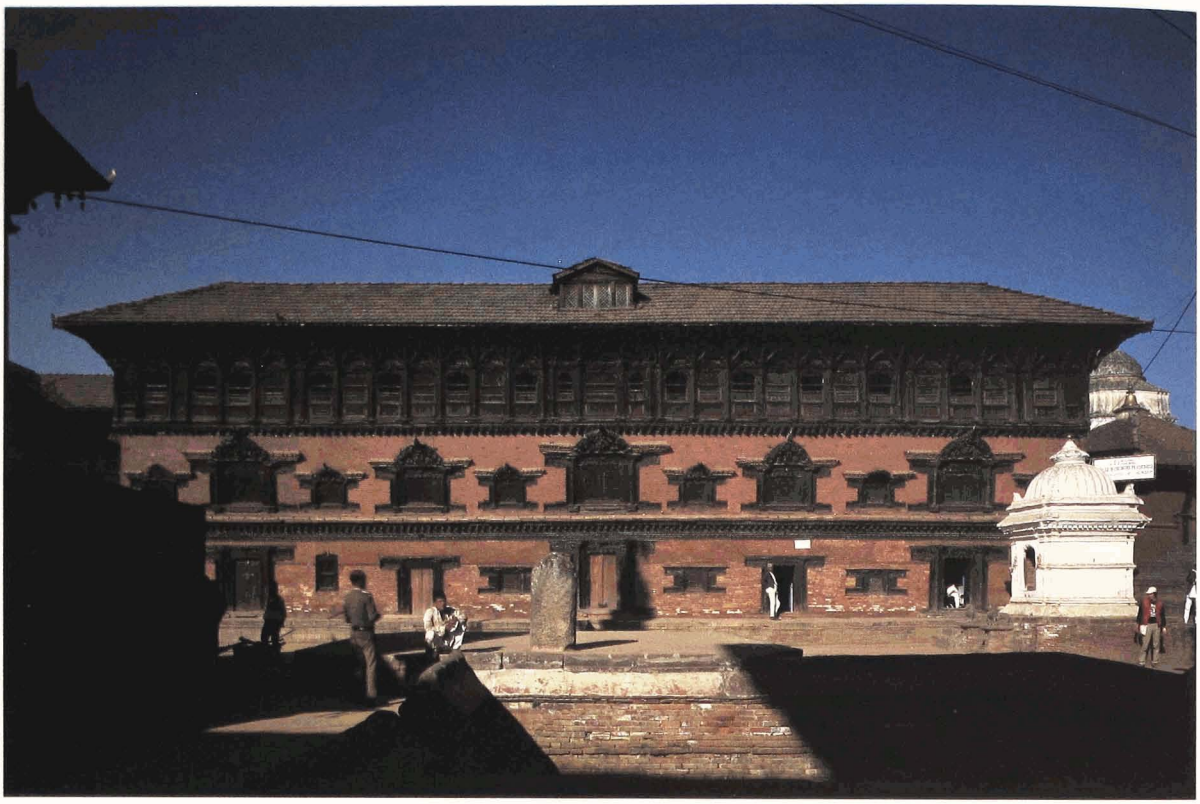
28 Hanuman Dhoka



29 Bhadgaon, from the Southeast



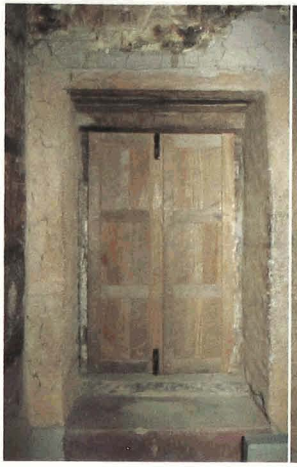
30 Darbar Square



31 Pachapanna Jhyal

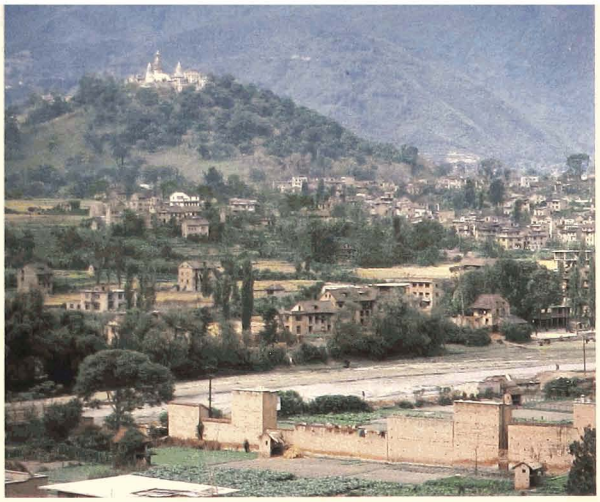
32 Sun Dhoka

33 Pachapanna Jhyal, the First Floor

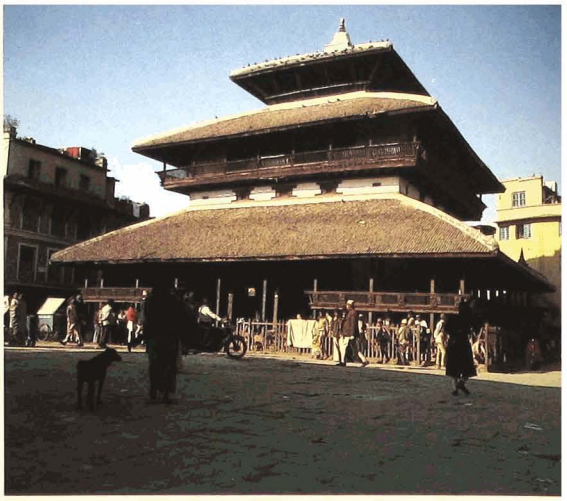


34-1 Pachapanna Jhyal, the Wall painting, the North Wall

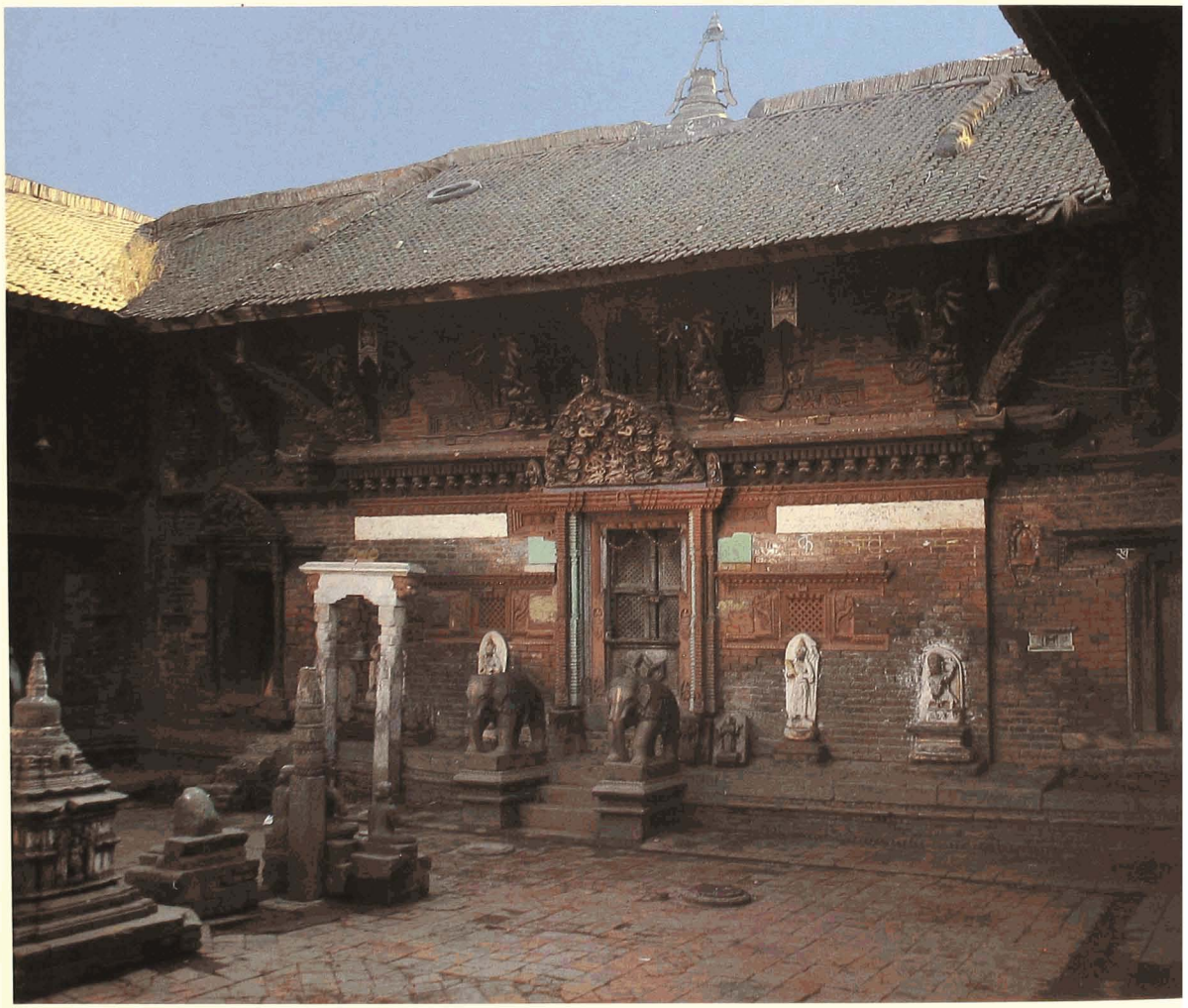
34-2 The East Wall



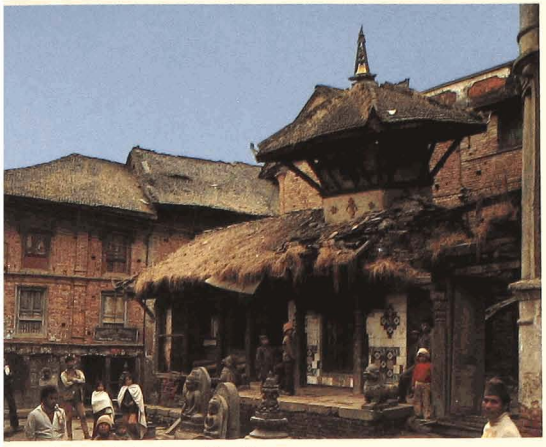
35 Swayambhu



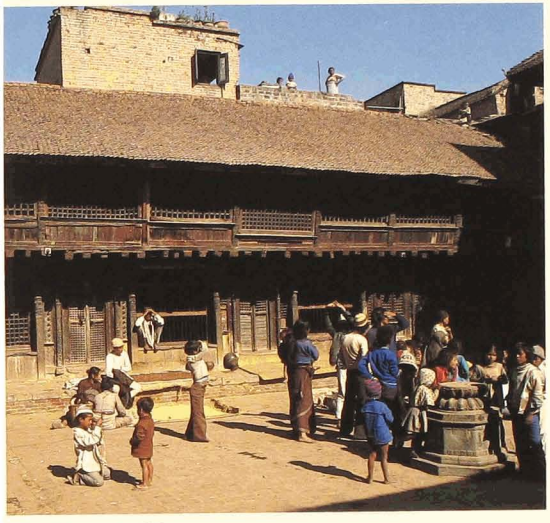
36 Kashta Mandap



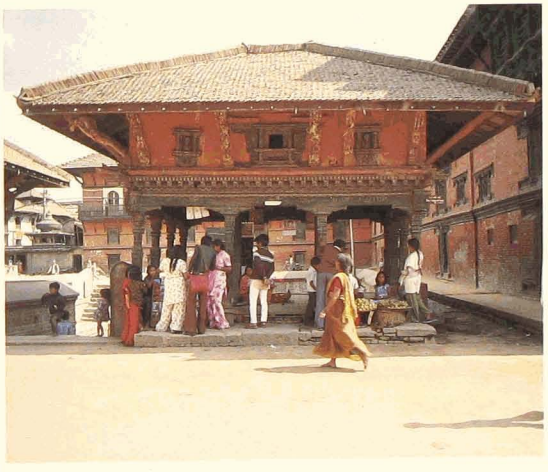
37 Chhusya Baha



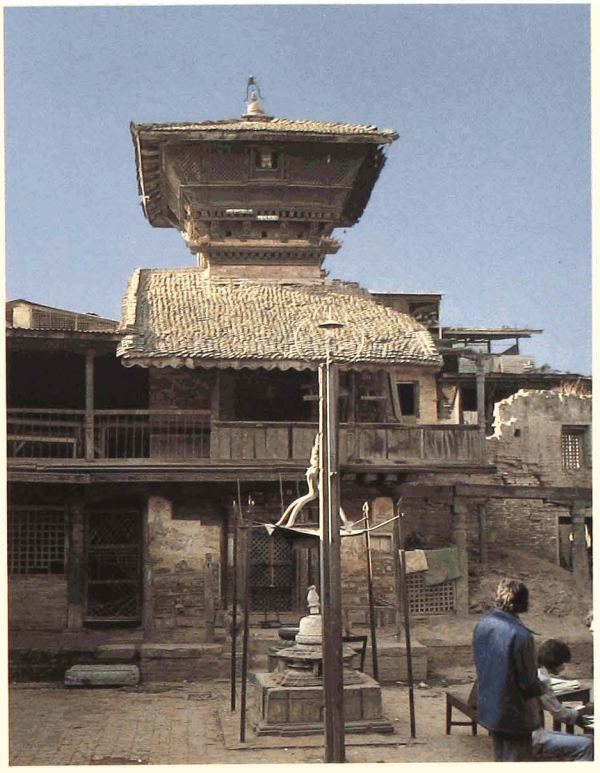
38 Banepa, Lokeshvar Mandir



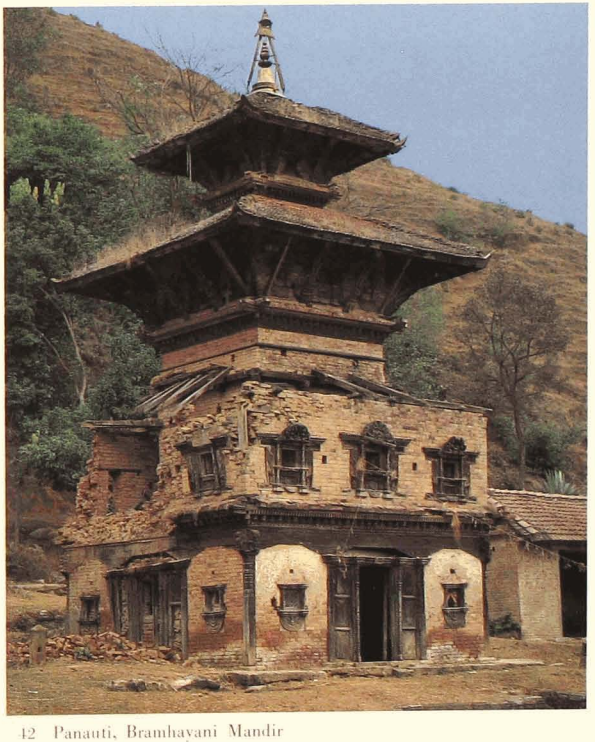
39 Patan, Su Baha



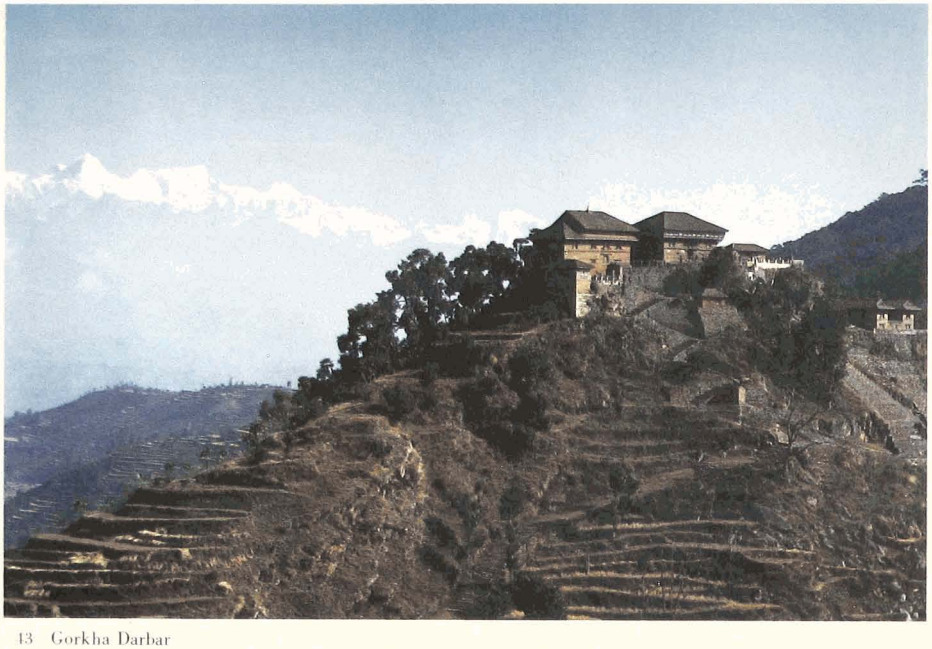
40 Patan, Mandapa



41 Patan, I Baha Bahi

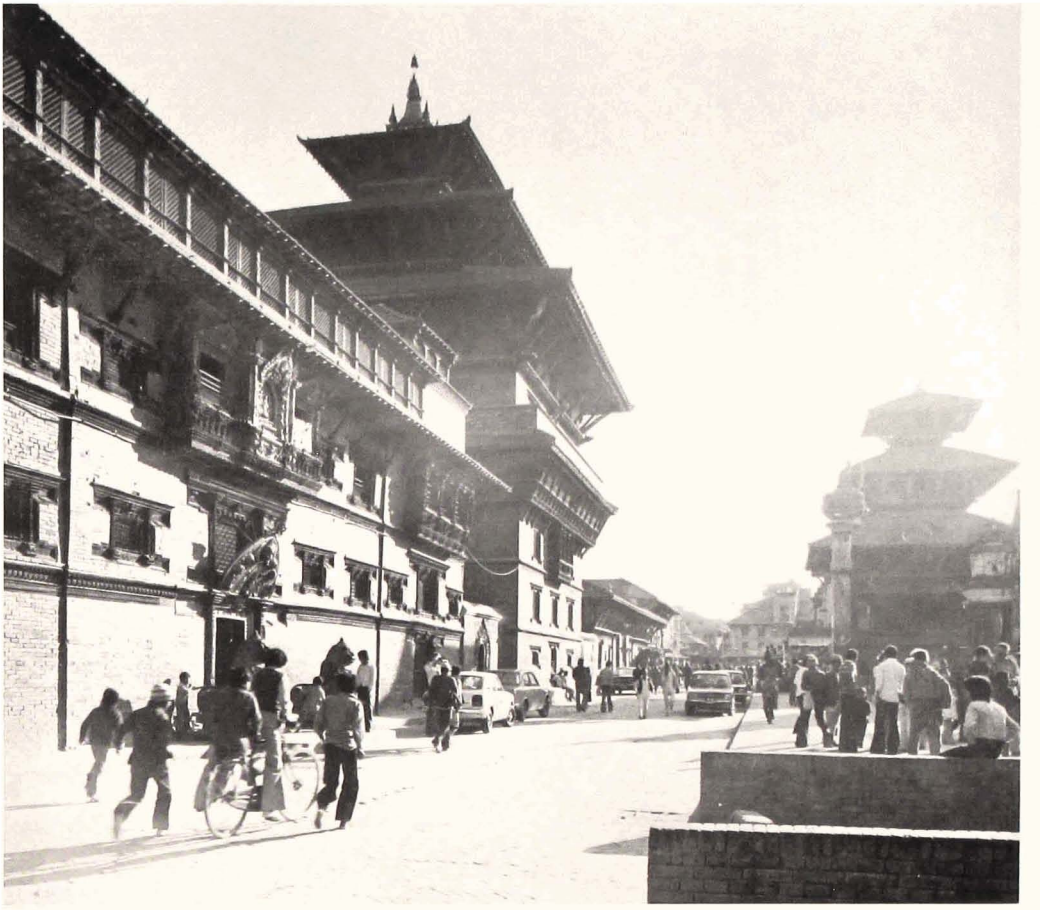


42 Panauti, Bramhayani Mandir

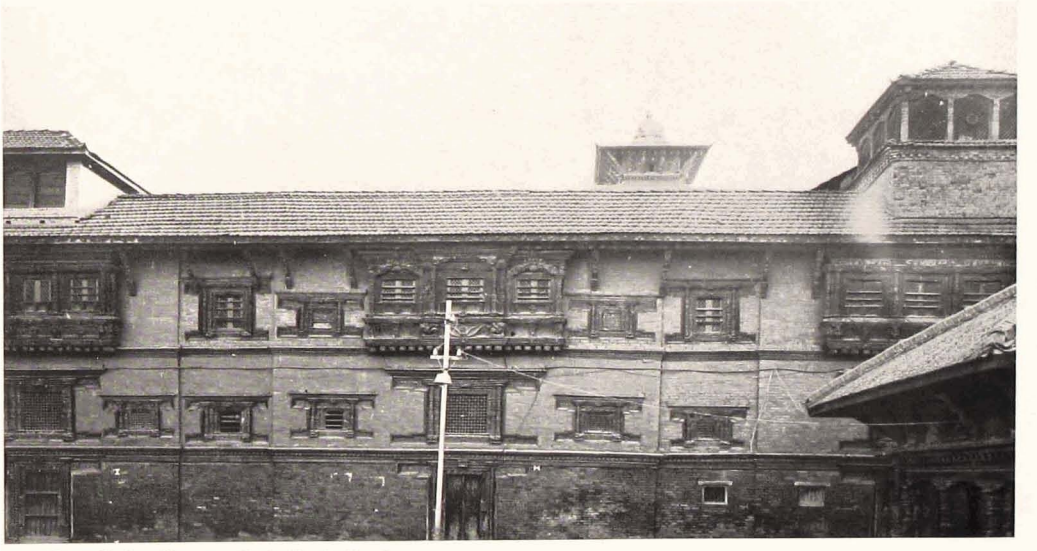


13 Gorkha Darbar

44 Gorkha Darbar, the Courtyard

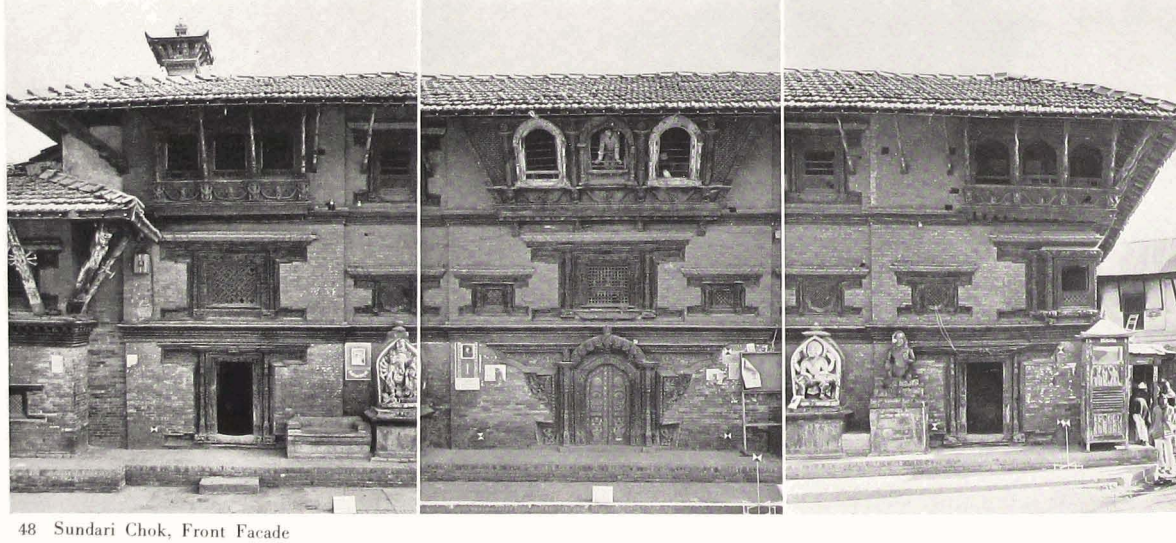


45 Patan Darbar and Darbar Square, from the North



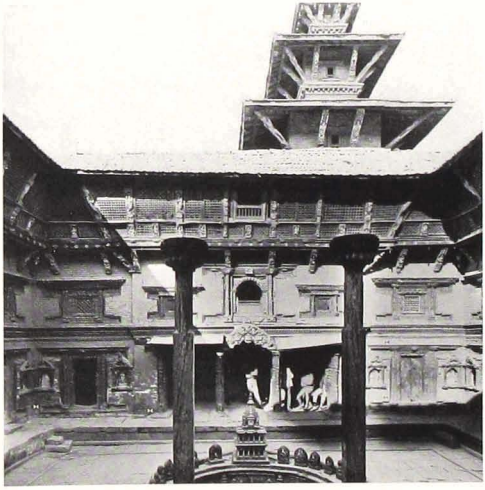
46 Mani Keshav Narayan Chok, North Facade

47 Sundari Chok

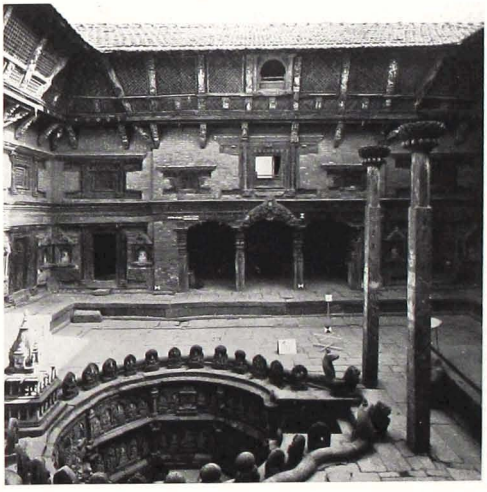


48 Sundari Chok, Front Facade

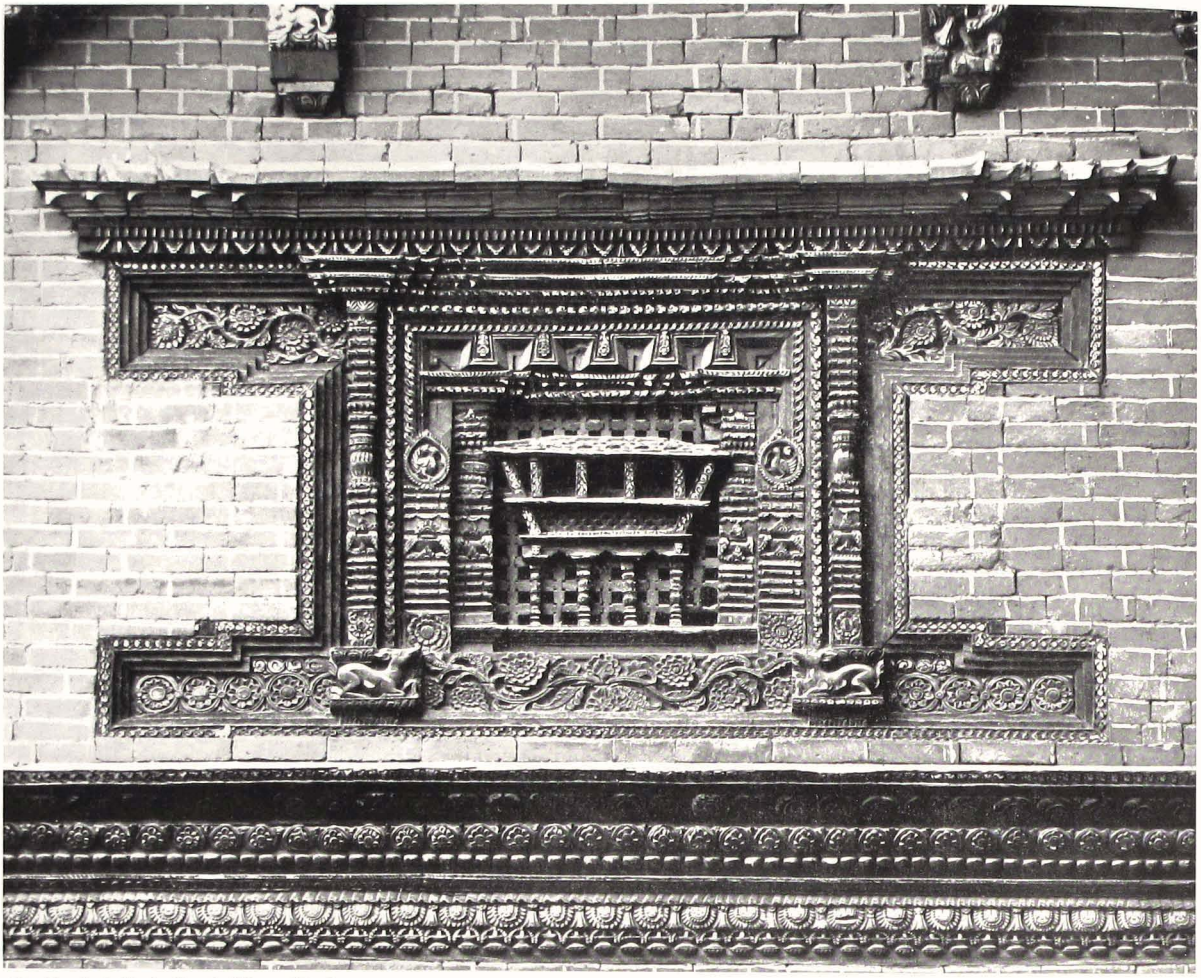
49 Sundari Chok, South Wing



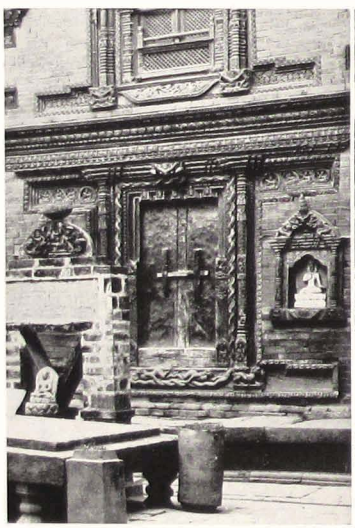
50 Sundari Chok, North Wing



51 Sundari Chok, East Wing

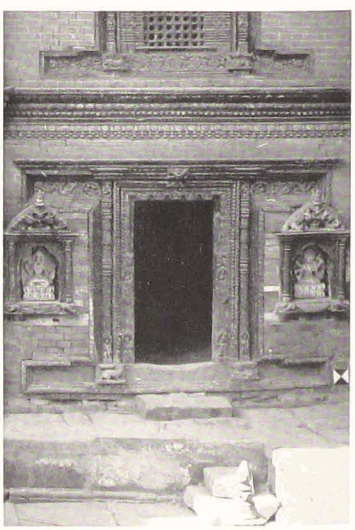


52 Sundari Chok, South Wing, Window (2W-49)

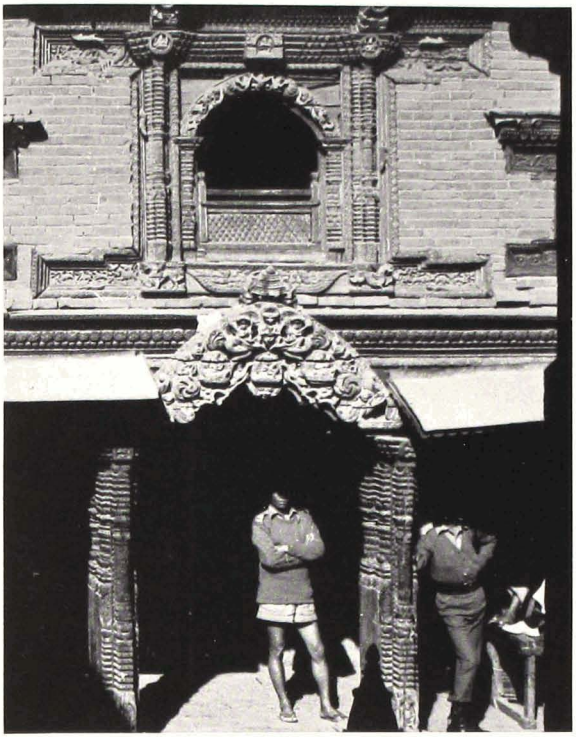


53 Sundari Chok, South Wing,
Entrance (1W-33)

54 Sundari Chok, South Wing,
Stone Carving of Foundation Bed



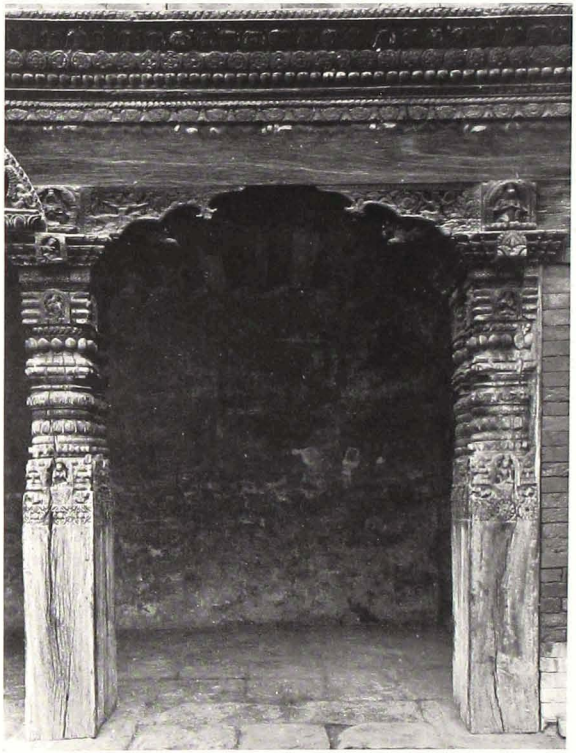
55 Sundari Chok, West Wing,
Entrance (1W-36)



56 Sundari Chok, North Wing, Dalan and Window (2W-57)

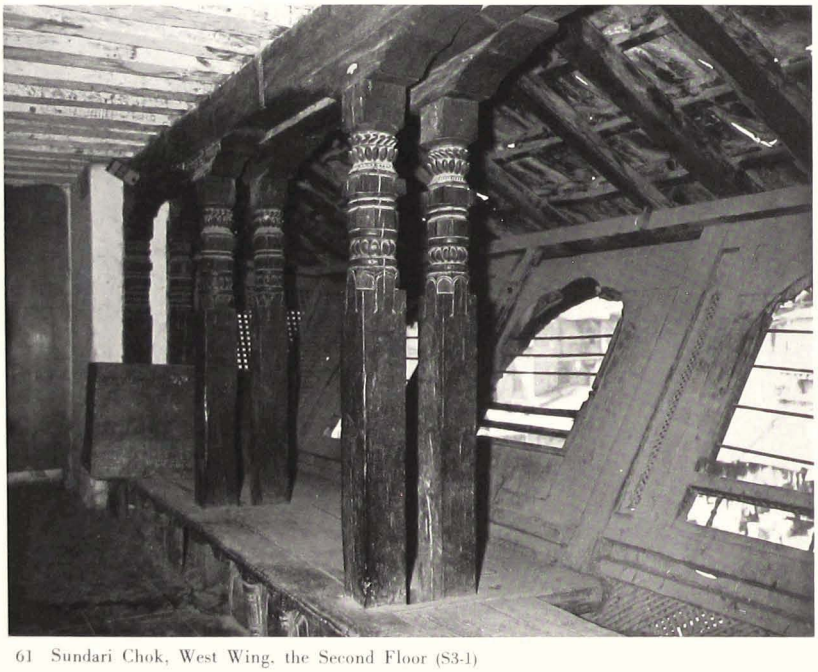
57 Sundari Chok, West Wing, Dalan

58 Sundari Chok, North Wing, Pillars of Dalan

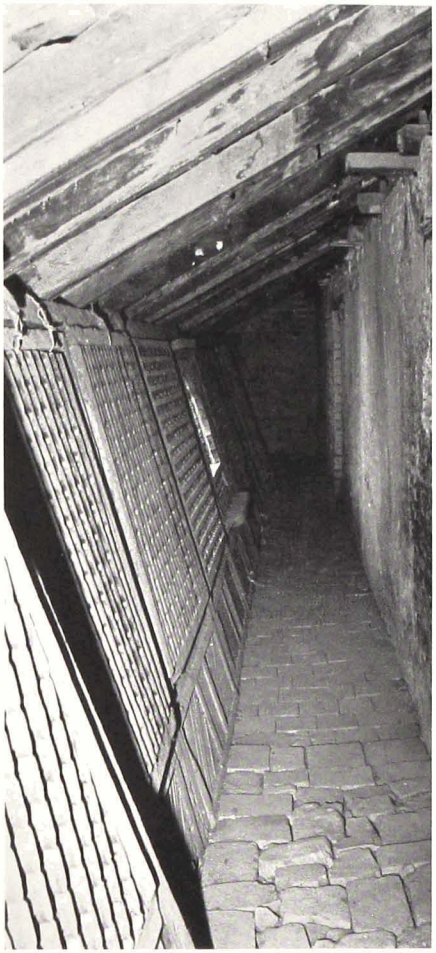


59 Sundari Chok, East Wing, Dalan

60 Sundari Chok. Tusa Hiti

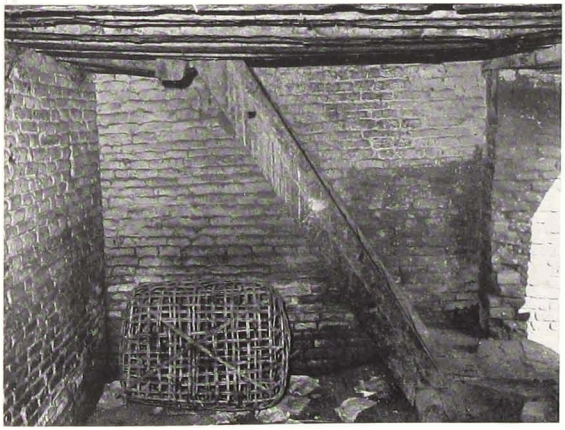


61 Sundari Chok, West Wing, the Second Floor (S3-1)



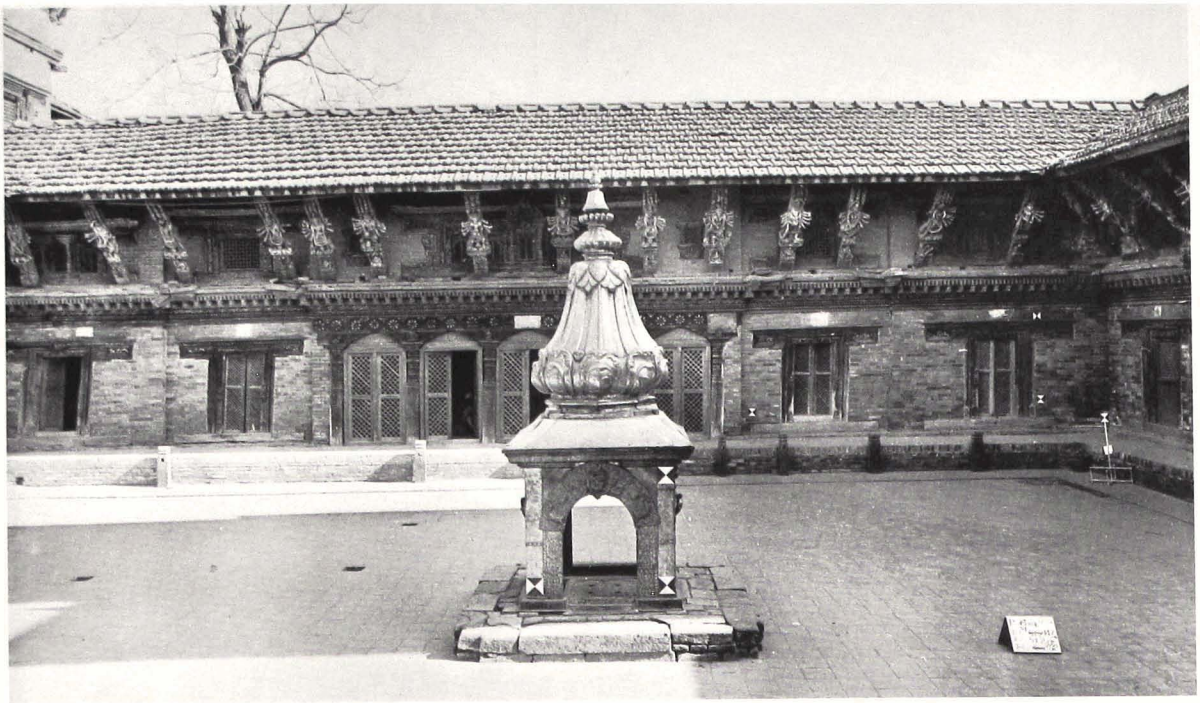
62 Sundari Chok, North Wing, Balcony

63 Sundari Chok, East Wing, Struts supporting Balcony



64 Sundari Chok, East Wing, the Ground Floor (S1-6)

65 Sundari Chok, East Wing, the Second Floor (S3-3)



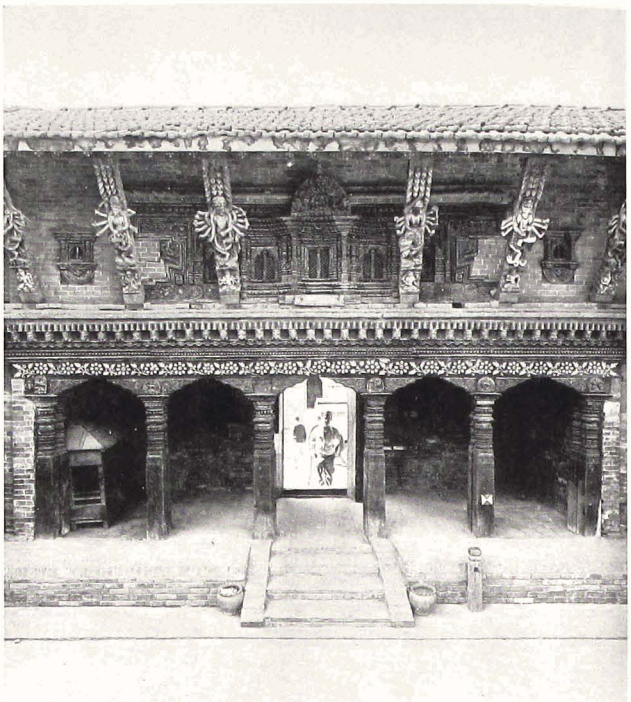
66 Mul Chok, East Wing

67 Mul Chok, West Wing

68 Agan Mandir

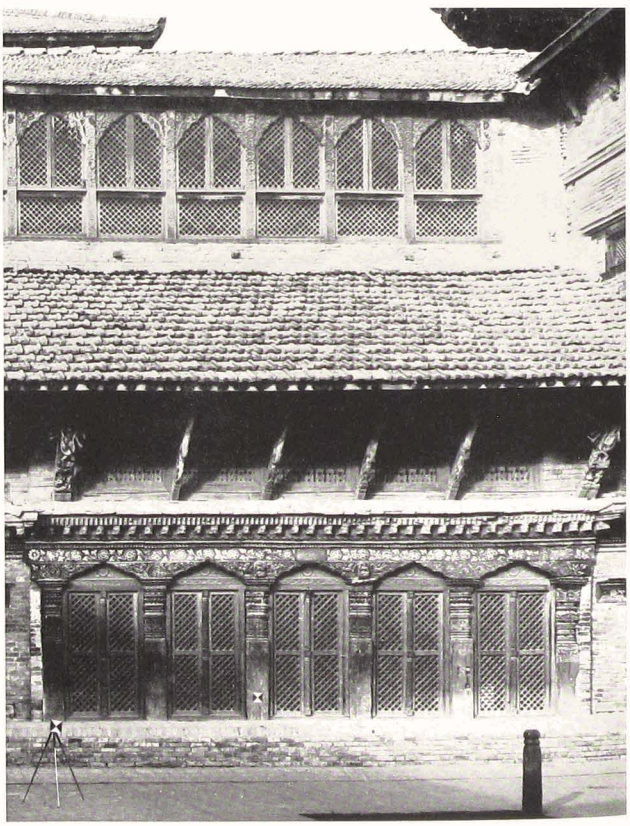
69 Taleju Mandir

70 Mul Chok, West Wing, Pillars of Dalan

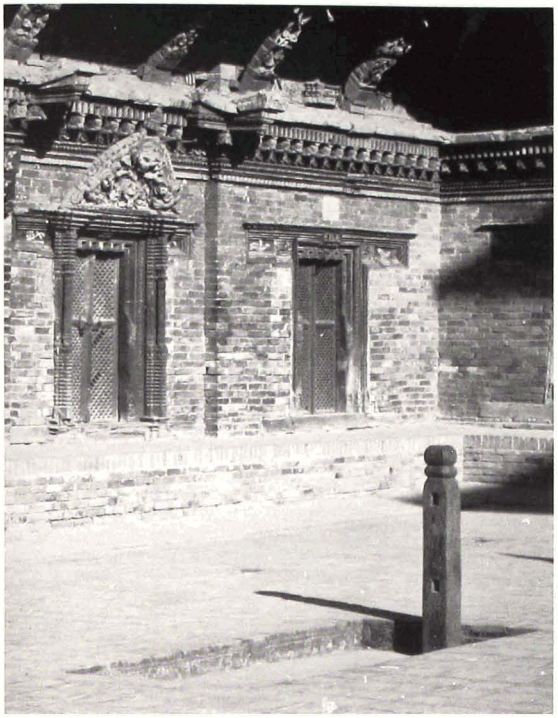


71 Mul Chok, West Wing, Dalan

72 Mul Chok, North Wing, Pillars of Dalan

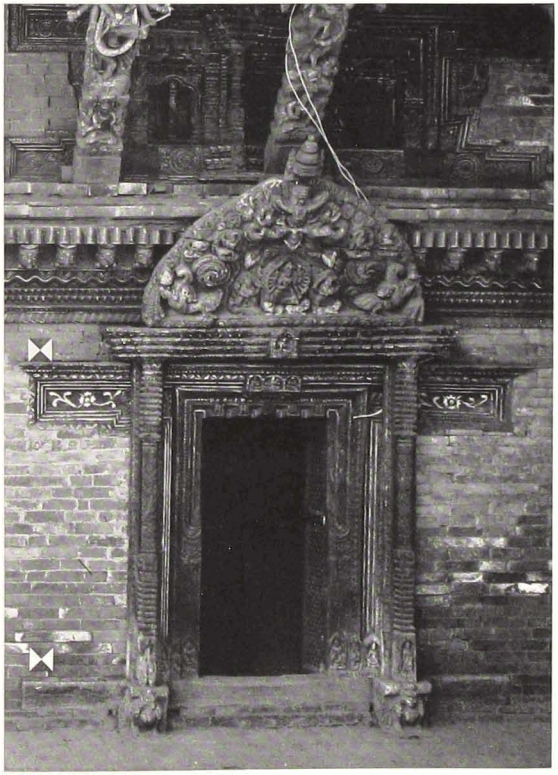


73 Mul Chok, North Wing, Dalan

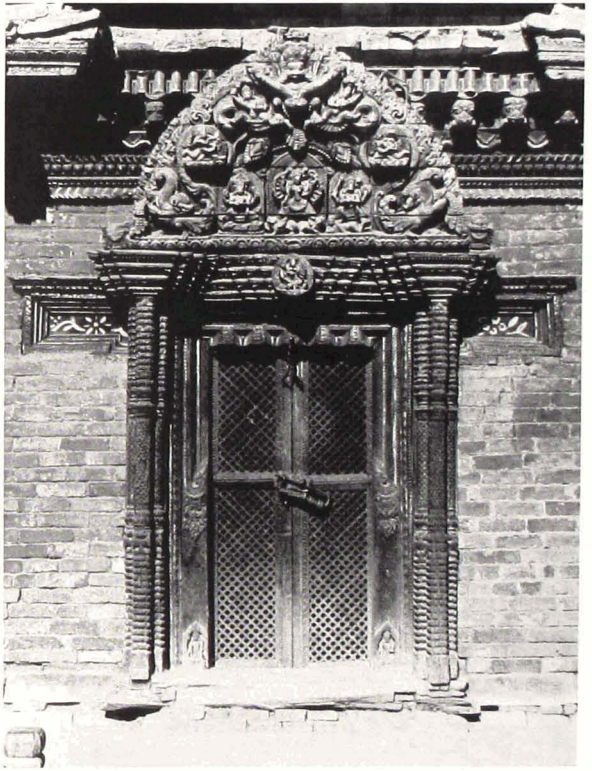


74 Mul Chok, Post for Sacrifice

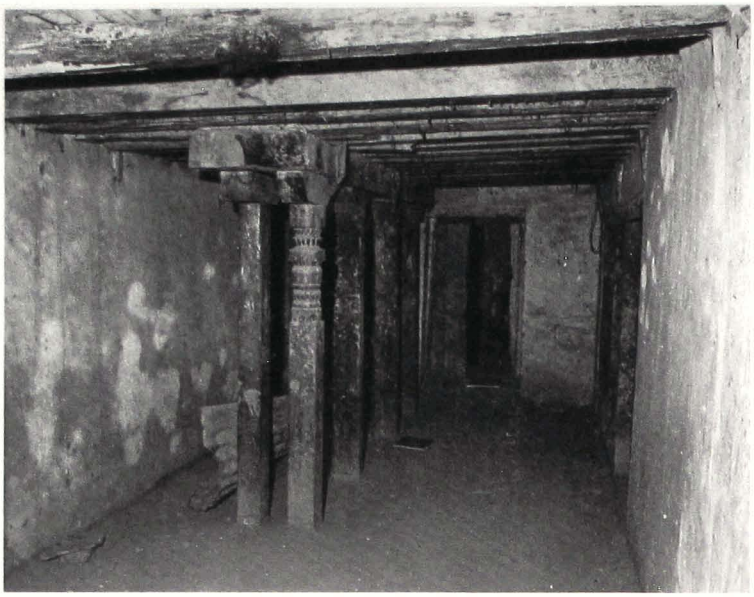
75 Mul Chok, South Wing, Entrance (1W-15)



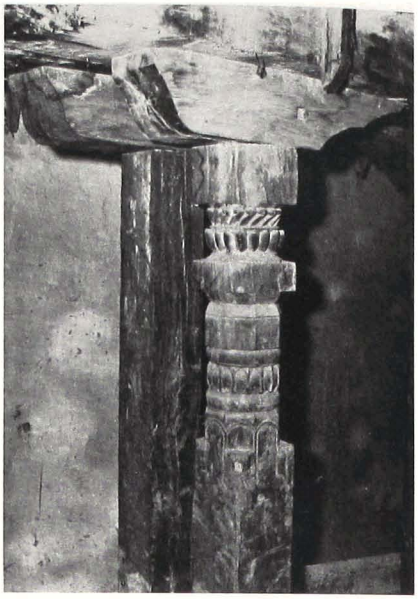
76 Mul Chok, West Wing, Entrance (1W-22)



77 Mul Chok, North Wing, Entrance (1W-24)

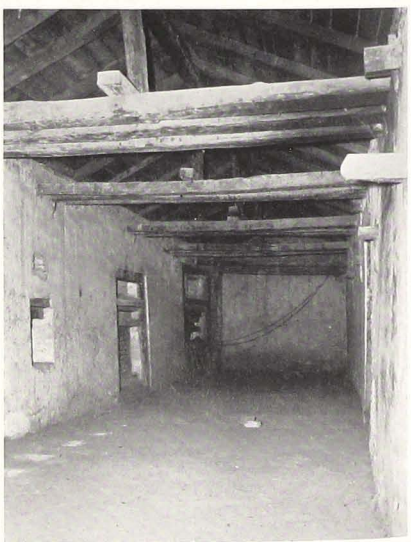


78 Mul Chok, South Wing, the First Floor (M2-13)



79 Mul Chok, South Wing, Pillars in the First Floor (M2-13)

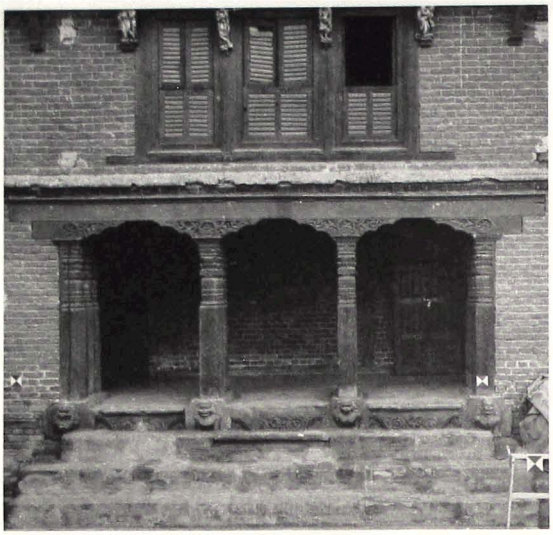
80 Agan Mandir, Structure view from the First Floor (M2-13)



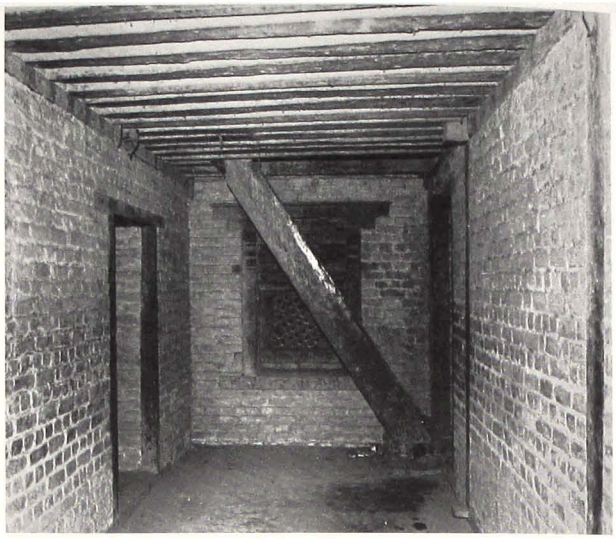
81 Mul Chok, East Wing, the First Floor (M2-9)

82 Degu Talle, from the East

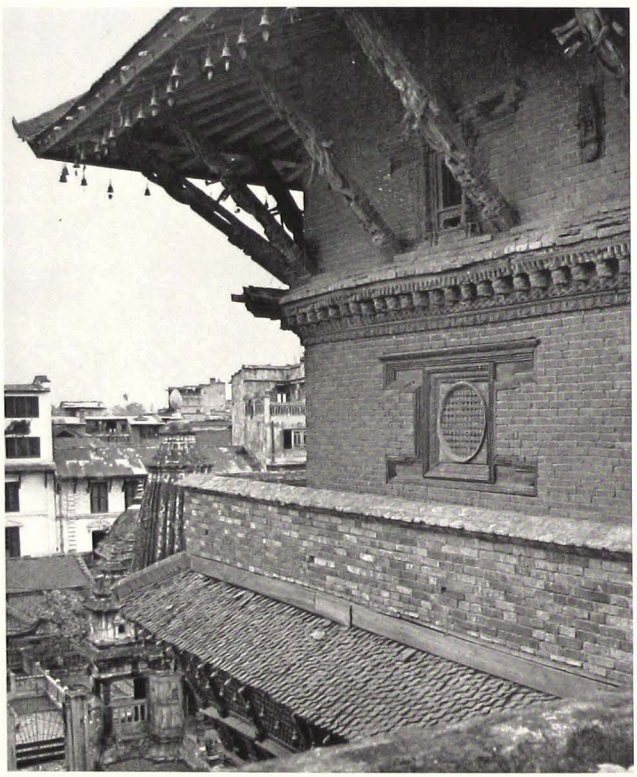
83 Degu Talle, from the West



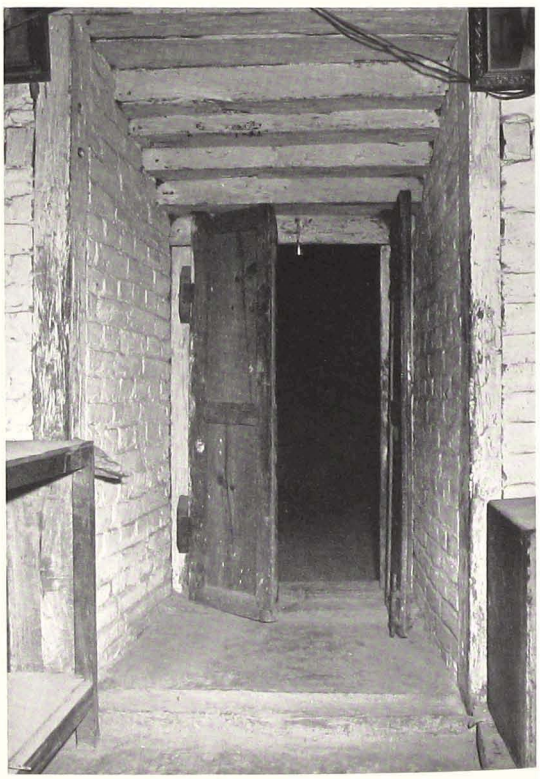
84 Degu Talle, the First Floor, Dalan



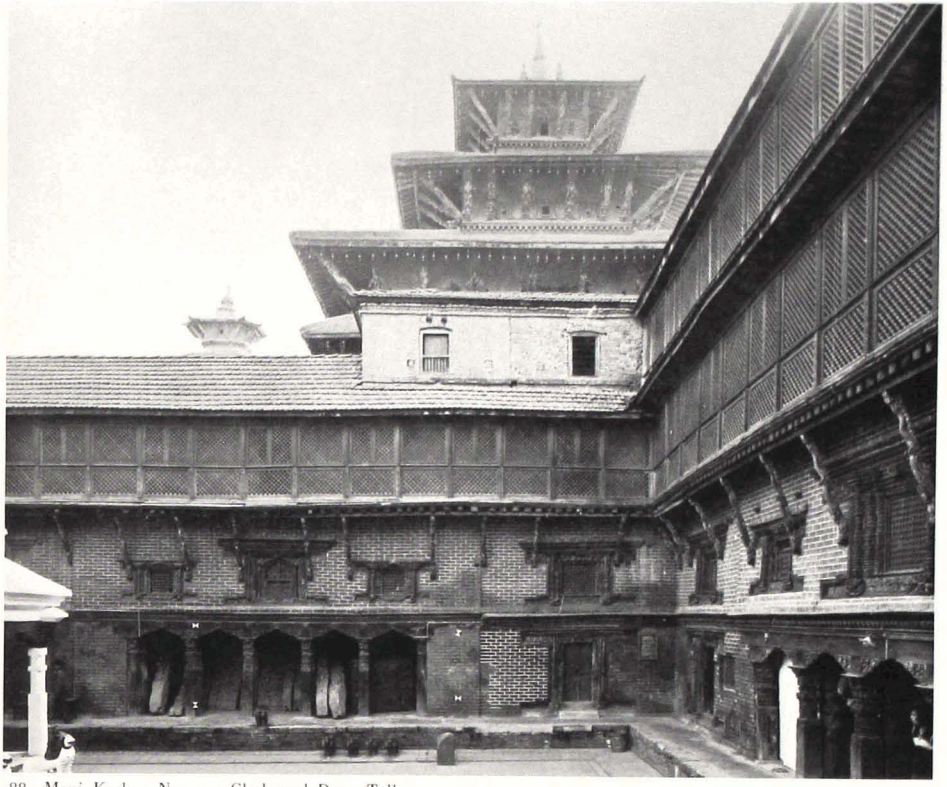
85 Degu Talle, the First Floor



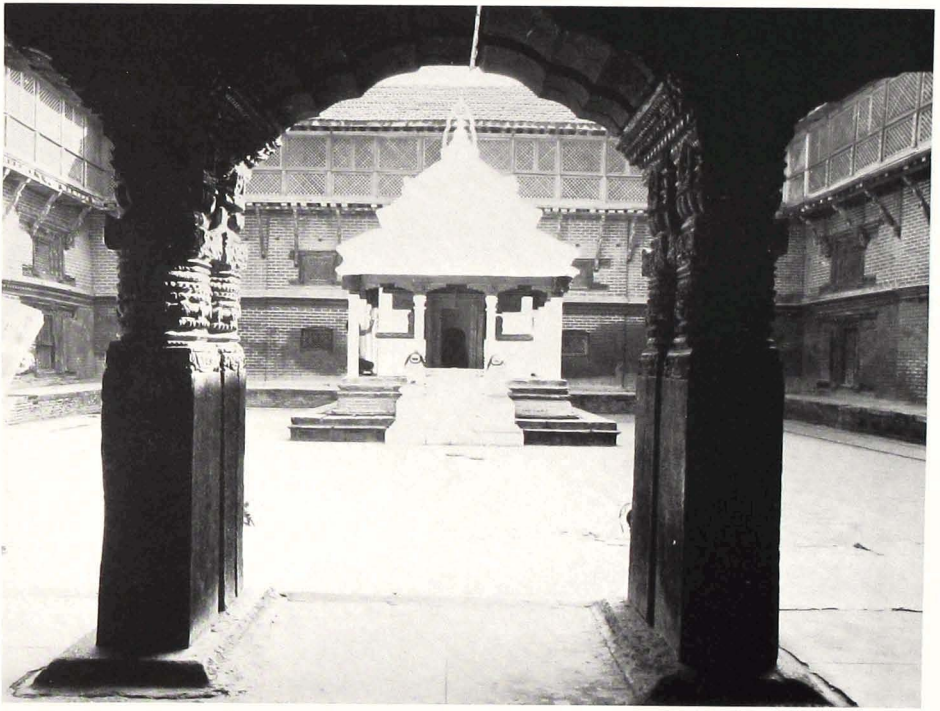
86 Degu Talle, from the Southeast



87 Degu Talle, the First Floor,
Joint Part with Mani Keshav Narayan Chok



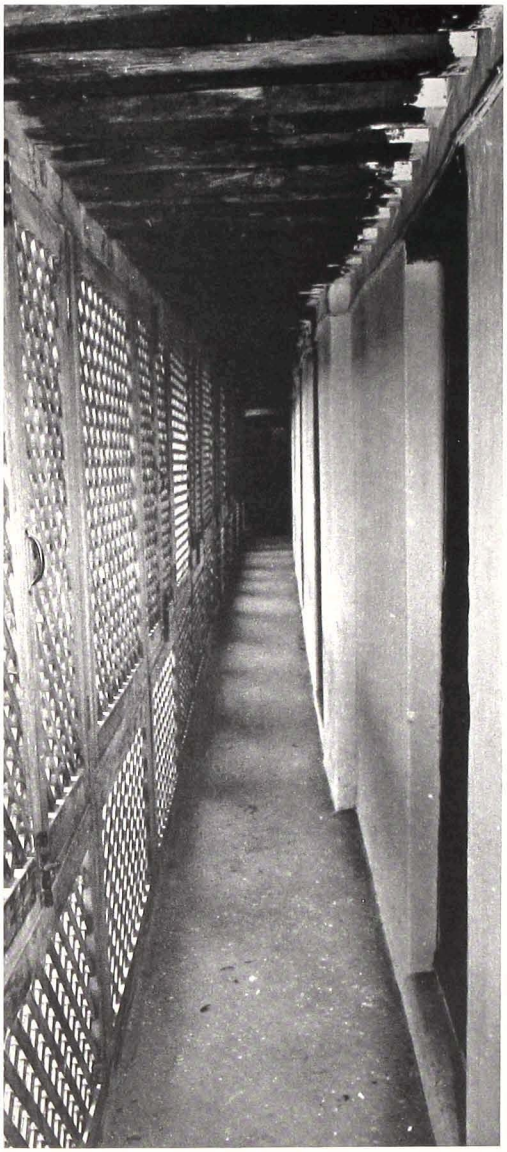
88 Mani Keshav Narayan Chok and Degu Talle



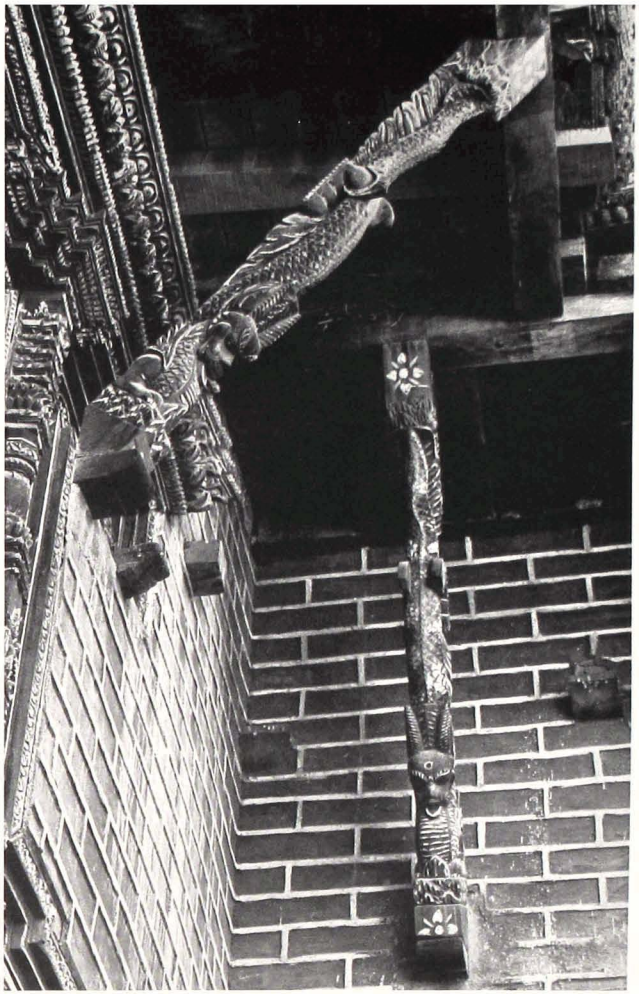
89 Mani Keshav Narayan Chok

90 Mani Keshav Narayan Chok, South Wing. Bracket of Dalan

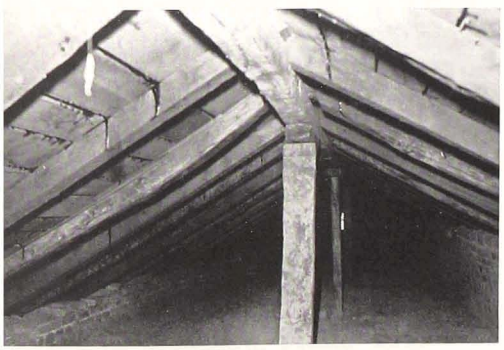
91 Mani Keshav Narayan Chok, South Wing. Pillars of Dalan



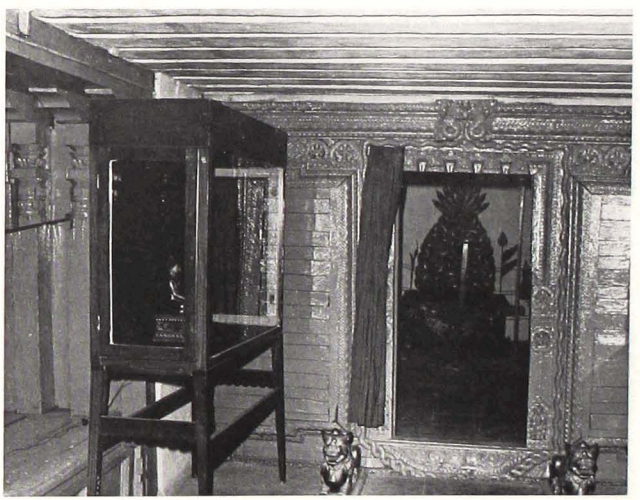
92 Mani Keshav Narayan Chok, the Second Floor, Balcony



93 Mani Keshav Narayan Chok, Struts supporting Balcony

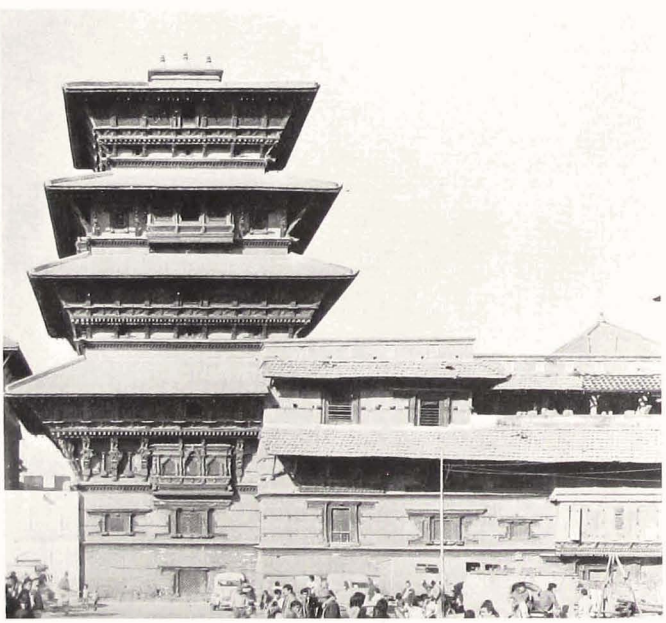


94 Mani Keshav Narayan Chok, Structure of Roof

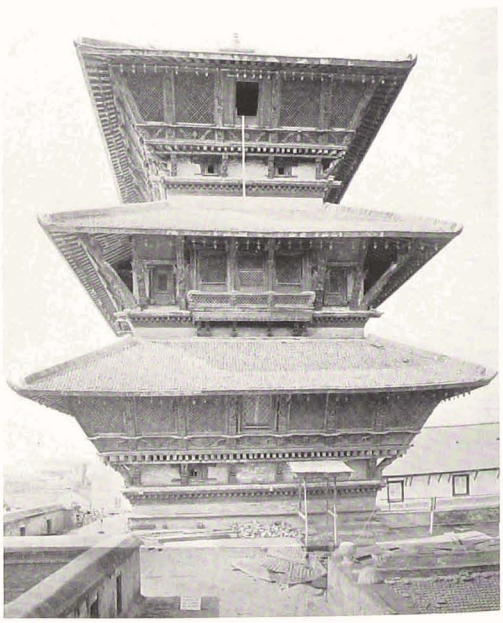


95 Mani Keshav Narayan Chok, West Wing, the Second Floor

96 Kathmandu Darbar

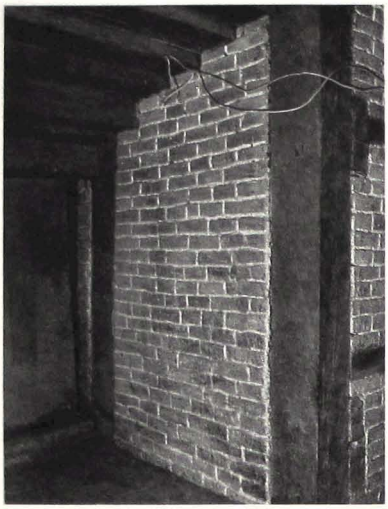


97 Basantapur Bhawan, from the South

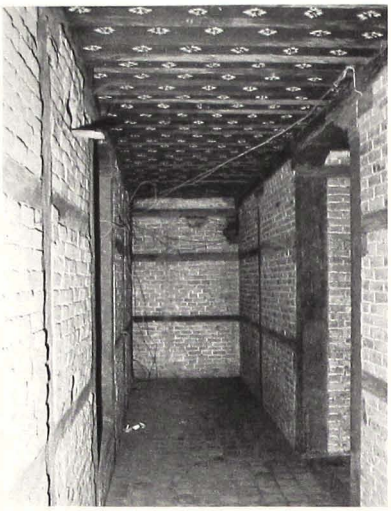


98 Basantapur Bhawan, from the East

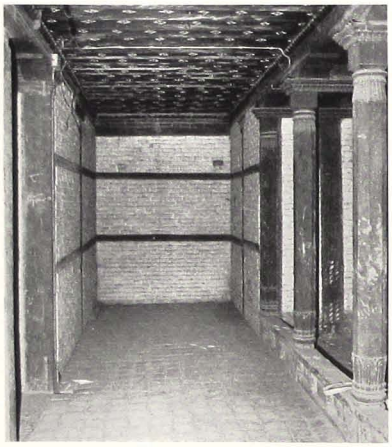
99 Basantapur Bhawan, from Nasal Chok



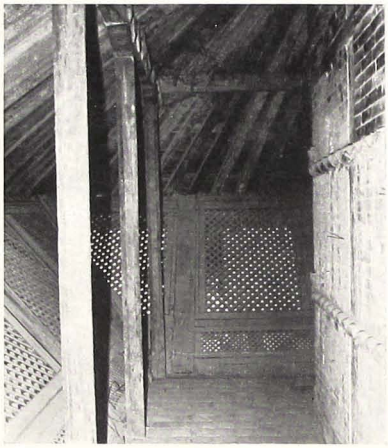
100 The Ground Floor, Entrance



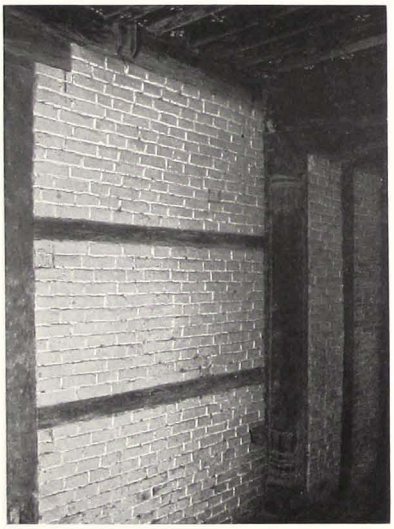
101 The First Floor, South Room



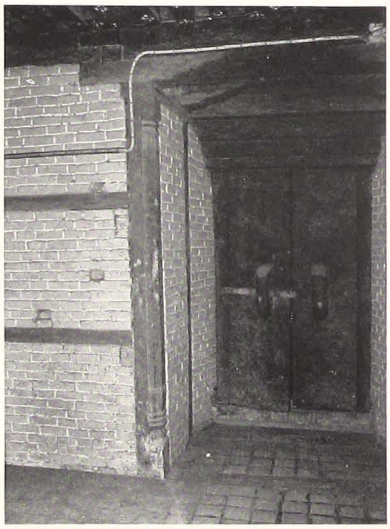
102 The Second Floor, South Room



103 The Third Floor, Balcony



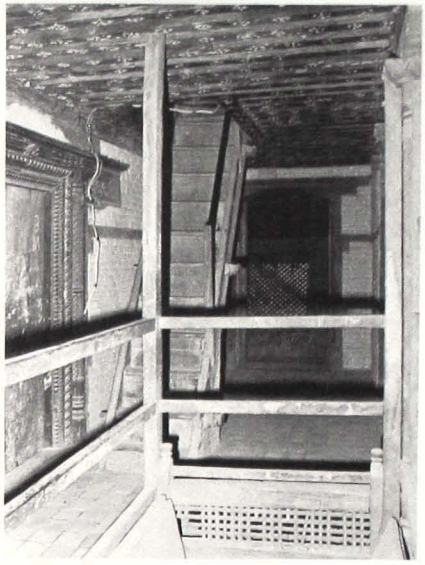
104 The Third Floor, Posts



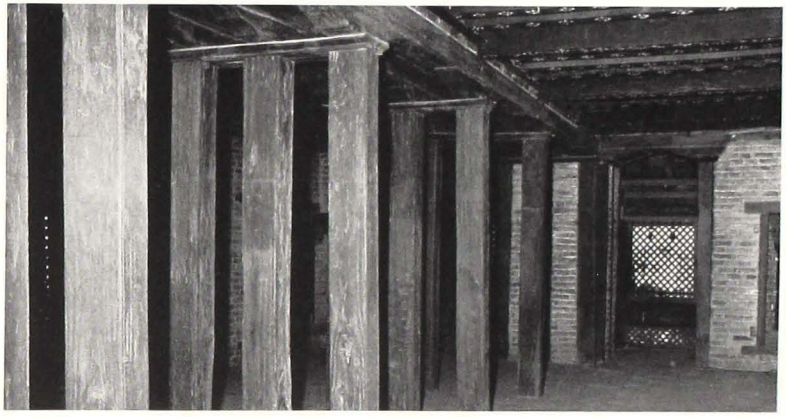
105 The Third Floor, South Room, Post

106 The Third Floor, Vestiges of a Post

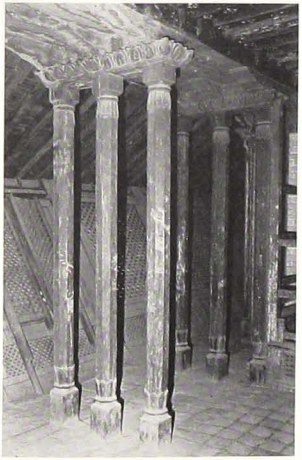
107 The Fourth Floor, North Room, Entrance to South Room



108 The Fifth Floor, North Room



109 The Sixth Floor, Posts

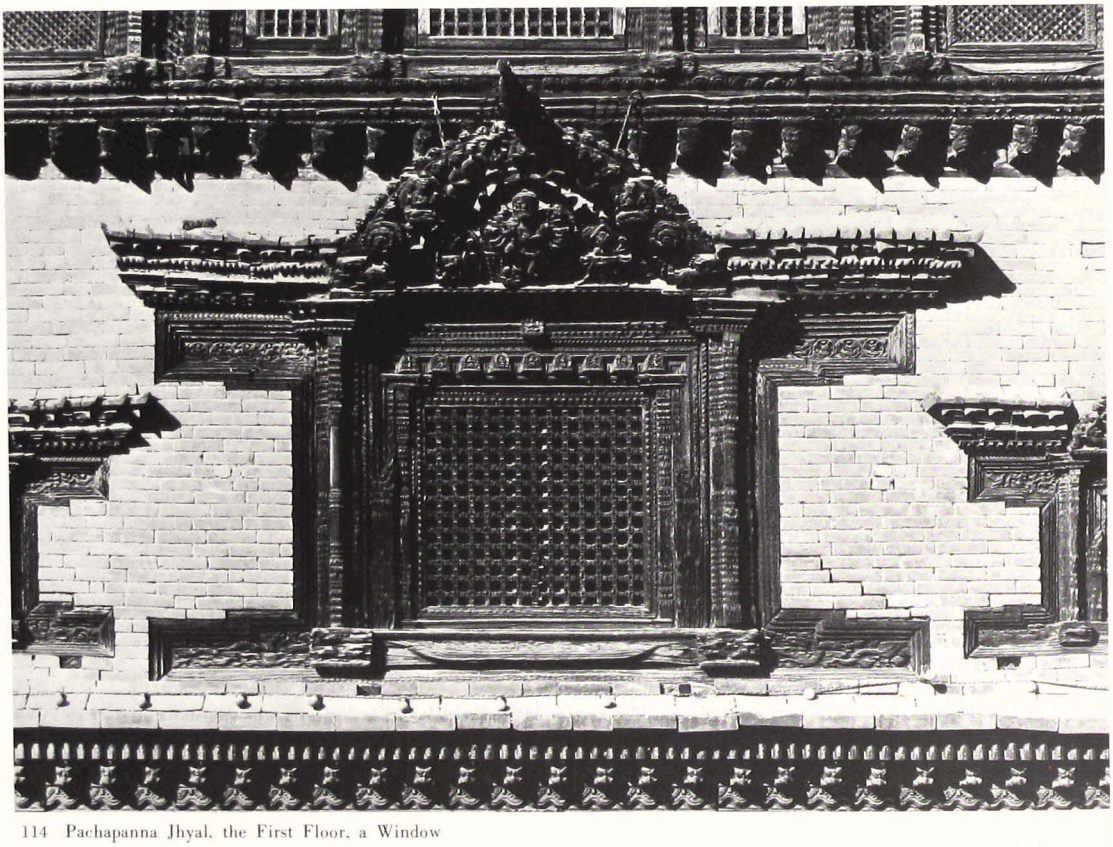


110 The Fifth Floor, North Room, Balcony and Posts

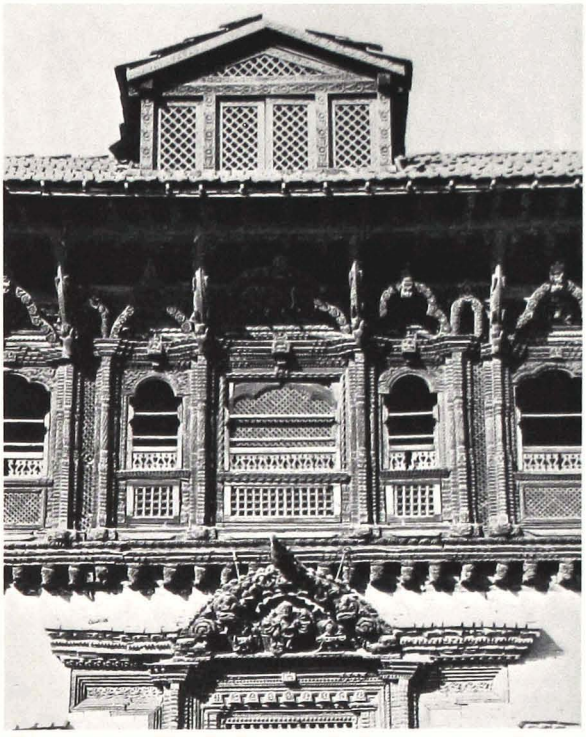
111 The Seventh Floor, North Room

112 The Eighth Floor

113 Bhadgaon Darbar, Pachapanna Jhyal



114 Pachapanna Jhyal, the First Floor, a Window

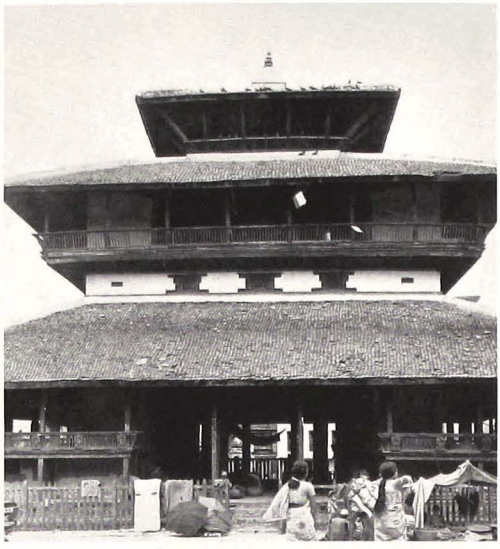


115 Pachapanna Jhyal, the Second Floor, Windows

116 Darbar Square, Dharmashala

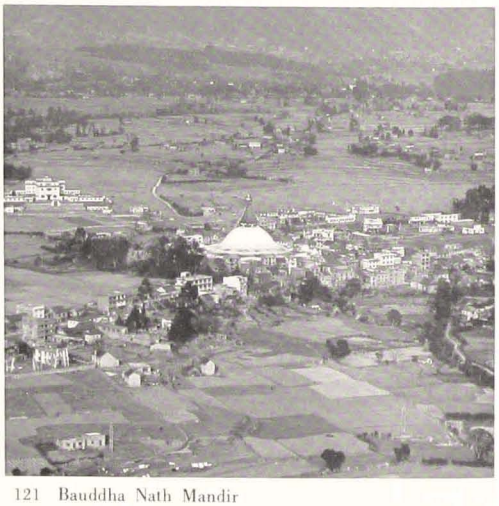
117 Kashta Mandap

118 Kashta Mandap



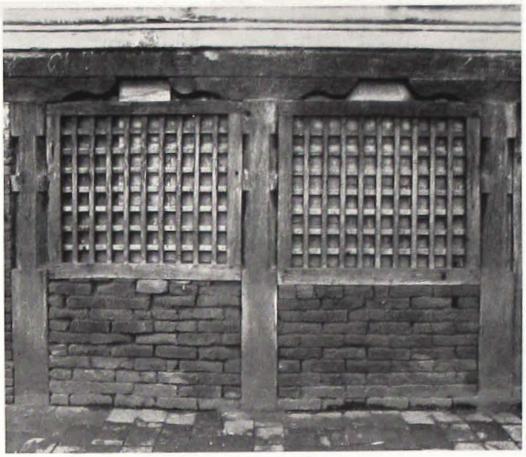
119 Kashta Mandap

120 Pashupati Nath Mandir



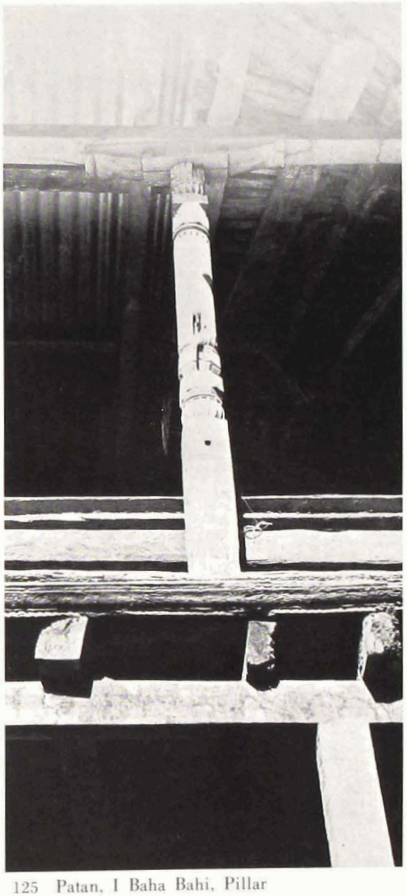
121 Bauddha Nath Mandir

122 Kathmandu, Chhusya Baha



123 Kathmandu, Na Bahi

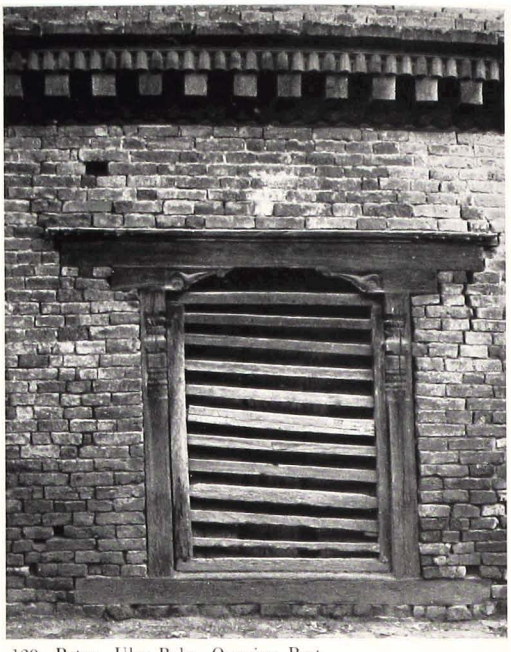
124 Banepa, Lokeshvar Mandir, Pillar



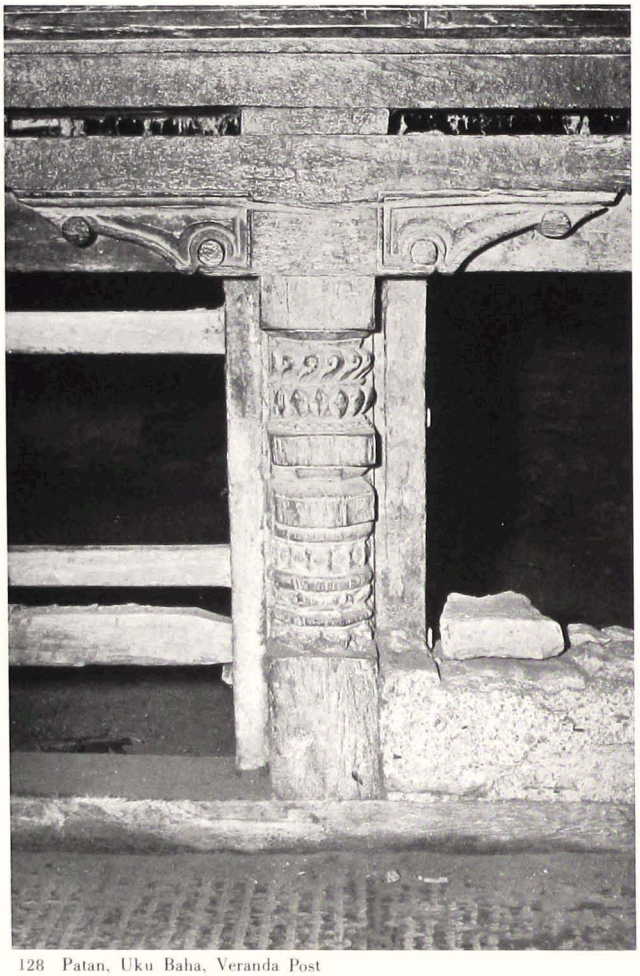
125 Patan, I Baha Bahi, Pillar

126 Patan, Bhinchhe Baha, Pillars

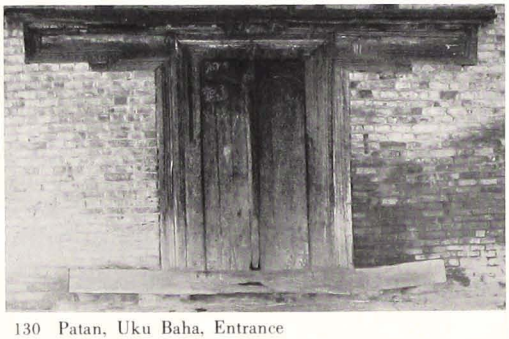
127 Patan, Uku Baha



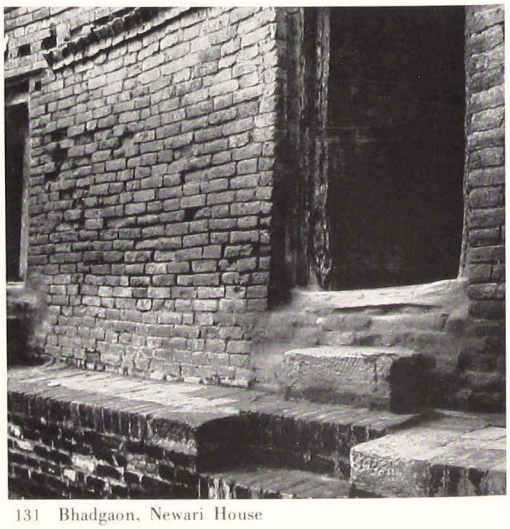
129 Patan, Uku Baha, Opening Part



128 Patan, Uku Baha, Veranda Post



130 Patan, Uku Baha, Entrance



131 Bhadgaon, Newari House

The Royal Buildings in Nepal

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Explanatory Notes

1. The Royal Buildings in Nepal—a report on the old royal palaces of the Kingdom of Nepal—is the report of investigation on the royal palaces of Patan, Kathmandu and Bhadgaon which was investigated in 1978-1980.

2. This book contains plates, contents, English text, Japanese text, appended terms and appended figures. Emphasis is put on the English text. Therefore the figures and tables are published only in the English text and the relevant number and page of the figures and tables of the English text are given in the Japanese text.

3. The text contains Preface, Chapter 1 (Present State of the Royal Palace Structures) and Chapter 2 (Architectural Analysis of the Royal Buildings). In Chapter 1 we arrange the Patan Darbar, the Kathmandu Darbar and the Bhadgaon Darbar in the order of the high degree of investigation. Each section in Chapter 2, plates and appended figure etc. are also set in this order.

4. Plates are showed in colours and next in monochromes. They are numbered serially. They are put in the order of the Patan Darbar, the Kathmandu Darbar, the Bhadgaon Darbar and other buildings both in colours and in monochromes. Furthermore in each building we put them in the order of external appearance, appearance from the courtyard, interiors of the building and details.

5. Figures and tables are numbered in every section. The number is given such as [chapter number]-[section number]-[order in section].

6. Appended figures are arranged according to the order of plates. They are in the order of plan, elevation, section and detail of each building.

7. Michio Fujioka, Katsuhiko Watanabe, Hisataro Gotoh, Jun Hatano, Shiro Sasano took the share of writing in the text. The name of the writer is shown at the end of his assignment.

8. Katsuhiko Watanabe and Jun Hatano took charge of editing.

9. Shiro Sasano took charge of translating into English in Chapter 1 Section 2-2, Miss Pauline Bush in Preface and Chapter 2 Section 2 and Section 3, Yoshihiro Ohtsuka in Table 0-3-1, Chapter 1 Section 1-2 and Section 3-2, Chapter 2 Section 1 and Section 4-3, Tsuneo Sakai in Chapter 2 Section 4-1 and Section 4-2.
   Yoshihiro Ohtsuka supervised all the English translation of this book.

10. Photographs are taken and figures are made by our investigation group except the special annotation and they are in safekeeping with Department of Architectural History of Nippon Institute of Technology.
    In filing photographs and making figures we could obtain cooperation from Nobuyoshi Satoh, Kazuo Sonoura, Masamichi Kominami, Shigeru Kohno, Junichi Okuyama, Ryuma Zushi, Ichiro Kurosawa and Kazuki Kurita of our department.

Preface

1. Purpose and Significance of the Study

Situated geographically between India and Tibet (Fig. 0-1-1), Nepal is the meeting point of both Indian and Chinese cultures. While generally Indian culture may be said to dominate, the fact that the country also has a long history of inter-cultural exchange with Tibet cannot be overlooked. In the three cities of Kathmandu, Patan and Bhadgaon which are located in the Kathmandu Valley (Fig. 0-1-2), it is possible to see many examples of medieval architecture preserved in ordinary structures in the streets of the towns, but it is *Darbar* (the palaces) with their pagoda-style temples towering above all else, that best perpetuate the traditional style of architecture of dwelling place and temple.

Fig. 0-1-1 Geographical Position of Nepal.

As yet there is still no fully satisfactory explanation of where this unique style of architecture fits into the total framework of the history of world architecture, nor, since the style of architecture naturally resembles the multi-storied (pagoda) style found in Chinese architecture, of where the relationship with China originally lay, and yet some clarification of these two factors may be considered to have an important bearing on the question of the history of inter-cultural exchange.

However, in order to clarify these points, a grasp of the actual structural system of these places is vital, and to achieve this, it is necessary to start first with an accurate architectural survey. There are three main prerequisites for obtaining an accurate survey of the exterior of any tall structure: the guarantee of a fixed locaton, virtually unlimited funds and an almost unrestricted schedule. Since these were not readily available on this occasion, for the purposes of the present study, it was decided to combine two survey methods and to use a stereo metric camera and to take measurements using stand-

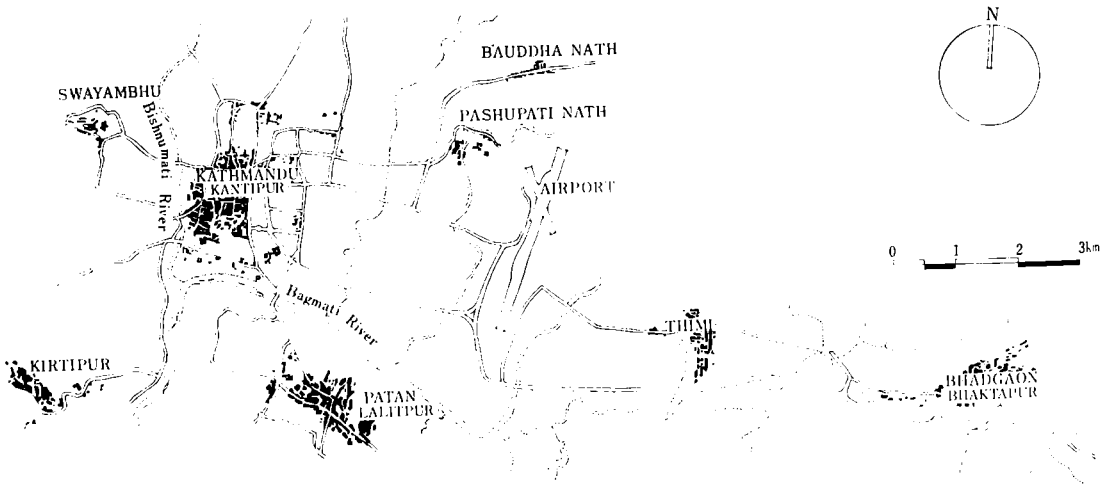


Fig. 0-1-2 Kathmandu Valley: Ref. Association for Comparative Alpine Research's *Kathmandu Valley*, Munich 1977.

ard surveyor's measuring tape for producing drawings of the plan and elevation of the structures under study.

(Michio Fujioka)

2. Study Programme

The study of the palaces of the Kingdom of Nepal began in December, 1969, with the visit of Dr. Michio Fujioka, Professor at the Nippon Institute of Technology, to the three cities of Kathmandu, Patan and Bhadgaon. Dr. Fujioka had been interested in the architecture of Nepal for some time prior to 1969, and his visit in that year was for the purpose of undertaking a preliminary study into the subject. At the time he was also extremely interested in the palaces of these three cities, some of which were then already very near collapse (Fig. 0-2-1).

Fig. 0-2-1 Lalitpur Bhawn of the Kathmandu Darbar in 1969.

It is not certain that by what route this extremely interesting style of architecture was introduced and developed in Nepal. However, Dr. Fujioka considered there would be value in undertaking some kind of research study into the subject, and in devising some means of conserving it, since he felt that it was of significance from the point of view of cultural history. Since he had also been advised, at the time, by the responsible authorities of the Government's desire to conserve the country's ancient architecture, he conceived the idea of this present study.

He began drafting a plan of study immediately on his return to Japan, but this was never put into effect. With the appointment sometime afterwards of Dr. Fujioka to his post as President of the Nippon Institute of Technology, no further action was taken on the plan until 1977.

In 1977, a new study programme was drafted by Dr. Fujioka, Dr. Katsuhiko Watanabe, Associate Professor, Department of Architecture, Nippon Institute of Technology, and Mr. Jun Hatano, Lecturer, Department of Architecture, Nippon Institute of Technology. Application for permission to undertake the study programme was forwarded to the National Planning Commission (N. P. C.) of the Government of the Kingdom of Nepal, together with the recommendation of Mr. Jiro Kawakita, in October of the same year, and this was received two months later in December. By the early part of 1978, the organization of the study team and the study schedule was finalized, and Tōko Gakuen, the administrative body responsible for the Nippon Institute of Technology, agreed to bear the cost of the study programme.

In August, all the members of the study team met together over a period of several days for the purposes of selecting the in-field study group, and for testing and learning the operation of the equipment such as stereo cameras, which was to be used in Nepal. By this time the study team had already accumulated data on living conditions in Nepal, particulary with reference to accomodation, procedures required for taking study equipment into the country and the problems of maintaining it safely while there, and the quality of water required for the development of the dry plates used with the stereo camera. Such data was obtained by reference to persons familiar with conditions in Nepal, and through the cooperation of the Royal Nepal Embassy in Japan.

On October 5, the working plan for the in-field study programme was mailed to the National Planning Commission. Although it was a little late for doing so, at the same time a copy of the working plan was sent to the Department of Archeology of the Government of Nepal, together with a request for permission to carry out in-field studies in the country. The procurement and preparation for transport-

ing supplies was also begun around this time.

On November 20, a favourable response was received from the National Planning Commission, and at the same time the study team was asked to contact the Department of Archeology. The date of the team's proposed date of departure was getting close, but as requested a second application was mailed to the Department of Archaeology together with an acknowledgement of the tardiness of the application and the cooperation of the authorities concerned regarding problems related to taking equipments into Nepal. The favorable approval of the Department of Archaeology and the conditions attached thereto were communicated to the study team by the National Planning Commission on December 4. The conditions stated that permission would not be given to carry out in-field studies at sites where entry to aliens was prohibited, and that the study team would be assigned a government official to accompany it while studies were being carried out.

On completion of these formalities, the Preliminary Survey was undertaken over a period of three weeks from December 20. The members of the study team on this occasion are shown as follows.

Team Leader:

Michio Fujioka, Dr.	Professor, Nippon Institute of Technology; Member of The Steering Committee, the Council for the Protection of Cultural Property.	Generalization Historical Survey

Members:

Katsuhiko Watanabe, Dr.	Associate Professor, Department of Architecture, Nippon Institute of Technology.	General Affairs Photo-survey
Jun Hatano	Lecturer, Department of Architecture, Nippon Institute of Technology.	Public Relation Accounts, Record, Mesurement using tape, Photo-survey
Hisataro Gotoh, Dr.	Associate Professor, Department of Architecture, Miyagi Gakuin University.	Photographing using cameras of large sizes
Mikio Ono	Teacher of Architecture, Tokyo Technical High School attached to Nippon Institute of Technology.	Photo-survey
Isamu Endo	the same as the above	Photo-survey
Masayuki Hirayanagi	the same as the above	Photo-survey
Takayuki Kurotsu	Assistant, Nippon Institute of Technology.	Assistance of record, Mesurement using tape
Masanori Takahashi	Architect.	Assistance of accounts, Assistance of photographing, Mesurement using tape
Shuichi Takeshige	Local Government Official.	Assistance of photographing, Photo-survey

The study team left Japan on December 20, 1978, and flew via Bangkok to Nepal, arriving in Kathmandu on December 21. On the following day, the team paid a courtesy call on the National Planning Commission and began customs clearance formalities. On December 24, the team visited the Department of Archaeology where the team met Mr. R. J. Thapa, Director General, and Dr. S. Amatya, Chief Exploration Officer, and obtained the formal permission of the Department to carry out field studies in Nepal as well as its cooperation in obtaining customs clearance for its equipments. With the cooperation of the authorities concerned, all the unaccompanied baggage was cleared the same day.

On December 25, the team obtained a written permission at the Department of Archaeology to carry

out studies of the Palace in Patan, and accordingly field studies began in Patan.

The field studies in Patan were carried out from December 25 to 30 inclusively except for December 29, the national holiday in celebration of the birthday of the King of Nepal. The weather was fine since it was the dry season in Nepal, and it was possible to carry out work on the survey daily from 10:00 a.m. until 4:00 p.m. during government office hours. The evenings were spent in the hostel writing up the field notebook, cataloging and developing dry plates and making preparations for the next day.

From December 30 through January 3 preliminary field studies were carried out in the towns of Bhadgaon, Kirtipur and Kathmandu. On January 4, preparations for returning to Japan and crating the equipments to be sent by freight were begun. At the same time, courtesy calls were made on the Department of Archaeology, the National Planning Commission, and the Embassy of Japan, and a request for permission to carry out a further study the following year was made to the proper authorities.

Although all preparations were completed and the team was ready to leave as scheduled on January 9, departure was delayed by a day due to cancellation of the scheduled flight from Kathmandu to New Dehli as a result of an accident. The team finally left Kathmandu on January 10, arriving back in Japan on January 11.

After its return the team was fully occupied for some time with the developing and cataloging of prints, transparencies and films taken during the field studies. The team then turned its attention to beginning preparations for the next field studies.

At the beginning of April, the study team was informed beforehand of the possibility of the Ministry of Education of the Government of Japan providing a grant for this study. Application for a grant had been made to the Ministry of Education as early as 1978, and since a hearing had already been held, the members of the team were considering making plans for a further study.

Work started at once on the details of a working plan, and this was presented to the Ministry of Education at the beginning of May. At the same time, the team started to make arrangements for its accomodation in Kathmandu and for the dispatch of its equipments.

In July, a request was made to the Royal Nepal Embassy in Japan to intercede on behalf of the authorities in Nepal with regard to the formalities for application for permission to undertake a furher field study in the region. The team was advised by the Embassy on this occasion to apply directly to the Department of Archaeology for the study. Thus facilitated by the Embassy, the team immediately presented its application to the Ministry of Education in Japan.

At the beginning of August, application was made to the National Planning Commission and the Department of Archaeology of H. M. Government of Nepal for permission to carry out the second survey (main survey). At the same time the study team pressed ahead with arrangements for a list of items to be checked during the second field study tour on the basis of the findings of the previous study. It also practiced using the stereo-cameras and other equipments it intended to take with it to Nepal again.

At the beginning of September, the team was informed officially that it obtained grant from the Ministry of Education. In addition, the team was informed on September 19 that permission had once again been granted to it to carry out field studies in Nepal. The conditions and requirements of the permission were the same as those of the previous year, except that on this occasion the team was requested to submit a copy of the study report of its previous survey to the authorities concerned.

Since the team once again intended to take a variety of instruments with it, a letter was immediately dispatched to the Department of Archaeology asking for its cooperation in facilitating customs clearance. At the same time a copy of the notification, which was obtained from the Ministry of Education, of

the grant which was given the team for the purpose of this study was forwarded to the Department of Archaeology by a request made by the Department.

Although work had been progressing in writing up the results of the preliminary survey since the team's return to Japan in January, work now started on preparing a study report for the Department of Archaeology. At the same time progress was made in preparing prints for presentation.

At the end of November final consideration was given to the cost of the study tour in view of the increase in the cost of air freight occasioned by the strengthening of the US Dollar.

The membership of the second filed study team is as follows:

Team Leader:

Katsuhiko Watanabe, Dr.	Generalization, Measurement using tape, Photo-survey

Senior Team Members:

Michio Fujioka, Dr.	Generalization, Survey of Design, Measurement using tape
Jun Hatano	Public Relation, Accounts, Record, Measurement using tape, Photo-survey
Gotoh Hisataro, Dr.	Photographing using cameras of large sizes, Survey of Design, Measurement using tape
Shiro Sasano (Instructor, Department of Architecture, Tokyo Institute of Technology)	Public Relation, Measurement using tape, Photo-survey

Junior Team Members:

Isamu Endo, Takayuki Kurotsu, Masanori Takahashi, Shuichi Takeshige

The advance party comprising Dr. K. Watanabe and Dr. H. Gotoh, and J. Hatano left Japan on December 11. The advance party was to study a number of examples of Hindu architecture because this is believed to have the close connection with the architecture of Nepal, and they finally arrived in Nepal on December 17.

On the following day the advance party met representatives of the Department of Archaeology, and while exchanging greetings, they asked a consultation with regard to the forthcoming field study.

At this contact it was discovered that there had been some delay and the study equipments sent by air cargo earlier from Japan had not yet arrived in Kathmandu. Contacting Tokyo about this problem and clarifying the situation in Nepal required several days. During this period the advance party made courtesy calls on the Embassy of Japan in Kathmandu and the National Planning Commission.

The remaining members of the team headed by Dr. M. Fujioka and S. Sasano left Japan on December 20. On the way to Nepal the party stopped in Bangkok and contacted the airline handling the unaccompanied baggages, and were able to have them loaded on an aeroplane bound for Kathmandu. The remaining members of the team and the unaccompanied baggage arrived in Kathmandu on December 21. Customs clearance was completed on December 24. Work on the preparations for the field study to be carried out in Patan also began on this day.

The full-scale field study of the Palace at Patan began on December 26, and the survey and measurement of the interior and the filming of the exterior with the stereo metric camera (S. M. C.) were completed by December 30. From December 31, the team was mainly occupied in carrying out a survey of the *Basantapur Bhawan* in the *Kathmandu Darbar*. Measuring by the use of surveyor's tape and a photo-survey were carried out simultaneously. Measuring was completed by January 3, 1980.

It was planned to carry out a partial photo-survey of the *Bhadgaon Darbar* on January 4, but although all necessary documents had been obtained from the Department of Archaeology and a government official was assigned to go with the team, this proved impossible.

The field study was thus concluded and from January 5 the team began crating its equipment, and making courtesy calls on the Department of Archaeology and the Embassy of Japan to thank them

for their valuable assistance, finally leaving for Japan on January 8.

The period from April 1980 to April 1981 has been used for compiling the final study report of the field studies carried out in Nepal.

This survey was made possible as a result of a grant by the Ministry of Education of the Government of Japan and a special research fund provided by the Nippon Institute of Technology.

(Katsuhiko Watanabe)

3. Brief History of the Kingdom of Nepal

The history of Nepal which will be discussed here is, in fact, the history of the Kathmandu Valley. However, historical facts with regard to the earliest period of the Valley are not very certain. According to legend, the Kathmandu Valley was originally a large lake that was drained by the Bodhisattva Manjusri when he came from China to the place now known as *Swayambhu* (Plate 35). Legend has it that he saw flames rising from the lake and proceeded to part the mountains at their lowest point, on the south side, thus draining the valley. It is said that the first hill to appear above the surface of the receding water was *Swayambhu*, and for this reason he erected a Buddhist tower and a temple on the spot. The geological explanation of the formation of the valley is that it was originally the floor of a lake which rose to become dry land, and so the inter-relationship between the scientific theory and legend can be clearly seen.

The famous *Pashupati Nath Mandir* (temple) (Plate 120) and *Bauddha Nath Mandir* (Plate 121) were said to have been built just as the period of pre-history, the so-called legendary period, was drawing to a close. In India, *Pashupati* (Lord of Domestic Animals) is believed to be a manifestation of *Shiva*, and the definitive basic scriptures of the *Pashupati* Sect are thought to have been compiled by the 1st century A. D., and the commentary to it to have been completed some time after the beginning of the 4th century A. D., although it is not certain when it passed into Nepal. However, the generally accepted theory is that this temple was first built in the 4th century[1].

It is at this time that Nepal seems to have passed from the age of legends to the age of historical records, but even so, the information contained in these records is somewhat lacking in clarity. Nevertheless, some clarity starts to appear from the time of the Lichhabi Dynasty. The rulers of the Lichhabi Dynasty are thought to have been descended from the Kshatria tribe, which was settled in and around Videha. The first recorded ruler of this dynasty was King Mana Deva I (463-505 A. D.), and monuments and historical records bear wittness to his reign. Since the present report is not primarily interested in the study of the historical developments of Nepal, a list of the dynasties and names of the rulers have been recorded in chronological order in the Appendix, together with the dates of the original construction and remodelling of major architectural structures (Table 0-3-1). In addition to those structures of major architecural importance mentioned in the Appendix, those relevant to the present study have been taken from the record of major architectural studies to be found in the work, *Kathmandu Valley*[2], edited by Dr. Carl Pruscha, and are indicated by the word 'record' in the Appendix.

The chronology given in the Appendix covers the general spectrum of the history of Nepal, but some of the more significant events will be treated in slightly greater detail here.

A date of importance to note during the Lichhabi Dynasty is the year 643 A. D. in the reign of Narendra Deva (641-679A. D.) when a diplomatic mission was received from China, and again four years later in 647 A. D. when the Chinese envoy, Wang Hiuen Tsu visited Nepal, and a goodwill mission was also sent from Nepal to China. According to the reports[3] of these missions, one of the buildings

Table 0-3-1 Chronological Table of Nepalese History and Architecture

PERIOD (A. D.)	DYNASTY	NAME OF THE KING	HISTORICAL AFFAIR	RELATION ON THE ARCHITECTURE
400		Mana Deva I (463-505)	Mana Dava I was the first king in the history of dynasties and established a big kingdom extending from Tibet to Gandak. There are records and monuments Showing his reign.	
500—				Changu Narayan constructed.
		Mahi Deva, Basanta Deva		
		Mana Deva II, Gunakama Deva		
		Shiva Deva I		
		Amsuvarma (588-621)	Transfer of the capital from Mangnilha to Kailashkuta.	
600—				
		Narendra Deva (641-679)	643 Chinese mission visited. 647 2nd mission visited; leader: Wan Hiuen Tse.	
	LICHHABI DYNASTY	Shiva Deva II (684-705)	Mahayana Buddhism was introduced into Tibet from Nepal.	Seven-storied building in the palace.
700—		Jaya Deva II (705-740)	Invading army of Tibet was repulsed.	
		Vaya Deva		
		Mana Deva		
		Amirt Deva	Dynasty tends towards decline.	
		Bara Deva (or Aramudi)	The capital was transfered to Lalitapatan.	
800—				
		Raghava Deva (879-909)	879 Lichhabi Dy. came end.	
900—				
		Jaya Deva (909-919)		
		Shanker Deva (919-939)		
		Saha Deva (939-940)		
		Vikrama Deva (940-949)		
		GunaKama Deva (949-994)	Name Kantipur Town 'Kathmandu'.	Pashupatinath renovated. Kashta Mandap.
1000—				
		Bhoja Deva (994-1024)		
		Laxmikama Deva (1024-1040)	Custom of 'Kumari' was introduced.	Laxmi Bihar
		Vijayakama Deva	According to another view, Jaya Deva reigned Patan. 1040 Bengal: Buddhist monk, Atisha Dipankara introduced the Tantric.	
		Bhasker Deva		
		Bala Deva (1048-1061)		
1050—				
		Pradymnaka Deva		
		Nagarjuna Deva		
		Shanker Deva (1067-1082)		
	THAKURI DYNASTY | NUWAKOT THAKURI |	Bama Deva (1082-1090)	Nuwakot Thakuri was wiped out and old dynasty was restored.	Nandikeswar at Naxal, Manohara Bhagabati.
		Harsha Deva (1090-1096)	The king of Karntak invaded through Simraoungarh.	
1100—				
		Siva Deva III (1098-1126)		Kirtipur was constructed. Pashupati Nath's golden roof is thought to be constructed.
		Indra Deva (1126-1137)		Wells, waterways, water tanks were dug in every part of the valley.
		Mana Deva IV (1137-1140)		
		Narendra Deva (1140-1146)	Patan reigned every part of the valley. The royal family became extinct.	Temple of 'Sivagla' in Bhadgaon.
		Ananda Deva (1147-1167)	One of the relatives came to the throne.	The water conduit was laid on near the royal palace.
1150—				
		Rudra Deva (1167-1175)		Water conduit was laid on in Patan and Kathmandu.

MALLA DYNASTY

	Amurit Deva (1175-1179) Someswawar Deva (1179-1183) Gunakama Deva II (1187-1195) Laximikama Deva II (1193-1197) Vyayakam Deva II (1192-1200)	At the end of the regime the worldly matters were unstable. Three kings established their kingdoms in the valley.	A part of the Panchapuri royal palace was built. Yodha (or Yogha) built a temple.
1200—	Ari Malla (or Ari Deva) (1200-1236) Abhaya Malla (1236-1255)	A cultural goodwill envoy was dispatched to Tibet and China. A big earthquake occurred and failure of crops continued.	Laksharoma constructed.
1250—	Jaya Deva, Anan Deva (1255-1258) Jayabhima Deva (1258-1271) Jayasimha Malla (1271-1274) Ananta Malla (1274-1310)	Jaya Deva reigned Patan and Kathmandu. Anan Deva reigned Bhadgaon and some small villages such as Banepa. 1287-88 Jitari Malla invaded into Karnali.	(Patan) 13th Cent., Chyasal Hiti Arniko went to Tibet with 18 artisans.
1300—	Jayananda Deva (1310-1328) Jayari Malla (1328-1344) Pasupatisimha (1344-) Jayaraja Deva (1347-1360)	Jayarudra Malla proved himself really capable. The king of Karnali, Ripu Malla invaded into the valley. 1332-1366 Devaladevi wielded power. National power declined because of domestic revolt; Muslims of Bengal invaded into the valley.	The temples and the houses rebuilt in 1313, were desolated. (Bhad.) 1324, Taleju Bhawani (Kath) 1334, Kashta Mandap (record) (Bhad.) 1338, Nhayakan Bahi (record)
1350—	Jayasthiti Malla (1354-1395) Jayarjuna Deva (1360-1382) Jayasthiti Malla (1382-1395) Dharma Malla, Jyotir Malla, Kirti Malla (1395-1409)	Devaladevi began to wield power in Bhadgaon. The valley was split in some city-states. Jayasthiti Malla became the king of Nepal in 1382. Three brothers made a joint reign.	(Bhad.) 1382, Tara Nani (record) (Patan) 1391, U Baha Bahi (record) (Patan) 1392, Kumbheswar (record)
1400—	Jyotir Malla (1409-1428) Yaksha Malla (1428-1482)	Jyotir Malla became a king after his brothers' death. The territory extends to Morang in the east, to Gorkha in the west, to Tibet Digarcha in the north and to Bodghgaya in the south.	(Patan) 1427, I Baha Bahi (record) (Bhad.) 1429, Biswakarama Baha (record) (Bhad.) Dattatraya renovated.
1450—	BHAKTAPUR: Raya Malla (1481-1512) LALITPUR: Jayasimha KANTIPUR: Ratar Malla (1484-1520)	Rudra Sen (1483-1518) founded Palpa Dynasty. The dynasty was split into small independent states. Patan had been reigned by several kings as a half-independent state.	(Bhad.) 1452, Mul Chok (record) (Kath.) 1485, Kashta Mandap (record)
1500—	Bhuban Malla (1512-) Prana Malla (-1547) (Kusamsimha) (Visuushimha) (Purandarshimha) Visnusimha (-1565) Surya Malla (1520-1529) Amar Malla (1529-1560)	Yaksha Malla's son, Rana Malla succeeded Banepa. He had no heir.	(Bhad.) 1508, Na Bahi (record) (Patan) 1529, Twaya Baha (record) (Patan) 1536, 1546, Su Baha (record)
1550—	Viswa Malla (1547-) Narasumha, Uddhavsimha, Purandarsimha (1565-1569) Purandarsimha (1569-1597) Mahendra Malla (1560-1579) Sadasiva Malla (1580-1589) Sivasimha Malla (1580-1618) Trailokya Malla (-1603) Harihrsimha (1597-1618)	Patan was reigned by three brothers. The king of Kantipur was banished from the land and came to Bhaktapur.	(Patan) 1552, U Baha Bahi, renovated. (Kath.) 16th Cent., Mul Chok (Kath.) 1576, Taleju Bhawani (Bhad.) 1589, Tara Nani renovated (record).
1600—			

MALLA DYNASTY

	Jagaj Jyotir Malla (1613-1637) Laximinarsimha Malla (1618-1641) Siddhinarasimha (1618-1661) Naresh Malla (1637-1644) Pratap Malla (1641-1674) Jagatprakash Malla (1644-1672)	The king of Kantipur concluded an economic treaty with Tibet. The king of Kantipur had been imprisoned in his later years for 16 years. A new king took part in the affairs of state. Kantipur concluded an alliance with Lalitpur and attacked Bhakutapur.	(Patan) 1601 Maha Baudha (Patan) 1610, Chyasal Hiti renovated. (Bhad.) 1617-1628, Mul Chok renovated. (Kath.) 1620, 1639, Kashta Mandap (Bhad.) 1624, Tara Nani renovated (record). (Patan) 1637, Krishna Mandir (Patan) 1646, Lohan Hiti (record) (Kath.) 1649, Sundari Chok (Kath.) 1648, 1650, Mohan Chok
1650—	Srinivas Malla (1660-1684) Jitamitra Malla (1673-1696) Nripendra Malla (1674-1680) Parthibendra Malla (1680-1687) Yoganarendra Malla (1684-1705) Bhupalerda Malla (1687-1700) Bhupatindra Malla	The Kantipur royal palace was named 'Hanuman Dhoka'. Darbar Square in Bhaktapur was beautifully arranged.	(Kath.) 1652, Chhusya Baha renovated. (Kath.) 1653, Agan Madir (record) (Patan) 1662, Degu Talle (Patan) 1666, Mul Chok (record) (Patan) 1666, Taleju Mandir renovated. (Patan) 1670, Sundari Chok (Kath.) 1670, Degu Talle renovated. (Kath.) 1671, Taleju Bhawani renovated. (Kath.) 1672, Hanuman Idol was built in front of the gate of the royal palace. (Kath.) 17th Cent., Nasal Chok (Nuwakot) Ranga Mahal (record)
1700—	(1696-1722) Lokaprakash Malla Indra Malla Mahendra Malla Riddinarsimha Ranajit Malla (1722-1768) Marendrasimha (-1722) Yogaprakash Malla Visnu Malla (1728-1743) Rajyaprakash Malla (1743-1750) Biswajit Malla (1751-1758) Ranajit Malla Bhaskar Malla (1700-1722) Jagajiaya Malla (1722-1734) Jayaprakash Malla (1734-1768)	At the king of Patan had no heir, since 1705, there had been no king for a long time. Men of influence contended against one another for succession to the throne. A figurehead king came to the throne one after another. The king of Kantipur had no heir. The queens of the previous kings elected Jagajiaya Malla king. There were internal disturbances in Kantipur. Jayaprakash Malla ordered Kasi Ram Thapa to fight against Gorkha in Nuwakot but he was defeated, in spite of the help of East-India Business Firm.	(Bhad.) 1702, Nyatapola (Bhad.) 1702, Pachapanna Jhyal (Kath.) Radah-Krishna temple. Mahet Visnu temple (Patan) 1723, Uku Baha renovated (record). (Kath.) 1742, Kashta Mandap renovated (record). (Patan) 1744, Su Baha renovated (record).
1750—	Jayaprakash Malla Dalamardanshar Tejnarasimha (-1765)		(Patan) 1761, 1799, M. K. Narayan Chok (Bhad.) 1763, Pujari Math (Kath.) 1769, Basantapur Bhawan (Kath.) 1769, Lalitpur Bhawan (Kath.) 1769, Bhaktapur Bhawan (Kath.) 1769, Kirtipur Bhawan (Kath.) 1769, Lohon Chok (Patan) 1799, Mul Chok renovated. (Nuwakot) Ranga Mahal, Tilanga House renovated.
	Prithivi Narayan Shah (1742-1774) Pratapsimha Shah (1774-1778) Rana Bahadur Shah (1778-1798)	1768. The king of Gorkha invaded into the valley. Dispatched troops to Tanahun and annexed a part of the country. Adopted a custom of putting up Linga on a festival of Indrajatra. As the king was too young, his mother, Rajendra Laxmi, became a regent (died in 1786) 1786-1795 His uncle Bahadur Shah became	

1800—		a regent.	
	Grivana Judda Bickram Shah (1798-1816)	1800 Rana Bahadur laid down his crown and came to Benares. Rana Bahadur came back to the palace and became a regent (died in 1806). Tripura Sundari Devi became the Empress Regent (died in 1832). 1808 A big earthquake occurred in Bhaktapur.	(Patan) 1809, Kumbheswar renovated.
	Rajendra Bickram Shah (1816-1847)	As the king was only two years old, his grandmother, Lalita Tripura Sundari, became a regent. Bhim Sen Thapa took an active part. 1832 The regent died and Bhim Sen waned faint. 1833 A big earthquake occurred in Bhaktapur. Jung Bahadur wielded power.	(Bhad.) 1826, Sun Dhoka and Mul Chok renovated (record).
	Surendra Bickram Shah (1847-1881)	1846 An autocrat, Jung Bahadur died and despotism by Rana began. It lasted for a century.	
1850—			
	Prithvi Bir Bickram Shah (1881-1911)	1850 Dispatched a special envoy to Great Britain. 1854 Warfare broke out against Tibet. 1856 A peace treaty was concluded. 1858 Warfare broke out against India. A part of West Tarai was retroceded. After Rana Uddip's poisoning, Bir Shumsher was elected Prime Minister. His brother, Khada Shumsher was placed as the King of Palpa. 1901 After the death of Bir Shumsher, Deva Shumsher was placed as Prime Minister. The midday gun began in Kathmandu Tundikhel. The weekly magazine, *Gorkhapatra*, began to be published. They tried to abolish the slavery and to introduce parliamentarianism and Japanese agriculture, but failed.	(Bhad.) 1880, Dattatraya renovated (record). (Bhad.) 1611,1888, Buwakarama Baha renovated (record). (Bhad.) 1888, Nhayakan Bahi renovated (record). (Kath.) 1891, Waterway was dug.
1900—			
	Tribhuvan Bir Bickram Shah (1911-1955)	1901 Chandra Shumsher was placed as Prime Minister. 1907 visited England. 1924 Slaves were set free. Suicide upon the death of one's husband was forbidden. 1929 Chandra died and Bhim Shumsher was placed as Prime Minister. 1932 Bhim died and Judda Shumsher was placed as Prime Minister. 1934 A big earthquake occurred in Bhaktapur. 1945 Judda abdicated the Prime Minister and Padma Shumsher was placed as Prime Minister. 1948 Padama abdicated the Prime Minister and Mohan Shumsher was placed as Prime Minister.	(Patan) 1934, Teleju Mandir renovated (record). (Patan) 1938, Degu Talle renovated (record).
1950—			(Patan) 1958, Sundari Chok renovated (record).

SHAH DYNASTY

at the Nepalese Court was a magnificent tall structure of seven stories roofed with copper tiles. This building was alternately described as 七重楼 (nanajūrō) and as 七層楼 (nanasōrō), so that both words imply that it was a tall building with seven stories, but it is not clear from the accounts available exactly the kind of style it was built in. Some authorities are of the opinion that it was a tower built in pagoda style[1], but there is no evidence to support this, and it is probably safe to assume that it was simply a palace in the form of an unusually tall multi-storied structure.

The Thakuri Dynasty came into being during the latter part of the 9th century, and during the reign of King Gunakama Deva (949-994 A.D.) a new city, Kantipur (the modern Kathmandu) was constructed, where, it is said, an architectural structure of significance was constructed from a single giant tree. It may be assumed that the structure referred to in the previous sentence was the forerunner of the present *Kashta Mandap* (Plate 36).

The Thakuri Dynasty was replaced at the beginning of the 13th century by the Malla Dynasty which, historically, marked the start of the medieval architectural period in Nepal. Literature and arts had been on the decline from the end of the Lichhabi Dynasty, but with the ascendancy to the throne of Jayasimha Malla (1271-1274),one of the Malla rulers, there was a stabilization of the political situation. Special mention is made in the records of Jayasimha Malla's reign that Arniko, an architect from Nepal, took 18 craftsmen with him to Tibet where they constructed a stupa and then led them as far as Peiping where they built a larger stupa. This same information also appears in Chinese records of the period, and today stupa can still be found standing on the outskirts of Peiping[5].

King Yaksha Malla (1428-1482 A.D.) was the most heroic conqueror of this dynasty, and during his reign it is said he subjugated the valley, extending his suzerainty to Morang in the east, Gorkha in the west, north into a part of Tibet and south to Buddhgaya. In addition, he endeavoured to make improvements to public welfare and had drainage ditches and wells dug in the vicinity of the four gates of the capital city of Bhaktapur, and by dint of a number of temples that were also constructed during his reign, he may be counted as being an architect of some stature.

However, immediately prior to his death his lands were divided among his sons, with the result that in addition to the capital of Bhaktapur, the cities of Kantipur (Kathmandu), Lalitpur (the modern Patan), and Banepa became independent city states. As a result the strength of the entire valley was weakened, thus laying foundation for its later subjugation by King Prithivi Narayan Shah of Gorkha. Nevertheless, during the Malla Dynasty trade and industry, religion and culture flourished, and new high standards were reached in the arts, crafts and in architecture. For all that, the constant skirmishing between the three major cities of Bhaktapur, Kantipur and Lalitpur combined with the political instability of the region at the time only succeeded in precipitating the decline of this dynasty.

Seizing his opportunity in 1768, Prithivi Narayan Shah, King of Gorkha, invaded the valley, unified it, and established the present Shah Dynasty. It is believed that the *Basantapur Bhawan* and the three other towers to be found in the *Hanuman Dhoka Palace* in Kathmandu were constructed at this time to symbolize the unification of the valley.

However, before this dynasty had been established for any length of time, it was beset by political unrest, culminating in the reigns of government passing from the king to one, General Rana, who then took over the leadership of the country.

With the emergence of the Kingdom of Nepal into the 20th century, the history of the country no longer bears any direct relationship to the subject of this study, and the chronology will be terminated at this point for the purposes of this report. (Michio Fujioka)

Notes:

1) Nakamura, Hajime: ヒンズー教史 [*Hindu-Kyo-shi*], Tokyo, 1979, p. 252.

2) Pruscha, Carl: *Kathmandu Valley*, 2 Vols., Vienna, 1975.
3) 旧唐書 Vol. 198.
唐書 Vol. 221, Part 1.
4) Thapa, Netra B.: *A Short History of Nepal*, Kathmandu, 1973, p. 35.
5) Murata, Jiro: 北平妙応寺ラマ塔の創建年代 [Peiping Myooji Rama-To no Soken Nendai], 建築史論叢 [*Kenchiku-Shi Ronso*], 1957.

4. Brief Description of the Architecture of Nepal

Research studies into the subject of architecture in Nepal have taken the form of a few works that have been published over the last few years, or reports of the findings of actual surveys carried out on existing structures in the country, but it would probably be true to say that no consideration has ever been given to the process of the development of Nepalese architecture from the standpoint of architectural history.

Basically, architecture in Nepal can be categorized into two main forms. The former is the stone structure (Fig. 0-4-1), which may be considered as being directly descended from the stone architecture of India. The latter is the brick and timber structure, and the great majority of structures fall into this group. The style of buildings in this second group may be described as the traditional architecture of Nepal (Fig. 0-4-2), and no matter whether the purpose of these buildings are as palaces, temples or housing, there is essentially no difference between them in respect of architectural style or structural system.

Fig. 0-4-1 Krishna Mandir in Patan.

Fig. 0-4-2 Bishwa Nath Mandir in Patan.

The most typical structure is three-storied building, and since the walls are constructed mainly of brick, and timber is used for the lintels and frames of doors and windows, would appear at first glance to be mainly brick structures. However, due to the poor quality of the joint of the brickwork, the timber around the doors and windows may be assumed to play a significant role in the support of the entire structural system. Moreover, in the case of taller building of more than three stories, the structural system is the curtain wall system, where the bricks are packed in the spaces between the timber framework of the building. One of the oldest existing examples of such a structure is the *Kashta Mandap*. Purported to have been constructed entirely from the timber of a single tree, the *Kashta Mandap* is almost totally a timber structure, with bricks having been used only in part. For this reason it is impossible to clarify

whether the traditional architecture of Nepal developed originally from timber structures, or whether the brick structure was the original style. Even where buildings are mainly brick structures, those using an arch in the shape of a bow over the main entrance would be of comparatively recent construction, and when it is considered that such openings would be supported by a lintel of timber, it is necessary to see the role played by timber in architectural structures in Nepal as a major one indeed.

There is value in paying attention to the fact that three-story and five-story pagodas resembling those to be found in Japan also form an integral part of traditional architecture. The two styles are really amazingly similar to look at although they differ in a number of points of construction, for example, in the case of Nepalese architecture the eaves are rectilinear and not curved as they are found to be in the Japanese pagoda style; they are deep and supported by ornamental timber struts decorated with carvings of deities instead of Japanese construction of eaves, and brick is used for the wall. The origin of this similarity is not clear, but in contrast to Nepalese authorities who recognize the influence of China in such structures, the Nepalese themselves maintain that the style is peculiar to Nepal alone. At this juncture it is difficult to state categorically that the origin of this style should be seen as having been influenced by Chinese architecture, and this is therefore a subject that will require further serious consideration[1].

A further point to be noted with regard to the pagoda-style structures found in Nepal is that the structural system used is an extremely unnatural one for application in the construction of tall buildings. If this factor is taken into consideration, conversely it is a point which raises some doubts as to whether or not this is a style of architectural construction uniuqe to, and originating in Nepal. This impression is particularly pronounced in the case of the structural system of pagoda-style structures that have started to fall into decay, from which it is easy to assume that the major factors leading to the collapse of such buildings are leakage of rain water resulting from an inferior system of applying roofing tiles combined with poor quality joint of the brick walls. Therefore, based on a number of actual examples, the life of the structural system of buildings constructed in the traditional architectural style of Nepal can be judged as being approximately 200 years. In other words, after a period of approximately 200 years, it may be assumed that because of the defects in the structural system such structures will require renovation, and this creates great difficulty in estimating the age of buildings in the Kathmandu Valley[2].

However, it is possible to assume that at the time of renovation, the timber around the doors and windows was probably retained and used again if it was still sound. Therefore there is difficulty in estimating the age of such structures, and this in turn creates the problems in how best to interpret the details recorded on copper plates affixed to them. There are instances of the interpretation of inscriptions attached to the ridge plate of ancient architectural structures in Japan creating such problems, and similar difficulties exist in judging the age of buildings in Nepal. (Michio Fujioka)

Notes:

1) N. B. Thapa: op. sit., p. 35. (Section 3, note 4).

2) Regmi, Delli Raman: *Medieval Nepal II*, 1966, Calcutta, p. 863.
No temple built prior to Jayastimalla's time has been preserved.

5. Brief Reference to Previous Studies on the Architecture of Nepal

Prior to undertaking the field study programme, preliminary research was carried out on the basis of data obtained from among published writings and scholastic papers on the traditional and historical architecture of Nepal.

In one section of his work, *History of Indian and Eastern Architecture*, James Fergusson gives a general outline of architecture in Nepal. He states that the predominant style of architecture in Nepal is the 'pagoda style,' and it differs from the style of Indian architecture in a number of respects[1].

In a slightly later work, *An Eassy on the History of Newar Culture*, K. P. Chattopadhyay consolidated previous theories and offers a definition of the type of architecture that has come to be known as the 'pagoda style' of Nepal[2]. He suggests two possible explanations for the origins of this style. One explanation is that the pagoda style was brought to Nepal from Tibet, and, since it differs from the architecture of India and more closely resembles styles found in Japan and China, that it originally came from China. An alternative explanaion is that it was copied from a style of architecture once used for religious buildings in India, but of which no extant examples now remain, or that the fundamental origin of the style was India. K. P. Chattopadhyay states that he favours the latter explanation, and believes that the pagoda style of Nepal has its origins in the pagoda style of India.

Perceval Landon introduces the architecture of Nepal together with its topography and folk customs in his work, *Nepal*[3].

Percy Brown, who wrote on the subject of the history of Indian architecture slightly more recently than James Fergusson, also mentioned the various styles to be found in Nepalese architecture in his publication, *Indian Architecture*[4].

While the architecture of Nepal was introduced to the West through the works of such scholars as these, it was introduced to Japan by Shun'ichi Amanuma in the form of comprehensive reports on his travels to India and Nepal under the title, 印度の建築, [*Indo no kenchiku*] and 印度仏塔巡礼記, [*Indo Butto Junrei-ki*][5].

In the early 1950s, Delli Raman Regmi took the study of Nepal even further in his general history of the country, *Ancient and Medieval Nepal*, in which he includes a brief description of its architecture. In this work he states that in his opinion the pagoda style of temple architecture seen in Nepal predates that to be found elsewhere, for example, in the pagoda architecture of Burma. Delli Raman Regmi, accordingly, proponded the theory that the pagoda style of temple architecture was Nepalese in origin, and could be described as a Nepalese style of architecture[6]. In a subsequent work, *Medieval Nepal*, he further pursues his investigation of the age of the architectural structures in question by means of copper plates, and dealing with individual structures such as the *Kashta Mandap*, presents the argument that these are older than previously believed.[7]

From around the mid-1960s, it becomes possible to find research findings that describe the architecture of Nepal rather more in detail.

Ramesh Jung Thapa examined the age of the construction of the *Kashta Mandap*[8].

Shantaram Bhalchandra Deo undertakes a classification of the styles of woodwork to be found in the pillars, beams, and window frames of architectural structures in the Kathmandu Valley and makes reference to the artisans who performed such work in relation to India and Tibet in his article, *Glimpses of Nepal Woodwork*[9].

In his introductory survey of the temples of Nepal, Ronald M. Bernier introduces a number of the

monuments found in each of the major cities, together with an explanation of such features of temple architecture as the structure of the foundations, the floors, and murals[10]. Subsequently he also published a work entitled, *The Nepalese Pagoda* (*Origin and Style*), in 1979 (New Dehli).

In Japan from around this period, works of reference on the subject exist in the form of a general description of the architecture of Nepal by Jiro Murata, which appeared in the 建築学大系4-II東洋建築史 [*Kenchikugaku Taikei 4-II, Toyo Kenchiku-shi*][11] and a report on ancient Napalese architecture by M. Fujioka, published in the *Journal of Architecture and Building science*[12].

Movements to conserve the traditional architectural structures of Nepal which were steadily falling into decay began to increase from the beginning of the 1970s. Jagdish Chandra Regmi drew up a list of the temples in Kathmandu[13].

Niels Gutschow and Bernhard Kölver, members of Auer's study group, were involved in research of a slightly different nature, and published a report describing the ordered space concepts and functions to be found in the town of Bhadgaon from the standpoint of town planning[14].

In a further publication, Gerhard Auer and N. Gutschow clarified many points related to the structural system of private dwellings and manner of dwelling in them with special reference to such characteristic features as the structural system of the brick walls. Of particular interest with regard to the present study, was that the Auer-Gutschow report indicates that the condition of the brick walls is not very stable[15].

Plans for the restoration and development of the town of Bhadgaon have progressed on the basis of researches mentioned above.

Further valuable information was provided by Mary Shepherd Slusser and Gautama Vjra Vajracharya in their report, *Two Medieval Nepalese Buildings*, which appeared in the *Atribus Asiae*. In their paper they describe the forms and functions of the architectural structures known as *Dharmashala* (rest houses) and *Sattal* (rest house) and discuss their relationship to Indian architecture[16].

Then in 1975, Carl Prusha et al., in cooperation with UNESCO compiled a detailed report of architectural structures in the Kathmandu Valley that ought to be conserved. The architectural structures on the list were evaluated as belonging to one of three categories depending on the degree to which conservation was considered necessary, and a report was presented to H. M. Government of Nepal[17].

Subsequently a conservation plan for H. M. Government of Nepal was drawn up by UNESCO using a team headed by Eduard F. Sekler. The plan was entitled, *The Master Plan for the Conservation of the Cultural Heritage in the Kathmandu Valley*, and was published in 1977[18].

In the meantime, UNESCO has made progress on its Project for the Conservation of the Palace in Kathmandu. John Sanday is in charge of the project the results of which are set out in a UNESCO report: *Building Conservation in Nepal*. The report contains a classification of the architectural structures on the basis of use and function, details of the structural system of each structure, the survey method, and a case study of the Kathmandu Palace[19].

Wolfgang Korn, who was involved in the conservation plans for the town of Bhadgaon and the restoration of the Palace at Kathmandu, turned his attention to what he describes as the 'traditional architecture' of Nepal. In discussing the traditional architecture of Nepal, he classifies the architectural structures into the Newari House, the Buddhist Monastery, the Hindu Priest House, the Royal Palace, the Temple, and the Public Resthouse[20]. The research he has carried out has been based on scale drawings. It is fundamental and definitive, and as such is indispensable to any study of the architecture of Nepal.

The architecture of Nepal has therefore been the subject of a variety of researches, as has been described above. However, it appears that to date little emphasis has been placed on the influence exerted by historical change on the architecture of the country. Apart from such references to the effect of

historical change as seen in the palaces of Nepal in the works of J. Sanday and W. Korn, the only other discourse on the history of the Palace of Kathmandu known to exist, is contained in a work of reference published by the Institute of Nepal and Asian Studies (Tribhuvan University.)[21].

As have been indicated, little study has been carried out to date on the architecture of Palaces in Nepal, although it is the palaces that may be considered to be one of the representative forms of architecture of the country. In addition, there are still many areas which require clarification with regard to the influence of historical change on the architecture of Nepal, most especially in respect of the palaces at Patan and Bhadgaon.

In addition to the works of reference published in Japan mentioned above, it should be noted that papers on the architecture of Nepal have been published by Hiroshi Hara[22], Nariaki Kurumizawa[23], M. Fujioka[24] et al.

(Katsuhiko Watanabe)

Notes:

1) Fergusson, James: *History of Indian and Eastern Architecture*, 2 Vol., rev. edit., London, 1910.
2) Chattopandhyay, K. P.: 'An Eassay on the History of Newar Culture', *Journal of the Asiatic Society of Bengal*, Vol. 19, 1923, pp. 465～560.
3) Landon, Perceval: *Nepal*, 2 Vol., London, 1928.
4) Brown, Percy: *Indian Architecture (Buddhist & Hindu Periods)*, Bombay, 1941.
5) Amanuma, Shun'ichi: 印度の建築 [*Indo no kenchiku*], Kyoto, 1944.
印度仏塔巡礼記 下 [*Indo Butto Junrei-ki*], Osaka, 1945.
6) Regmi, Delli Raman: *Ancient and Medieval Nepal*, Kathmandu, 1952.
7) Regmi, D. R.: *Medieval Nepal*, Part I-II, Calcutta, 1965-66.
8) Thapa, Ramesh Jung: 'Kashtha mandapa', *Ancient Nepal* 3, Kathmandu, April, 1968, pp. 41～43.
9) Deo, Shantaram Bhalchandra: 'Glimpses of Nepal Woodwork', *The Journal of the Indian Society of Oriental Art*, Vol. 3, No. 5, 1968-69, pp. 1・67.
10) Bernier, Ronald M.: *The Temples of Nepal*, Kathmandu, 1970.
The Nepalese Pagoda (origin and style), New Delhi, 1979.
11) Murata, Jiro: 建築学大系 4-II 東洋建築史 [*Kenchikugaku Taikei 4-II Toyo Kenchiku-Shi*], Tokyo, 1957/1972.
12) Fujioka, Michio: 'ネパールの古建築 [Nepal no Kokenchiku]', *Journal of Architecture and Building Science*, Vol. 86, No. 1032, Tokyo, January, 1971, pp. 4～7.
13) Regmi, Jagdish Chandra: *Temples of Kathmandu*, Kathmnudu, 1972.
14) Gutschow, Niels & Kölver, Berhard: *Bhaktapur*, Nepal Research Center Publication, No. 1, Wiesbaden, 1975.
Auer, Gerhard: 'Bhaktapur/Nepal', *Bauwelt*, Vol. 64. No. 48, December, 1973, pp. 306～315.
15) Auer, G. & Gutschow, N.: 'Domestic Architecture of Nepal', *Art & Archaeology Research Papers*, Vol. 12, December, 1977, London, pp. 64～69.
16) Slusser, Mary Shepherd & Vajracharya, Gautama Vajra: 'Two Medieval Nepalese Buildings', *Atribus Asiae*, Ascona, Vol. 36, No. 3, 1974.
17) C. Pruscha: *op. cit. (section 3 note 2)*.
18) Sekler, Eduard F., et al: *Master Plan for the Conservation of the Cultural Heritage in the Kathmandu Valley*, Paris, 1977.
19) Sanday, John: *Building Conservation in Nepal (A Handbook of Principles & Techniques)*, Paris, 1978.
'The Hanuman Dhoka Royal Palace Kathmandu Building Conservation and local Traditional Crafts', *Art & Archaeology Research Papers*, December, 1974, pp. 1～20.
20) Korn, Wolfgang: *The Traditional Architecture of the Kathmandu Valley*, Kathmandu, 1976.
21) Institute of Nepal and Asian Studies: *An Introduction to Hanuman Dhoka*, Kathmandu, 1975.
22) Hara, Hiroshi: 'Domain Theory; Case Study of the Villages in India and Nepal Area', *Space Design*, Tokyo, Extra No. 10, Jun, 1978.
23) Kurumizawa, Nariaki: 'ネパール・スケッチ [Nepal Sketch]', 建築知識 [*Kenchiku Chishiki*], Tokyo, 1979.
24) Fujioka, M., Watanabe, K., Hatano, J., Gotoh, H., Sasano, S.: 'Royal Palaces in Nepal,' *Space Design*, No. 194, November, 1980, pp. 53～76.
Fujioka, M.: '1本の柱 [Ippon no Hashira]', 建築界 [*Kenchikukai*], March, 1981.
ネパールの天守閣 [Nepal no Tenshukaku]', 建築界 [*Kenchikukai*], April, 1981.
Watanabe, K.: パタン古王宮の塔の構造について (ネパール王国古王宮の研究1) [On the Structures of the Towers of the Patan Darbar], *Report of the Annual Meetng of the Architectural Institute of Japan*, September, 1981.

Chapter 1. Present State of the Royal Palace Structures

Section 1. Patan Darbar

1) Position of Patan Darbar

Patan, one of the most important cities in the history of the Kathmandu Valley, which is said to have been founded on the top of a low hill in the 14th century, is located on the south side of the Bagmati River (Plate 2). Since its foundation, it has maintained a close relationship with Kathmandu, which is located to the north on the opposite side of the Bagmati River.

There are many categories of buildings and space in Patan, such as temples, squares, water places and so on. The residential districts, although restricted by caste in former times, are now multi-caste in character.

The historical background is still evident in present organization of the city; the network of road is notably complicated and appears to lack any conscious organization. However, there exist in the city two likely main roads, which run from north to south and west to east respectively, and intersect at the centre of the city. It is here that the old palace complexes are located (Fig. 1-1-1). Rather surprisingly, however, the main gate is situated in the northwestern part of the town. It appears that the original symbolic entrance to the city must have been different from the present. Therefore, I can say that the western half of the east-west main road and the northern part of the north-south main road were not as important in the past as they appear to be from the modern situation. In fact, at the present ceremony of *Dasain*, one of the most important annual ceremonies in Nepal, the processional route from a square near the city-gate, *Naka Bahi*, to the *Darbar Square* in front of the old palaces and culminating at the southern half of the aforementioned main road plays an important role.

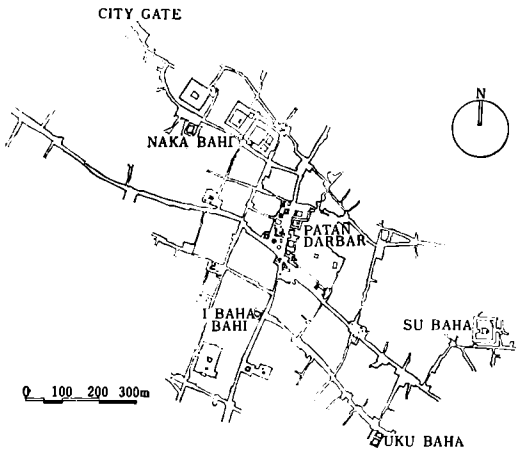


Fig. 1-1-1 Patan: Ref. C. Pruscha, *Kathmandu Valley*.

The old palace complexes form the centre of the city. It was decreed that the palace should be founded at the crossing of two important roads for the commercial objectives intersected. We can no longer afford any proper reason for this legend from historical description, although we can observe various commercial activities at the intersection; for example, in the open space called *Darbar Square* in front of the old palaces, an open-air bazaar is regularly opened. In addition, several religious monuments are arranged within the square and beside the old palaces, a large watering place with twin rest-house is found, the architectural type of which is generally called *Dharmashala*, which supplys water for everyday life. (Shiro Sasano)

2) Disposition of Patan Darbar

a) Patan Darbar and Darbar Square

Patan Darbar, as is mentioned in Part 1), lies at the corner of the crossing of the two trade routes, which cross at an acute angle of 70°, not at right angles, and faces the point of intersection (Fig. 1-1-2). The complex of buildings of the *Darbar* stands at the north-east corner of the intersection and faces west on to the street extending from north to south (Plate 4).

On the opposite side of the street extending north to south, lies the *Darbar Square*, (royal palace plaza, plate 3), which is about 10 cm above the level of the street and rimmed with bricks. In the *Darbar Square* stand seven temples in the traditional style and four temples in the Shikkara style, all of which front on to the *Darbar*. Among these temples, *Char Narayan Mandir* (temple) has an open stage at the front 40 cm high.

b) Placement of the Buildings of Patan Darbar

The structures of the *Darbar* stand in a line facing west in the order, from south to north, of the *Sundari Chok*, the *Mul Chok*, the *Degu Talle* and the *Mani Keshav Narayan Chok* and face the street extending north-south.

The three buildings called *'Chok'* are of the court-house style. From the outside the *Degu Talle* looks like an eight-storied pagoda. The *Sundari Chok* is a building of three stories and the *Mul Chok* is two stories. In the case of the *Mani Keshav Narayan Chok*, the west wing is four-storied, though the main building and its other wings are three-storied.

In the centre of the south wing of the *Mul Chok* soars

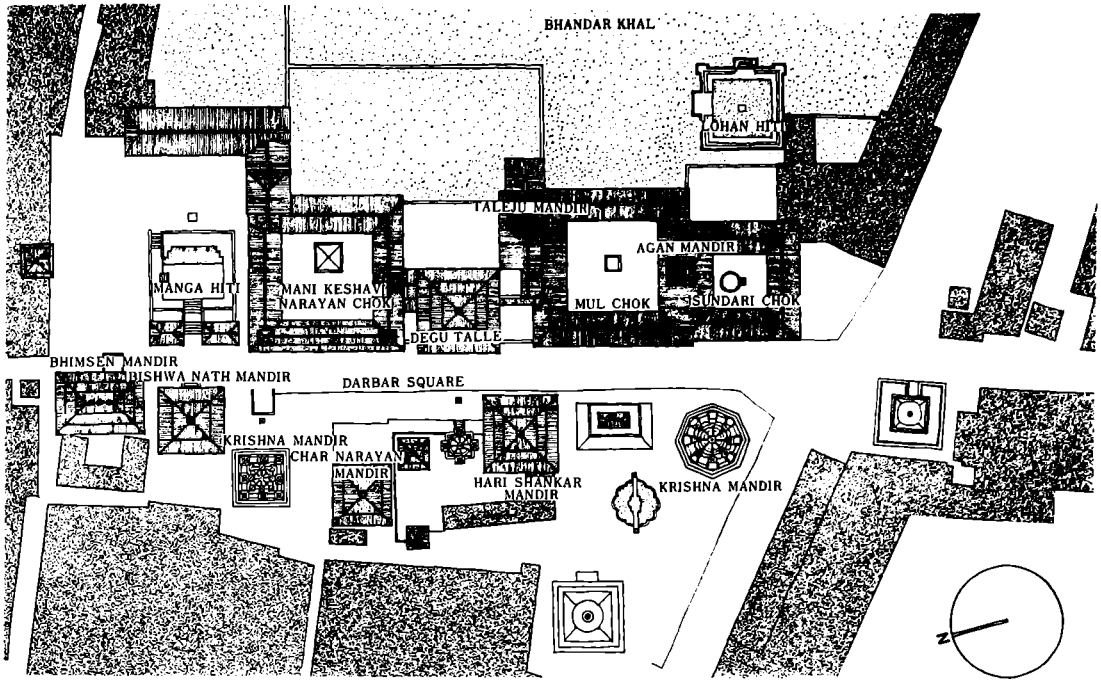


Fig. 1-1-2 Patan Darbar and the Darbar Square, Site Plan: Ref. C. Pruscha, *Kathmandu Valley.*

a pagoda which has the appearance of a three-story tower. The pagoda is dedicated to the god of *Agan* (Plate 14). The northern half of the north wing of the *Mul Chok* is a three-storied dwelling quarter for priests upon which stands the octagonal *Taleju Mandir* (Plate 69).

On the east side of the royal buildings lies a vast stretch of garden called '*Bhandar Khal*' (Plate 21) with a watering place called '*Lohan Hiti*' (Plate 22). Some people say that there was once a building in the garden, but this is dubious since nobody has ever tried to make a factual survey through excavation.

The following is detailed explanation of each building;

c) Sundari Chok

The *Sundari Chok* is a three-storied building of a court-house style which stands in the south end of the com-

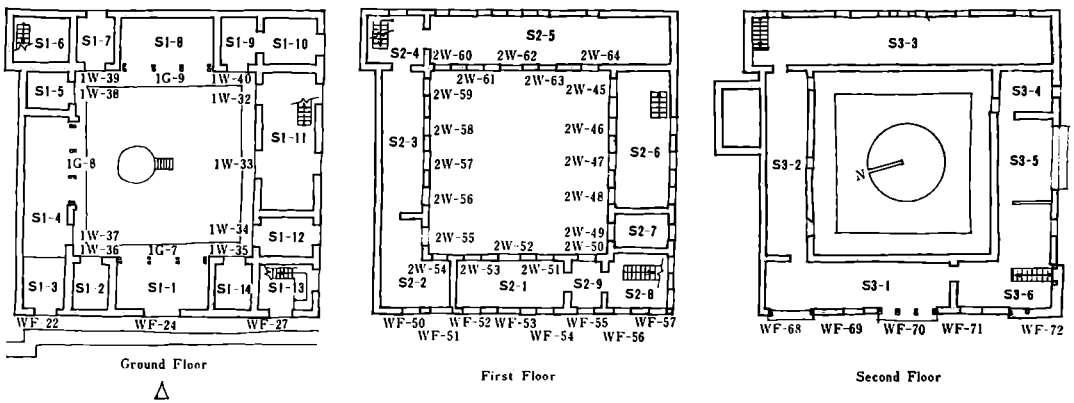


Fig. 1-1-3 Sundari Chok of the Patan Darbar, Brief Plan.
Notes: thick character=temporary room number,
slender character=temporary number of window and opening.

plex of the royal structures and fronts on to the intersection (Plate 7). The north wing of the *Sundari Chok* is adjacent to the *Mul Chok*. As it stands at a crossroad, its south and west sides are artistically decorated (Plate 17). The outward form is a regular square, with sides on each side about 19.70 m long. The square courtyard inside it is 12.60 m long and is surrounded by the building which is 3.60 m across (Fig. 1-1-3). The *Sundari Chok* is now used as a police station.

The Ground floor: The building is constructed on a foundation of bricks which is 50 cm higher than the street (Plate 10). Going into the front entrance in the centre of the west facade, we find a hall with a frontage of 6.20 m and a depth of 2.48 m, (inside measurement), which is partitioned by a peri-style of three spans (Plate 9). This form (hall) is called '*Dalan*' in Nepali. *Dalan* is found in the centre of every wing, east, west and north. The floor of the *Dalan* is paved with stone and the floor leads on the same level to its foundation bed jutting towards the courtyard. There is no *Dalan* in the centre of the south wing but there is a room with a door, which seems to have been used as a sacred room (Plate 53). There is a foundation bed with stone carving in front of this door (Plate 54). This kind of foundation bed is very rare in this area. At present this room is being used as a store with the door blocked up with bricks on its inside. As the door cannot be opened, the room is entered from the south, that is, from the street.

Along both side of the three *Dalan* and along both sides of the sacred room in the south wing, there are several rooms which have doorways to the courtyard[1]. In every corner of the wings, there are rooms which have doorways to the outside, not to the courtyard. The stairs up to the first floor (British style), which is to the east of the sacred room in the south wing and to the east of the rooms in the south-west and north-east corners, are made of wood. Along the west side of the *Dalan* in the north wing, there seem to have been stairs (Fig. 1-1-4).

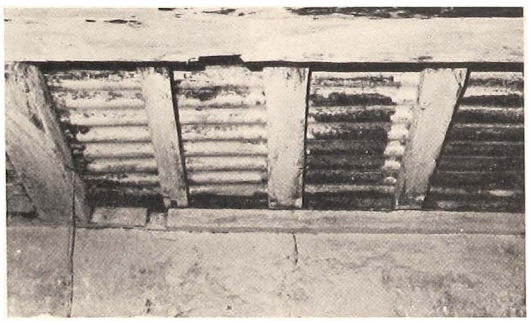


Fig. 1-1-4 Vestige of the Stair Case in the Room S 1-4, north wing of the Sundari Chok.

The courtyard is about 45 cm lower than the foundation bed and is paved with stones. In the middle of the courtyard, there is a bathing place called '*Tusa Hiti*' which has an axis extending north-south, and beside the bath lies a monolithic couch. The bottom of the *Tusa Hiti* is about 2 m lower than the surface of the courtyard and the wall of the *Tusa Hiti* is artistically decorated with stone carvings, with a miniature of a temple in the style of Shikhara at the northern end (Plate 60).

The First Floor (British style)**:** There are three flights of stairs going up to the first floor and two of them, which are at the south-west and north-east corners, lead farther up to the second floor.

Going up to the stairs at the south-west corner, we can go as far as the room in the centre of the west wing, but can not go any farther, nor to the rooms in the south wing. The central room in the west wing is the end room of a suite of rooms and can be reached by the south-west stairs and is now used as a police station. The wall on the north side of this room seems to have been remodelled, since the wall extends to the southern half of the window (WF-51) on the west facade. The stairs at the north-east corner lead to the long and narrow rooms on the first floor both in the north wing and in the east wing.

The Second Floor: On the second floor, there is a balcony which juts out onto the courtyard some 65 cm from the wall and surrounds the courtyard, with wooden screens filted towards the courtyard (Plate 62). In the centre and the northern end of the west wing are the bay windows which open on hinges (Plate 61). In the south-west corner of the west wing is another bay window.

d) Mul Chok

The *Mul Chok* is a two-story building in the style of court-house and stands on the north of the *Sundari Chok*, facing toward the *Darbar Square* (Plate 8).

The external form is a regular square some 27 m long on each side. The building, 3.6 m across measured from the outside, surrounds the courtyard with a north-south length of 20.7 m and an east-west length of 19.9 m (Fig. 1-1-5). The *Mul Chok* is now used for festivals such as *Dasain* and also used in part as an office by the Department of Archaeology, but not officially used as a store, nor for any other purposes.

The Ground Floor: The building is constructed on a foundation of bricks. The foundation bed is about 80 cm above the level of the street. Going into the entrance in the centre of the west facade, we find a *Dalan* with a frontage of 7.09 m and a depth of 2.64 m measured from the inside (Plate 71), which is divided by a peri-style of five spans. We also find a *Dalan* of equal size in the centre of the north wing and of the east wing, but in the case of these *Dalan*, the screen doors are set in between the pillars. There is no *Dalan* in the centre of the south wing, but there are golden doors (1W-16, Plate 13) which are said to be an entrance to the *Agan Mandir*. Behind the golden doors can be found a sacred room with some pillars of the *Agan Mandir*. Along both sides of the *Dalan*, there are two rooms each; that is, each of the

north, south and west wings has five rooms fronting onto the courtyard, including the *Dalan*.

Just behind the *Dalan* of the north wing, there is a room which does not conform with the rectangular plan and is located under the dwelling quarter of priests between the *Degu Talle*.

Stairs leading up to the first floor, as shown in the plan, are found in five places and among them two flights of stairs in the rooms (M 1-9 and M 1-21) are made of wood. The remaining three flights of stairs are mainly made of bricks set with mud.

The courtyard, which is some 90 cm lower than the foundation bed, is paved with brick plates, and in the middle of the courtyard lies a small gilt sanctuary (Plate 15). There is also a place in which animals are slaughtered as a sacrifice to the gods. This place is rectangular in shape (1m×2m) and is about 10 cm lower than the surface of the courtyard.

In the courtyard, there are some ten low posts to which animals are tethered for sacrificial purposes.

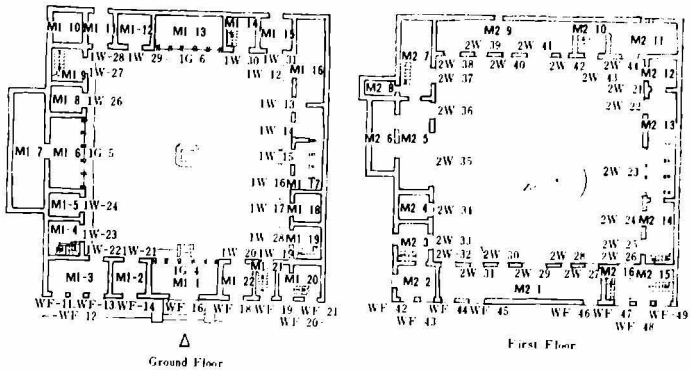


Fig. 1-1-5 Mul Chok of the Patan Darbar, Brief Plan.
Notes: thich character=temporary room number,
slender character=temporary number of windows and openings.

The First Floor: There are five flights of stairs leading up to the first floor, as is mentioned above, and each flight of stairs leads to only limited number of rooms. Namely, we can not visit any of the other rooms by these flights of stairs except the rooms in the south and east wings.

c) Degu Talle

The *Degu Talle*, which is an eight story pagoda in appearance (Plate 11), is on the north of the *Mul Chok* and faces the *Darbar Square*. This pagoda is a semi-detached structure, which is only connected with the *Mul Chok* by a dwelling quarter for priests and with the *Mani Keshav Narayan Chok* by a connecting corridor, and on the side of the *Darbar Square*, the pagoda is connected with the *Mul Chok* and the *Mani Keshav Narayan Chok* by 3.5 m high brick walls. These brick walls have two entrances of stone framed with carvings (Fig. 1-1-6). On the east side of the pagoda lies a courtyard, which is surrounded by the dwelling quarter of priests (on the side of the *Mul chok*) on its south side, by the south wing of the *Mani Keshav Narayan Chok* on its north side, by the wall and the storehouse on its east side and by the pagoda on its west side. This court (Plate 81), which is about 1.5 m higher than the level of the street on its west, is paved with bricks.

The plan of the *Degu Talle* is a square, 13.3 m long up as far as the second floor. The third floor is the same but with the balcony supported by brackets. The fourth floor is surrounded by a brick wall as a guardrail, forming a deck, on which stands a pagoda with a 12.7 m square base and with triple layered rooves of sharply diminishing size.

The sacred room of the *Degu Talle* is in the middle of

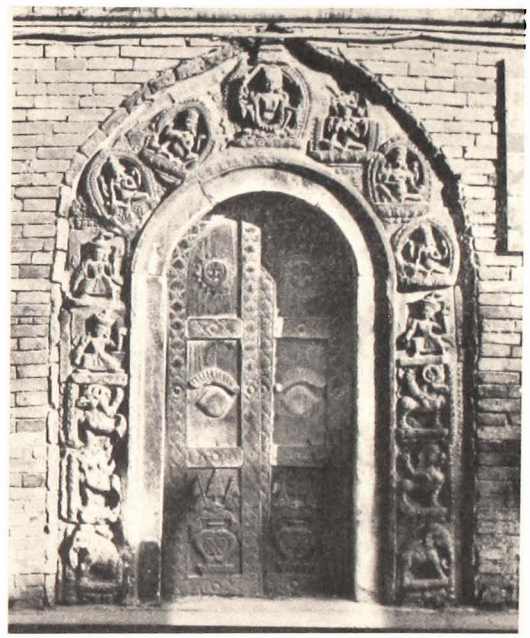


Fig. 1-1-6 Entrance of the Degu Talle.

the west side of the fourth floor. Some of the rooms of this temple are inhabited by people, but most are unused.

On the west facade on the ground floor of the *Degu Talle*, there are the remains of an entrance and windows on each side, but they are blocked up with bricks from the inside, so we can not verify the existence of the rooms.

In order to enter the *Degu Talle*, you have to pass through the entrance on the north wall of the *Degu Talle* and go up the steps outside the building to the first floor.

The floor of the *Degu Talle* begins at the first floor and

continues to the second and third floors. As shown in the plan, there is a 'core' 7 m square in the centre of the first floor, and around the core there are four rooms 2 m long measured from the inside. These rooms are the only space between the core and the outer wall.

The disposition of the rooms on the first, second and third floors is the same. Of these rooms, the one on the east side of the first floor is a *Dalan* (Plate 84). In the centre of the west facade of the second floor, there is a large bay window. In the centre of the middle part of the east side of the second floor, there is a simplified bay window of the same form as that on the west side.

f) Mani Keshav Narayan Chok

The *Mani Keshav Narayan Chok*, which is in the most northern part of the royal structures, is a three-story building, just like a court-house in style, with a four-story wing on the west side (Plate 18). This four-story wing has the shape of a one-storied house placed on the roof of a three-storied building (Plate 88).

On the north of this building, there is a large watering place called *Mani Hiti*. Therefore, the west as well as the north sides of this *Chok* are artistically decorated.

The plan is 28 m square and much larger than any other *Chok*. The south, the north and the west wings are 4 m across measured from the outside and the east wing is 5.5 m across measured from the outside. These wings surround a courtyard which is 19.8 m north-south and 18.7 m east-west. The west wing of the *Mani Keshav Narayan Chok* is now used as a museum while the other wings are unused. This building is also built on a foundation bed only 15 cm high which is lower than any other foundation of *Chok*. Entering the entrance in the centre of the west facade, we reach the *Dalan* formed by a peri-style of five spans. Similar *Dalan* are found in the north and south wings.

In the courtyard stands a sanctuary painted white and facing the west (Plate 19). Judging from the position of the *Dalan* and the orientation of the sanctuary, the direction of the axis of this *Dalan* is considered to be 90° which is different from that of the *Sundari Chok* and the *Mul Chok*, whose axes face north.

On the second floor, there is a balcony with wooden screens which protrudes from the building and runs around the courtyard. This type of balcony is the same as that of the *Sundari Chok*. The same kind of wooden screen can be seen on the third floor, which also protrudes out onto the courtyard. (Jun Hatano)

Note:

1) There is no wall between *Dalan* and the room on its west-side of the north wing, and between the sacred room and the room on its east-side of the south wing. However, we could find the trace of wall in each suite of the rooms.

3) Present Condition of Rooms

a) Sundari Chok

The inner arrangement of each room in the *Sundari Chok* is described through the survey as following.

The numbers of a room and a window are the same as those in drawing Fig. 1-1-3, and the general condition of an inner disposition is depicted in drawing (Table 1-1-1).

S1-1 The rectangular shaped room, flanking the *Darbar Square*, is the main vestibule at the *Sundari Chok*. Inside the room, the floor is covered with a red brick tile, square shaped in design. The ceiling is composed of parallel joists, placed close together and running to the east-west direction.

The main entrance (WF-24) is in the centre of the west wall; this wall borders the court (Plate 10). The outer door frame has elaborate carving. The wall opening itself is broader and higher on its inner face to its outer face, and the door lintels are set gradually higher toward the inside. This is the characteristic construction of the Npalese window also. Besides this entrance, there exists no opening in the west wall.

The floor of the room spreads to the podium, which surrounds the court, at the same level. The room is opened to the court on its east side, where four pairs of posts support the superstructure with a wing wall in brick, being placed on both sides. As a pair of posts in both sides is ajusted to awning wall, three passages under the wooden bracket with concave curve are opened to the court. The width of the opening between the posts is around 1.4 m. Of the three passages, the central one carries the embellished arch (Plate 9), which is reminiscent of a tympanum, over the posts. The post, which rests on the stone base, is also decorated with carving on its upper part.

The thickness of the north and the south wall is rather thin, compared with the west and the east wing walls, which are more than 60 cm in width. The room is projected a little on the east and the west outer-face.

S1-2, S1-3 Next to the room S 1-1 is the room S 1-2; the room is entered from the podium, surrounding the court. In the outer face of the east wall, there are two small niches on both sides of the door (1 W-36); two small Hindu-god statues stand in the niches. Within the room, the floor is covered with tile and the wall is of brick. However, the brick on the south wall was inserted to some extent in the late period, and a wooden bench is attached along the west wall. There is an opening between the rooms S 1-2 and S 1-3 only with a wooden frame, which seems to be a modern addition.

The room S 1-3, at the north-west corner of the *Sundari Chok*, has a door (WF-22) in its west wall; this has a beau-

Table 1-1-1 Sundari Chok: Its Size, Material and Function of the Rooms.

	Size of Room NS×EW×H(mm)	Floor	Ceiling	Wall N	Wall E	Wall S	Wall W	Function
S1-1	6200×2180×2120	T	J (EW)	B	●	B	B	a vestibule-like room in Sundari Chok
S1-2	2380×2110	T	J (EW)	B	B	B	B	a wooden bench attached along the west wall
S1-3	2760×2380	T	J (EW)	B	IL	B	B	a bedroom at present
S1-4 (WEST)	2270×1260×2395	T	J (NS)	B	●	B	IL	
S1-4 (EAST)	2270×5530	T	J (NS)	B	B	●	●	
S1-5	2365×3005			B	B	B	B	a storage at present
S1-6	4280×2350	E	J (EW)	B	B	B	B	
S1-7	2360×2300	E		B	B	B	B	
S1-11	2380×8180			B	B	B	B	
S1-13	2325×2095	T		WM	WM	WM	WM	a wooden stair for vertical communication
S2-1	6500×2170×2150	C	J (EW)	WM	WM	WM	WM	
S2-2	4985×2555	B, E	J (NS, EW)	WM	WM	WM	WM	
S2-3	2400×9070×2070	E	J (NS)	B	B	B	WM	a dormitory at present
S2-4	1240×2335	E	J (EW)	B	B, WM,	B, WM,	B, WM	
S2-5	15165×2310×2080	E	J (EW)	WM	WM	WM	WM	a dormitory at present
S2-8	3685×2980	T, C		WM	WM	WM	WM	
S2-9	1765×2170	T	J (EW)	WM	WM	WM	WM	
S3-1	×2540	T	J (EW)	WP	WM	WM	WM	
S3-1' (NORTH)	$\times\frac{2710}{2600}$		J (EW)	WM	WM	WM	WM	
S3-2	2520×12650×1835	T	N	B, WM	B	B	B	an office at present
S3-3	20210×2160	E	N	B	B	B	B	a dormitory at present
S3-4	2620×3325	E	J (NS)	WM	WP	WM	WM	
S3-5	2590×5390×1965	C	J (NS)	WM	WM	WM	WM	an office at present
S3-6	$\frac{2600}{5580}\times\frac{6010}{2600}$	T	J (NS, EW)	WM	WM	WM	WM	an office at present

Floor, covered in earth = E
covered in wood = W
covered in tile = T
covered with concrete-like material = C

Ceiling, composed of joists = J
( ) = Direction of joists, indicated in a bracket.
No ceiling = N

Wall, Brick = B
Washed with white plaster on a brick wall = WM
Wooden partition = WP
Iron lattice on a low wooden wall = IL
No wall (which means that the room's space is not limited by wall) = ●
Indication of the side, facing to the court = ⌐ (Example. B̄)

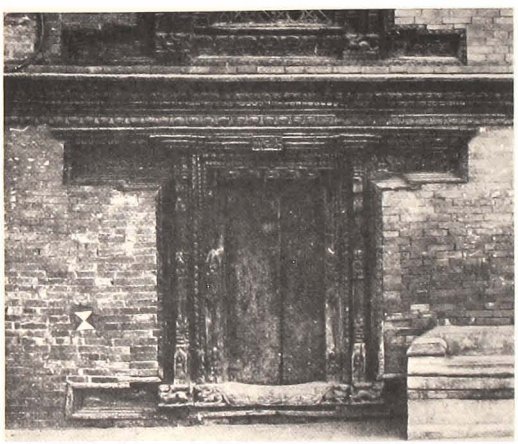


Fig. 1-1-7 Entrance 'WF-22'.

tified door-frame on the outer face (Fig. 1-1-7). The outer face of the west wall projects to almost same degree as those in the room S 1-1. On the opposite side to the door, a light iron lattice partition divideds the room S 1-3 from the rooms S 1-4 and S 1-5, and the brick wall continues to the next room S 1-4.

The room S 1-3 is at present used as a bedroom. The joists in both rooms run in an east-west direction.

S1-6 The room, at the north-east corner of the east wing of the *Sundari Chok*, extends to north beyond the *Sundari Chok*, so that its north wall also forms part of the south outer wall of the *Mul Chok*. The east side of the room has openings, but every other side is enclosed by a brick wall. The east wall contains an unornamented small window and one door. The floor is of earth.

A door can be perceived in the centre of the south wall although it is at present filled up with brick (Fig. 1-1-8); the bare lintel still remains inside the wall, but there is no post for a door. At the south corner of the west wall, a small niche, with steps leading to it, is visi-

Fig. 1-1-8 South Wall of the Room 'S1-6'.

Fig. 1-1-9 Nich in the West Wall of the Room 'S1-6'.

ble; its frame is carved and over this is an embellished arch like a tympanum (Fig. 1-1-9). However, it is doubtful that the niche was originally settled in this place since its height is rather low and the brick courses around it are not regularly arranged.

The function of this niche is unclear, for this room is now used only for circulation by means of a steep stair, which is placed at the north side of the room.

S1-7 The room, facing the court at the north corner of the east wing, has two doors on its east and west sides. These doors open to a back-yard and to the court of the *Sundari Chok*. The wooden screen door in the east wall is very bare and probably a recent addition. The door (1 W-39) and two small niches in the outer face of the west wall, however, have lavishly decorated frames; such an arrangement is likewise applied to the outer face of the other corner rooms, facing to the court. In the north wall, a vestige of a door to the room S 1-7 is still distinguishable although it is now filled with brick. On the surface of the south wall, the brick is laid unevenly.

S1-8 The room, placed at the centre of the east wing of the *Sundari Chok*, is almost the same size and layout as the room S 1-1, placed to the opposite side of this room. However, there is no opening in the east wall.

S1-13 At the south-west corner of the *Sundari Chok*, there is a small room acting as a circulation space; a wooden stair is installed, which leads to the upper storeys. At the centre of the north and the south wall, a post is inserted into the wall although its function is unclear.

The door (WF-27), at the north corner of the west wall, through which one can enter the room, has the same style of the door (WF-22) as described in *room S 1-3*. The outer face of the west wall projects a little from the face of the side wall so that the facade of the *Sundari Chok* is symmetrical at the ground floor level.

S2-1 The room is placed almost at the centre of the western structure of the *Sundari Chok*. The surface of the solid floor is covered by mortar, and all other brick walls are plastered. At present, the room is used as a police station.

The frame of the door in the centre of the south wall, except for its sill is carved in low relief (Fig. 1-1-10). At the east corner of the north wall, a wooden door is in-

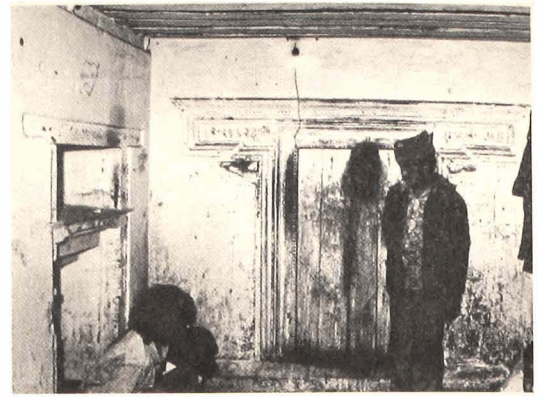


Fig. 1-1-10 South Wall of the Room 'S2-1'.

stalled into the wall; its bare frame on the right side is inserted into the east wall and, a brick wall occupies the space to the other side of the door. Since the door is attached on the wall, its actual function is difficult to determine. In addition to this, there is a crack running along the joint where the north and the west wall meet. Due to this it would seem doubtful that the walls is original.

Both the outer faces of the east and west walls project as in the case of the ground floor. The openings in the walls are also similar: a large window at the centre and a small window on both sides of it. The upper part of the post and the lintel have simple carvings. Above the window lintel, a recessed wall with a wooden frame forms a niche. Although the lintel of the niche is set at equal height to the beam which supports the joists, the beam and lintel seems to be intentionally manifested as separate elements by means of cutting the beam at both sides of the niche, and setting the lintel in the space provided. These niches are presently used as shelves.

S2-2 In this L-shaped room, there is no vestige of a partition-wall on the surface of plaster[1], except on the south wall, which divides the room from the room S 2-1 and is of relatively new construction. Half of the small window (WF-51) in the west wall is concealed by the brick of the south wall. So, the west wall is considered to have been constructed later.

The joists in the east part of the room, which projects from the north structure of the *Sundari Chok*, run in a north-south direction though they run in an east-west direction in the western part; at the point of change, two posts attached to the north and the south wall support a girder which extends along the east wall.

Around the north-east corner of the room, there is a door installed in the east wall; since the left jamb of the door is attached to the north wall, the lintel which normally sticks out of the door jamb is inserted into the north wall on its left side. Its frame is decorated with relatively simple carving.

Next to the door, around the south-east corner where

the form of the ceiling differs from the other part, traces of a stair remain; here, the direction of joists is reversed to those in the eastern part of the room, and the materials in this part are relatively in comparison; the width of the stair is presumed to be about 80 cm. from its present remains.

S2-5 This large room is now used as a dormitory for policemen; the only entrance into this room leads from the room S 2-5 to the north, in which a wooden stair makes vertical circulation possible. Some trace of what appears to have been, a partition-wall is concealed under the plaster of the brick wall. However, three small cavities penetrate the east wall where five doors are disposed symmetrically to the central one; these are perhaps the remnants of wooden brackets which now no longer exist.

In the court side, five windows are installed exactly opposite to each door in the east wall; five windows are also disposed symmetrically to the central one. The central part of the west wall is projected a little and has three windows. Three different types of windows are evident in the west wall (Plate 51). In addition to the windows on the inner face of the wall, niches are formed above the central window and both flanking windows.

S2-8, S2-9 The south-west-corner room in the *Sundari Chok* is used for communication between storeys; in the centre of the room is a stair to the ground and the second floors. The space itself forms an 'L'-shape.

Only the door frame remains of the opening in the north wall to the room S 2-9. This room forms a vestibule for the room S 2-1. This wall would most likely not have been in the original planning since the frame of the window (2 W-50) on the right side of the east wall in the room S 2-9 is concealed inside the face of the south wall. The posts of one of the windows in the east and the west wall of the room S 2-9 have carving on its upper parts. The raised floor in the south-west corner of the room S 2-8 is covered in wood; the shape of the south-west corner window (WF-57) is similar to a bay-window. The post of the window put in the south and west walls has carving on its upper part. Above the window, there is a niche which is a characteristic of the design of the Nepalese window.

Surprisingly, the direction of the joists changes at the corner where the east wall turns to the east; the joists run in an east-west direction in the northern part of the room S 2-8 while running to the north-south in the southern part. Therefore, almost at the centre of the west small window (WF-56) the direction of joists is reversed.

S3-1 The room is elongated to north-south with a wooden partition in the north part of the room. It contains two projected bay-windows, one small window, two doors. The opening which must have once existed in the centre of the east wall leading to the balcony is filled up with bricks at present. In the east wall, the northern part which lies between the rooms S 3-2 and S 3-1, is recessed a little from the surface of the east wall and it becomes thinner at this point.

The style of the two doors leading to the rooms S 3-2 and S 3-6 seems to be different from that of the traditional Nepalese door; this can be observed in the thick plaster which remains on the wall.

What appears to be two bay-windows are recessed from the face of the west wall (WF-68, WF-70). At these points, the girder running along the top of the wall is removed, and the lintel of the window itself supports the joists. However, the girder is not cut over the niche above the window in the west wall and functions itself as a lintel.

S3-2 The room, surrounded by a bare brick wall, is one space elongated to east-west[2]. Except for the window of the south wall near the south-west corner of the room, the window style, due to its simplicity, does not appear to be in the true Nepalese tradition. At the north-west corner in the north wall, two jambs and a lintel for a door remain although the opening itself is now filled up with bricks.

The special feature of this room is its structural complexity at the junction with its neighbouring spaces; the south wall of the *Agan Mandir* corresponds with the north wall of this room. And between the *Mul Chok* and the *Sundari Chok*, incomprehensible deadspace remains although it would be impossible to examine its exact condition. One result of the complexity appears on the north wall where a step in the wall-surface can be observed at the corner of the *Agan Mandir*.

Furthermore, the bricks in the north wall are laid over the girder which supports the north-south directional beams. Since the room has no ceiling, the structure of the roof is clearly observed (Fig. 1-1-11).

Fig. 1-1-11 Roof Structure of the Room 'S3-2'.

S3-3 The room S 3-3 is a rectangular large room, used as a dormitory, and terminates at the south wall of the *Mul Chok* over the north wall of the *Sundari Chok*. In the east wall, seven simple openings are arranged symmetrically to the central one, while four rectangular cavities remain in the east wall, only two are visible in the south wall. There are traces of a door to the room S 3-4 which is largely concealed by the brick-work, and one to the balcony in the centre of the west wall.

In this room, bricks are laid over a girder and directly support the roof-structure. It is noticeable that the brick

wall sticks out of the roof in the northernmost part of the east wall; around this part, the organization of the roof-structure becomes confused.

In front of the door to the room S 3-2 stands a post (Fig. 1-1-12), which has a carved capital and supports a beam.

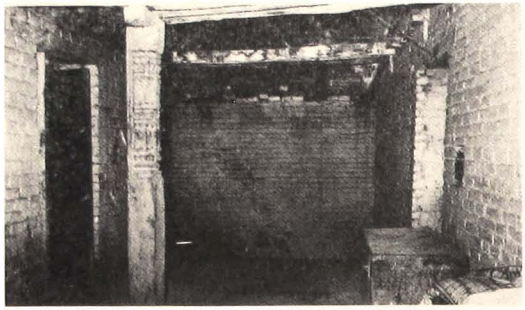


Fig. 1-1-12 the Room 'S3-3'.

Compared with the poor condition of this room, this post appears out of place. The post has almost definitely been moved from another part of the building.

S3-4, S3-5, S3-6 The 'L'-shaped room, S 3-6, in the south-west corner of the *Sundari Chok* is now divided up by wooden partitions and used for office space. The corner window (WF-72), the wooden sill of which is raised, projects slightly over the crossing (Fig. 1-1-13). The direction of the joists is reversed at the point where the east

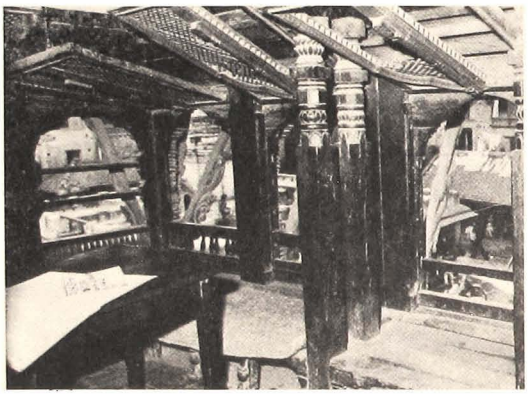


Fig. 1-1-13 Window 'WF-72' in the Room 'S3-6'.

wall of the west wing and the north wall of the south wing of the *Sundari Chok* meet; the joists run parallel in an east-west direction in the northern part of the room from the turning point and in a north-south direction in the southern part. A lintel and two posts remains in the north wall although the opening itself is now filled up with bricks.

The partition between the rooms S 3-5 and S 3-6 is made of wood; the room S 3-5 seems to have been modified to some extent in recent times, for use as an office. However, the partition wall between the rooms S 3-4 and S 3-5 is constructed in bricks. There is a door in the north wall[3].

In the room S 3-4, shelved and closets run the length of the east wall. However, the function of this space is unclear since they are not practically used. There is one window in the south wall and one door in the north wall; outside the door, a balcony overlooks the court; the window has no carving inside although it is constructed in the typical Nepalese manner.

In the room S 3-4, since the material between the joists has been partially removed, the structural system of the roof can be observed; the king post which is placed on the wall between the rooms S 3-4 and S 3-5 and supports the ridge girder is presumed to have been taken from another part of the building, since it has the decorated capital and is in the nature of the typical Nepalese post as is often described in this report.

b) Mul Chok

The inner arrangement of each room in the *Mul Chok* is described through the survey as following. In this section, the numbers of a room and a window are the same as those in the drawing Fig. 1-1-5, and the general condition of an inner disposition is depicted in Table 1-1-2.

M1-1 This room is the main vestibule of the *Mul Chok*, being placed in the centre of the west wing. In the west wall, there are the main entrance (WF-16) at the centre and, at its both sides, windows whose shape on the face of the *Darbar Square* is circular; its shape itself reminds us of man's eye (Plate 12). Except this entrance, on the western of the *Mul Chok*, there is no door which leads directly from the *Darbar Square* to the court of the *Mul Chok*.

The sill of the entrance, which rises up in one step, is made of stone. In this entrance, the composition of lintels differing, from the general manner in the Nepalese architecture, is arranged at the same level within the wall's depth. The window, forming a round shape on the outer face, is framed in wood and a panel with a wooden lattice is set within the frame.

In the east side facing the court, six pairs of posts which are decorated with carving are lined with the almost same distance. The size of posts are relatively larger than in the *Sundari Chok*. Those posts stand directly on the brick floor of the room, except four in the central bay.

The floor within the width of the central bay is inclined from the main entrance up to the podium which circles around the court; from the part of the entrance inside the room, at which the floor-level of the room is the lowest, to the part under the beam in the central bay, the floor gradually rises with the width of the bay. Except this slope, the floor is set on flat in the south and the north side of the room and rises a little, compared with that of the central bay.

M1-4 The stairwell space, the room M 1-4, where

Table 1-1-2 Mul Chok; Size, Material and Function of the Rooms.

	Size of Room NS×EW×H(mm)	Floor	Ceiling	Wall N	Wall E	Wall S	Wall W	Function
M1-4	2540×3160	E	J (NS)	B	B	B	B	a stairwell space, and brick and tile are stored
M1-6	2490×7115 (2445)	W	J (NS)	B	B	WP	B	
M1-7	2320×8690		J (NS)	B	B	B	B	a timber-storage at present
M1-9	2160×2810	E	J (NS)	B	B	B	B	
M1-11	2505×2545	T	J (EW)	B	B	B	B	
M1-12		T	J (EW)	B	B	B	B	a cooking place at present
M1-13	6960×2780 (2745)×2520	W	J (EW)	B	B	B	B	
M1-20	1370×2575	E	J (EW)	B	B	B	B	
M1-21	1765×2540	E	J (EW)	B	B	B	B	
M2-2	3850 (3700)×2610×2100	T	N	B	B	B	B	
M2-3	2460×4180 (4080)	E	N	B	B	B	B	
M2-5	2570×8675×2042	T	J (NS)	B	B	B	B	
M2-6	2410×6025×2070	T	J (NS)	B	B	B	B	
M2-7	2225×7640		J (NS)	B	B	B	B	
M2-8	3115×1515	T	J (NS)	B	B	B	B	
M2-9	13755×2650×2150	E	N	WM	WM	WM	WM	a sacred space
M2-10	2480×2820	E	N	WM	WM	WM	WM	
M2-11	6950×2700	E	N	WM	WM	WM	WM	a sacred space
M2-12	2690×3200	E	N	WM	B, WM	WM	B, WM	a sacred space
M2-13	2580×8445	E	J (NS)	WM	WM	WM	WM	a sacred space
M2-14	2620×7520	E	N	WM	WM	WM	WM	a sacred space
M2-15	5340×2670	E	J (EW)	WP	B	B	B	
M2-16	1185×2670	E, T	N	WM	WM	WP	WM	

Floor, covered in earth=E
covered in wood=W
covered in title=T
covered with concrete-like material=C

Ceiling, composed of joists=J
( )=Direction of joists, indicated in a bracket.
No ceiling=N

Wall, Brick=B
Washed with white plaster on a brick wall=WM
Wooden partition=WP
Iron lattice on a low wooden wall=IL
No wall (which means that the room's space is not limited by wall)
Indication of the side, facing to the court=▭(Example, B)

Fig. 1-1-11 North Wall of the Room 'M1-4'.

brick and tile are stored, has only one door on the south wall. However, the lintel and posts remain on the north wall although the opening which must have once existed is concealed (Fig. 1-1-11).

The brick stair, blocked by a low brick wall, occupies the west part of the room. On the west wall, cavities aligning at a slightly lower height than those on the first floor remain. The first floor overhangs the south part of the stairs in order to provide a link with the room M 2-3.

Along this side, where the ceiling has been removed to form the stairs, the size of two joists is relatively larger than the other.

M1-6, M1-7 The room M 1-6 is located in the centre of the north wing of the *Mul Chok* with the room M1-7 adjacent to it on its north side. Three of the walls in the room M 1-7 have no opening, although there is a recessed niche in the east wall. The south wall, which connects to the room M 1-6, also has two windows equidistant to either side of the door opening. The room M 1-7 is now used for a timber storage.

The frame of the openings on the south wall of the room M 1-7 are not adorned with carvings but the opposite side of the door has carvings of a high standard. It is noticeable that the opening for the windows in the north wall of the room M 1-6 is of brick; the brick arch with a low raise spans the window (Fig. 1-1-15).

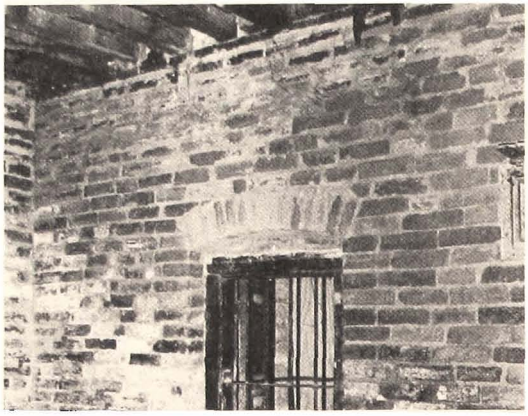


Fig. 1-1-15 Arch in the North Wall of the Room 'M1-6'.

In the room M 1-6, the size of piers along the south side are relatively larger than those on either of the other two rooms in the *Mul Chok*: namely the rooms on the east and the west of the wing. The wooden piers also appear on the south side (Fig. 1-1-16). Although wooden doors are installed between the piers, they would be later attachements.

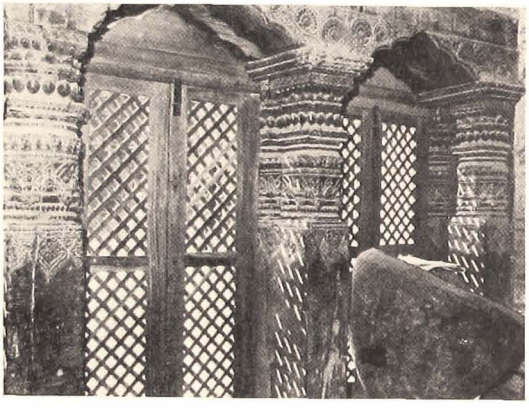


Fig. 1-1-16 Thick Pillars of the Room 'M1-6'.

M1-11 The small room, M 1-11, has one door on both the east and west wall (1 W-28). Of the door on the east wall, as the post on the right side is attached directly to the south wall, the door form is not symmetrical. The door itself has been demolished so violently that the width of the opening formed on the outside is larger than that on the inside. On both walls between the outer and the inner posts, there are two holes almost at the same height, seemingly for a door-bar.

The girder of the west wall is lost near the north wall, which, without a girder, rises higher than the level of the joist.

M1-12 The room M 1-12 is assumed to be presently used as a cooking place from the equipment; a fireplace is set at a place near the north wall. However, there is neither an opening nor any facility like a chimney, except for a door (1 W-29), immensely deformed, in the west wall. To the left of the door, a wooden window-frame, almost demolished, is placed only partially in the wall. But it would be impossible to consider that the window once existed in such a narrow place between the door and the south wall.

M2-2, M2-3 These two rooms located in the north-western corner of the *Mul Chok*, are not linked with the other rooms on the first floor; the room M 2-3 is reached by the stairs leading; there remains no indication of an opening on either the east wall of the room M 2-3 or the south wall of the room M 2-2 (Fig. 1-1-17). And curiously neither wall is joined at right angles to its two neighbours. The north wall of each room, there is a door which, since it has no post on its inner face, would appear to be a recent addition and was perhaps provided for ventilation.

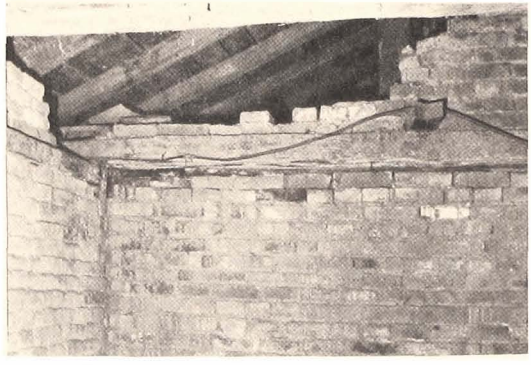


Fig. 1-1-17 South Wall of the Room 'M2-2'.

Concerning the triple window (2 W-33) in the south wall of the room M 2-3, the width of the opening between posts on the inner face is the same as on the outer face. The same is true of the large window (WF-13) of the west wall in the room M 2-2, but in this case there is no post on the inner face. In addition to the large window, one more window (WF-42) is installed in the west wall; it is small and the post of the inner face has carvings on its upper part.

In the east wall of the room M 2-3, the bricks continue over the beam to form a gable. However, the brickwork of both the dividing wall between the rooms and the south wall of the room M 2-2, terminates at the level of the beam[4]. The structural system of the roof is clearly seen

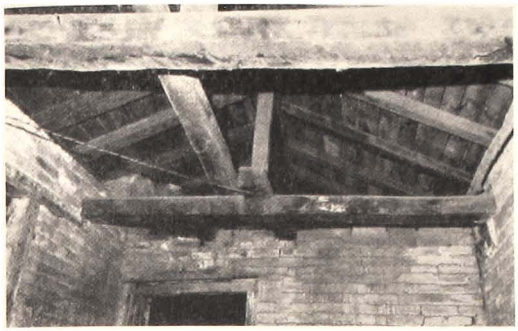


Fig. 1-1-18 Roof Structure of the Room 'M2-2'.

since there is no ceiling in this part (Fig. 1-1-18).

M2-9, M2-10, M2-11 While the floor level in the room M 2-11 is lower than in the room M 2-12, the rooms M 2-11 and M 2-9 are set at the higher level than the room M 2-10. These three rooms, which do not contain a ceiling, constitute the east structure of the *Mul Chok*, by terminating from the south bordering wall of the Mul Chok up to the wall of the *Taleju Mandir* which is joined to the *Mul Chok*.

In the east wall of the room M 2-11, the two small windows which are set at a different level seem to be later additions, for their design, in general, is not consistent with the traditional style (Fig. 1-1-19). In the room M 2-9, the previous existence of two openings is identified on the east wall by the vestige of a lintel and posts although it is very doubtful whether its design was part of the original edifice. In this wall, a row of protruding timbers would seem to act as cantilevers to support the roof at the eaves (Fig. 1-1-20).

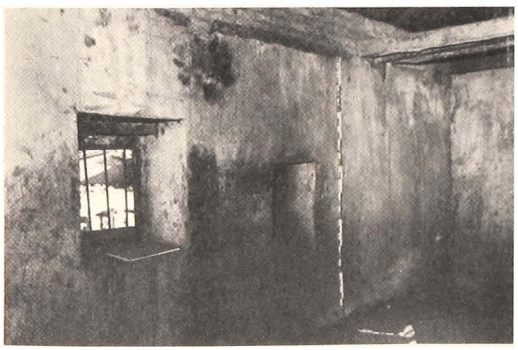


Fig. 1-1-19 Window in the East Wall of the Room 'M2-11'.

On the other hand, there are several windows on the west wall similar to those of the north wall of the south wing. The posts within the frame of the larger window (2W-11), although generally of the same style as that in the room M 2-13, support a lintel by means of a bracket which in this case is of a particularly elaborate shape (Fig. 1-1-21).

Fig. 1-1-20 East Wall of the Room 'M2-9'.

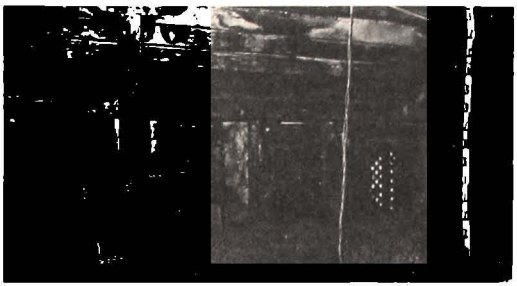


Fig. 1-1-21 Window '2 W-11' in the West Wall of the Room 'M2-11'.

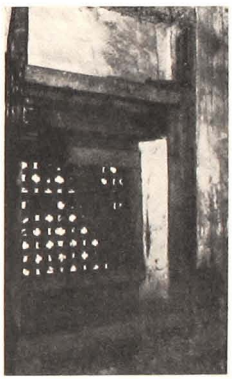


Fig. 1-1-22 Window '2W-25' in the North Wall of the Room 'M2-11'.

The rooms M 2-9 and M 2-11 can be approached from either the room M 2-10, which contains a stair, or the room M 2-11 through the rooms M 2-13 and M 2-12. Nevertheless, the circulation to the north and the west wing is obstructed by a wall, whose upper part forms a gable.

M2-12, M2-13, M2-14 These three rooms constitute the south wing of the *Mul Chok*. The room M 2-11 is reached from the room M 1-19 on the ground floor through a brick stair which is constructed on the west side. Its function might be considered as a vestibule for inner rooms. It is here that visitors must take off his shoes before entering.

On the north wall of the room M 2-14, there are a triple and single windows. In the latter case, the composition of the wooden elements differs from the ordinary Nepalese windows; a niche is installed above the lintel and this is adjusted to window-posts on either side and therefore does not stick out of the posts (Fig. 1-1-22). A large window

(2 W-23) placed in the west side of the north wall of the room M 2-13 is divided into five panels, which are put in between window-jambs. In front of this window, four posts, two of which are inserted in the wall on both sides of the opening, are aligned along the line of the wall-surface. However they are directly joined to the lintel without the wooden bracket. The window (2 W-21) on the north wall and the door on the east wall in the room M 2-12 retain the traditional composition; that means, the size of the opening is larger on the inside than the outside.

In the west part of the room M 2-13, the beams spanning between the north and the south wall are supported by four pairs of posts between the walls. The posts are regularly positioned about 1 m from the south wall and not mid span (Fig. 1-1-23). Obviously, these structural elements

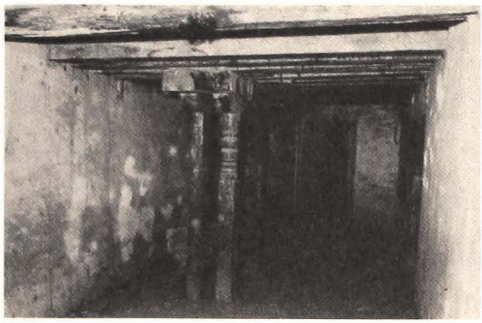


Fig. 1-1-23 The Room M 2-13 Facing West.

are employed for bearing the load of the *Agan Mandir*, the planning of which overlaps with the *Mul Chok* and the *Sundari Chok*. However, the posts, three of which have carvings on their upper part, seem to have been diverted from another place. The girder above the posts is supported with a bracket.

The floor covering of all three rooms is earth but the level of the room M 2-13 is higher than that of the rooms M 2-12 and M 2-14. Therefore, the threshold of the door rises up from the floor level of the rooms M 2-12 and M 2-14. Moreover, there is no ceiling in any of the three rooms. In contrast with these obvious distinctions at present, it is almost impossible to discover any vestiges on the walls, for thick plaster covers on their surface.

However, the walls dividing the rooms continue up to roof level, forming a gable and isolating one room from the next.

(Shiro Sasano)

Notes:

1) According to Korn's reconstructed planning, there is a brick partition-wall in the room. (Preface, Section 5, Note 20)
2) Although there is a partition-wall inside this room in Korn's reconstructed planning, our survey could not recognize the vestige on the wall.
3) Although there is a door at the centre of the east wall in Korn's reconstructed planning, only one door is installed at the north corner of the east wall at present.
4) The south wall of the room M 2-8, the wall around the large window of the west wall and the east part of the north wall of the room M 2-7 seem to have been of newer construction.

Section 2. Basantapur Bhawan in Kathmandu Darbar

1) Position of Kathmandu Darbar

At present, Kathmandu, the Capital of the Kingdom of Nepal, is the largest city in the Kathmandu Valley (Plate 21). In the western suburb of the city flows the Bishnumati River. The Bishnumati joins the Bagmati at the south-western outskirt of the city. The city was founded almost on a flat land, surrounded by cultivated land. Like other cities in Nepal, agriculture is the main occupation for the citizens.

Although commercial activity, in recent years, has increased notably with a modernization of the society. Since the erosion of a strong feudalistic society, the clarity of the city plan has been destroyed; one illustration of this is the occurrence of suburban spraul around the city due to the growth of its population. Of all the cities in the Kathmandu Valley, Kathmandu has changed most noticeably.

The original plan of Kathmandu is very obscure. The present organization of the city was evident by the 16th or 18th century, the period referred to as the Malla dynasty. Although it would appear that present architecture is of an earlier style in design and arrangement, it is not possible to verify this hypothesis.

The palace-complex (Plate 23) is located in the centre of the city. The palace in Kathmandu, in contrast with other two cities, Patan and Bhadgaon, is surrounded by open space. In Patan and Bhadgaon the open space flanks two sides only. The position and number of entrances to the palace-complex is difficult to determine in Kathmandu. The present entrance is near the statue of *Hanuman*.

Generally, it is very doubtful to what extent the palace surrounding maintains its original organization, although it maintains its ceremonial importance.

2) Present Condition of Outside and Inside of Basantapur Bhawan

As was described in Section 5 of Preface, the restoration is being carried out under the auspices of the conservation project of the *Hanuman Dhoka*. In this section the general features relating to the present condition of the *Basantapur Bhawan* (Plate 25) are described.

The *Basantapur Bhawan* is a large tower of eight floors, the total height of which reaches about 31 m. The outline of the projection of the ground floor, partially joined as it is into the *Lohon Chok* (Plate 97), is measured at 11.9 m east to west and at 8.0 m north to south. The structural material mostly used is brick, however non-structural elements such as the cornices marking the floor levels and the mid-floor levels on the outer face, are wood (Plate 99). In addition to wooden projecting windows on the second and sixth floors and balconies on the third, fifth and eighth floors (Plate 23), there are many windows which are set on to the walls.

The roof of the building is hipped with its eaves overhanging the top floor. Eave-like canopies shade the third, fifth and eighth floors. These eaves and the balconies (Plate 98) described above are supported by wooden struts. Since all of the wooden elements on the exterior are decorated with subtle carvings they become a dominant element in the overall perception of the building.

In constast with the exterior, the general design of the interior is rather restrained.

The Ground Floor: The ground floor is divided into north and south rooms by a central brick wall. A 1.61 m wide opening at the centre of this wall links the rooms.

The thicknesses of the south, central and north walls measures up to 1.90 m in places therefore if this thickness is subtracted from the 8.0 m width of the exterior, interior room widths of 1.1-1.16 m result.

On the northern side there is an entrance opening onto the *Nasal Chok* while at the centre on the outer side of the south wall (Plate 100) there is an entrance opening of 1.61 m wide. The floor level within this entrance is 41.5 cm above that of the south room.

The First Floor: The height from the floor to the underside of the joists is 2.855 m.

On this floor as in the first floor the plan consists of two rooms, but here the width of the rooms increases to about 1.5 m. In the north room there is a 1.24 m wide window with stepped lintels at the centre of the north wall. The level of the lowest stage-like sill is 30.5 cm higher than that of the floor. To either side of the main window are small windows while on the east and west sides in place of the brick walls are twin-paneled doors.

Again, in the centre of the central wall is a doorway linking the rooms. It has a width of 1.27m. Near the centre of the north and south exterior walls are traditional Nepalese windows with stepped lintels. These windows have width of 1.24 m and 1.27 m respectively. The lowest sill-level is 32.5 cm from that of the floor. Towards the west of the south wall there is another window.

The Second Floor: The height from the floor to the underside of the joists is 2.71 m in the south room and 2.64 m in the north room.

On the second floor there are again north and south rooms with width north to south of approximately 1.94 m. On the second floor there are two windows with widths of 1.02 m and 1.05 m and sill heights of 63 cm and 51.5 cm flanking a central window of 1.30 m wide and sill height of 44.5 cm. Inside the recessed space of the central window there is a wooden floor 32.5 cm higher than the lowest lintel. The east and west walls are blank and the south wall is broken only by the connecting full-height doorway 1.26 m wide.

In the south room (Plate 102) exterior openings are restricted to the south wall, towards the western end of which there is a window having a width of 95 cm and a lintel height of 63 cm. There is also a central window projecting 67 cm from the outer face and supported by protruding joists. The exterior of this window is decorated with carvings whilst the interior remains unadorned. Following the line of the brick wall inside this window there are three bays formed by four sets of three posts in line. Each span between the posts measures 1.42-1.44 m. Of these twelve posts the six free standing ones are 21 cm square at the top and bottom yet octagonal at the middle. This octagonal section is carved at both the top and bottom. Carvings can also be seen on the innermost two posts attached to the wall.

Moreover, 27 cm from the floor level are two joists-like timbers joined to the four innermost standing posts. Up to this height the surfaces of the twelve post timbers are roughly finished. Thus it can be assumed that the three bays in the window projection would have had a "floor" level of about 27 cm.

The Third Floor: The height from the floor to the underside of the joists is 2.715 m.

On the third floor there is a balcony (Plate 103), the three sides of which projects 1.300 m from the outer face. On the east the tower joins the *Nasal Chok* at this level. Joists project from the wall to support the balcony floor with the joists at the corners being radially projected. Wooden outward-leaning screen panels are attached to the balcony. The eaves incline at about 32 degrees and have their rafters parallel except for those which join the corner posts. These rafters are supported midway by a purlin (15.5×9.5 cm in section) which in turn is supported by posts standing upright at the outermost corners of the balcony. These posts are connected to the projecting joists of the floor below. Struts connect these joists to the rafters. In this way the basic structure of the balcony is derived.

This third level is divided by the central wall into

symmetrical north and south rooms. The brick wall on the north and south sides is removed to make a 1.20 m wide space occupied by four sets of three posts in line, so forming three bays. On the east and west sides of both rooms there is one post and lintel framed opening.

Two distinct methods of settling the posts can be seen on this floor (Plate 104). One method uses free standing posts, the four faces of which are decorated with carvings. The other method, which usually occur adjacent to a wall can be divided into three types. The first type, usually concurring adjacent to a wall is not embellished with carvings. The second type has both exposed faces carved. The posts on the north side of this particular opening belong to the first type in that they have no carvings however those on the south side must be defined as belonging to a third type in that they have carvings on opposing faces only (Plate 105). Although such varied types can be seen on this floor, the overall arrangement seems rather haphazard in a sense. In the centre of the central wall the doorway opening is 1.43 m wide.

In addition to this, from vestiges in the form of slender holes near the base of the innermost posts in the bays of the north and south openings (Plate 106), it can be understood that wooden boards were inserted into these holes bridging the posts to a height of 21 cm. After considering this, it could be assumed that, by filling it up with earth, the floor level of the balcony would rise to 21 cm, but the absence of similar vestiges on the posts of the eastern and western sides suggests that either the balcony level was uneven or that the posts were installed at different times, or most likely that only the floor level with in the large openings was raised.

The Fourth Floor: The height from the floor to the underside of the floor joists is 2.545 m.

On the fourth floor the width of the south and north rooms (Plate 107) enclosed within the brick wall increases respectively to 2.24 m and 2.28 m. Except for the relatively large window in the centre of the north wall 59 cm above the floor level, the other windows on this floor are rather small. In the north room they are disposed towards the eastern and western ends of the north wall and to the east and west walls. This situation is mirrored in the south room.

The Fifth Floor: The height from the floor to the joists is 2.68 m.

The balcony (Plate 110) which surrounds the fifth floor varies in projection from between 56.5 cm and 63 cm from the outer face. Its composition and designs are roughly similar to these of the balcony on the third floor, however its eaves are inclined at 30 degrees which is slightly less than those of the fourth floor. Also, there is no girder midway supporting the rafters.

On the north side of the north room (Plate 108), three central bays are again formed by four sets of three posts in line and open to the balcony. The interior measurement between the posts is about 1.28 m and the shape and arrangement of these posts are similar to those of the third floor. On the east and west sides of the north room, the brick wall ends approximately 50 cm from the corners. The connecting door on this floor has a width of 1.885 m. Again, at the corner of the opening on the south face of the central wall, the posts, like any other corner posts in the *Basantapur Bhawan*, have no carving.

The Half-Height Floor (Between the Fifth and Sixth Floors): For no apparent reason, there is a floor of ceiling height 1.11m between the fifth and the sixth floors. There are no openings except for the connecting door which is 1.455 m wide. The width of the two rooms is between 2.26 m and 2.30 m.

The sixth Floor: On the sixth floor five spans of three posts in line (Plate 109) divide the floor into roughly equal spaces north and south. From east to west the spans between the posts have widths of 2.015 m, 1.365 m, 1.44 m, 1.37 m and 2.04 m respectively.

On the north side the central three bays are composed of four sets of three posts. Outside of the line of these posts, there is a window, the projecting floor of which extende 59 cm from the face of the wall. On both sides of the wall next to this window, there are small, hole-like windows penetrating the wall.

On the eastern face the brick wall is removed to a width of 1.05 m in the north room and to 1.04 m in the south room. The bay window-like balcony project 59.5 cm from the outer face. On the north and south of this face there are small openings similar to those on the north side. The arrangement of the elevations of the south and west walls is identical to that of the north and east.

Carvings can be seen only on those posts standing on the outer wall line of this floor.

The Seventh Floor: The height from the floor to the underside of the joists is 2.33 m.

Compared with the sixth floor, the length and breadth of the seventh floor are respectively 32.5～35 cm shorter. Therefore the brick wall of the seventh floor is put not on the wall but on the beam of the sixth floor. This floor, enclosed completely by brick walls, is divided by the east-west central brick wall. The width of the north room (Plate 111) is 1.62 m. Small windows are set high at the centre and eastern and western ends of the north wall as well as the centre of the east and west walls.

The central wall opening has a width of 76 cm but a height of only 1.4 m. The composition ofthe wall in the south room again mirrors that of the north wall in the north room.

The Eighth Floor: The height from the floor to the underside of the joists is 2.455 m.

Only on the four corners of the eighth floor are there brick walls. The balcony extends 56～59 cm past the line determined by these wall sections, and a wooden screen extends from this line to the edge of the eaves as can be

seen on the third and fifth floors. The planning is almost identical to that of the seventh floor in that five spans of three posts in line centrally divide the floor east to west (Plate 27, 112).

At the opening on the north side, four pairs of posts form three bays, the opening width being 1.4 m. On the east side, there is the same post formation but the length of the side walls becomes 37 cm to the north and 37 cm to the south. The composition of the south and west walls is the same as that of the north and west walls.

From this description it can be seen that every floor is divided into two almost equal rooms or spaces by means of an east-west brick wall or by sets of posts running east to west. In the case of these rooms the two spaces are linked by the centre opening. The timber door frame in which a two-panel door is inserted is usually carved.

Inside the north room there is always a timber cut-string staircase.

The materials of the floor, the walls and what appears to be the ceiling can be summarized as follows (Plate 28);

Floor: brick

Wall: brick (In every floor up to the seventh floor, the wall is divided into three parts by the horizontal wooden band and also divided vertically by the wooden posts.)

Ceiling Surface: ceiling-like surfaces are composed basically joists but in the case of the balconies, it is composed of rafters.

Section 3. Bhadgaon Darbar

1) Position of Bhadgaon Darbar

Bhadgaon is located on a plateau 12 km east of Kathmandu (Plate 29). High density housing covers all of the plateau——this phenomenon is very similar, in a sense, to the Italian medieval hill towns. The Hanumante River, southward of the plateau, flows along the city from the east down to the west. The citizens of the town are supplied with water from a reservoir situated at the highest point of the plateau. Cultivated land surrounds the plateau where the present city is located.

Bhadgaon is said to have been founded in the latter half of the 14 th century under the Malla dynasty. The distinctive character of the architectures found there is impressive and is presumed to have gradually developed since that time. Also, in the latter half of the 15 th century, the city was proclaimed as the capital and was occupied by one of the three kings of the Malla dynasty. The site of the palace complex, which corresponds with the present one, was constructed in the north-western periphery of the city since it was the highest region of the plateau. According to legend, the original palace complex was the structure most representative of the high style of the Nepalese architecture. At present, however, since many of the complex have been modified and demolished, it has become difficult to envisage its subtle inter-gradation of design. In front of the palace lies the *Darbar Square*, where the platforms and religious monuments are even today used for ceremonial purposes. An open space is further found to the east side of the complex. Therefore, as a result, there is 'L'-shaped open space composition.

The approach to the city from Kathmandu rises along the road on the western slope of the plateau. The gate of the city is set to the west of but near the palace-complex. Inside the city, the network of roads is more complicated than in Patan. Due to the topographical characteristics it would have been difficult to build straight roads to form a regular grid network and thus the road width and direction have changed in accordance with this. The roads and lanes in the city are more often than not paved in brick or stone. Therefore, it is difficult to determine exactly which is the main road in the city.

2) Disposition of Bhadgaon Darbar and its Present Condition of Inside and Outside

a) Bhadgaon Darbar and Darbar Square

Bhadgaon Darbar consists of a complicated cluster of several buildings. The front facade of the buildings is facing south, and on the south of which spreads the *Darbar Square* (Plate 30). In the *Darbar Square*, there are seven temples in the tradtional style and four temples in the Shikkara style, and also a gate in the west end, and an 'L'-shaped large *Dharmashala* (public resthouse) (Plate 116) in the south-east corner. From old stone-cut prints[1] we know that there were more temples in the *Darbar Square* in the past. Many temples seem to have been destroyed by earthquakes.

b) Total Disposition of Bhadgaon Darbar

Of the palace building fronting onto the *Darbar Square*, there are, in order from the west, a three-storied building with brick walls which are not so elaborately decorated; a two-story building with steep stairways, walls painted white and with windows which are not traditionally Nepali; and a gate called *Sun Dhoka* in Nepali (Plate 32). This gate is made of brick of which not only the roof but also the casing, the *Torana* and the doors are decorated golden. The next is a building affectionately named *Pachapanna Jhyal* (Plate 31), which will be described in detail below.

At the back of the *Sun Dhoka* stands the *Mul Chok* in the style of a courthouse, and the *Kumari Chok* further

[illegible]

no connecting corridor. Looking at these *Chok* and the *Degu Talle* from the viewpoint of structure, we find a complicated arrangement whereby a common wall joins two buildings, and the *Agan Mandir* stands astride the *Sundari Chok* and the *Mul Chok*.

When moving from *Chok* to *Chok* we have to go through the *Darbar Square* or go across the garden as there is no connecting corridor[8]. It is thought that each *Chok* had an independent function. The *Degu Talle* is a tower with characteristics of a watchtower from the bottom to the third floor and also a traditional style tower with a high rate of successive diminution on the third floor.

The *Patan Darbar* was constructed by the Malla Dynasty, mostly in the 17th century, with the remaining parts constructed in the 18th century[9]. It lost its function as a royal palace during the Shah Dynasty. That is why the *Patan Darber* has not been enlarged or rebuilt since then.

Accordingly, the *Patan Darbar* is thought to be an appropriate choice to study the use of royal buildings. The function of each *Chok* of the *Patan Darbar* is discussed in the next section.

Notes:

1) As for *Bhadgaon*, *Taumadhi Tol* in front of *Nyatapola Mandir* played an important role, and the Imperial Palace Plaza had political and religious functions.
2) As the name as opposed to Urban-Style Royal Palace, Mountain-Style Royal Palace seems to be suitable. The Mountain-Style Royal Place, which was found in Nuwakot and Gorkha, was founded by the Gorkha Dynasty. We would like to give a full detail of this mountain-style royal palace after minute reinvestigation.
3) C. Pruscha: op. cit., vol. 1, p. 8. (Preface, Section 3, Note 2).
4) *Sundari Chok* can be called *Sundari Ghar*, but the Nepali do not call like that. On the other hand, *Kumari Chok* in Kathmandu is often called *Kumari Ghar* or *Kumari Dyo Chhen*.
5) *An Introduction to Hanuman Dhoka*, p. 38. (Preface, Section 5, Note 21).
6) Ibid., *Mohan Chok* was constructed by King Pratap Malla in 1649 and remodeled by King Rejemdra Bikram Shah into the persent model in 1822.
7) W. Korn: op. cit., p. 57. (Preface, Section 5, Note 20).
8) The corridor connecting each *Chok* may be found by excavation of the garden. If it should be found, it would not be the building with the influence diminishing characteristics of each *Chok*.
9) W. Korn: op. cit..

2) Relationship between Planning and Utilization of Patan Darbar

The purpose of this section is to consider each architectural constituent of the *Pa'an Darbar* and its use on the basis of the plannig of the buildings. A comparative and contrastive study will also be done of the buildings of the *Darbar* are identically in Kathmandu and in Bhadgaon.

a) Sundari Chok

'*Sundari*' means 'beautiful', 'pretty' and 'charming'[1]. W. Korn makes the following comment on the *Sundari Chok* of the *Patan Darbar*:

> As the completed structure turned out to be a very impressive and beautiful one, Siddhinarasinha named it Sundari Chok, the "magnificent courtyard"[2].

The *Sundari Chok* of the *Kathmandu Darbar* is situated to the north of the *Hanuman Dhoka* and next to the *Mohan Chok*. In the case of the *Patan Darbar*, the *Sundari Chok* is at the south end of the royal buildings and faces the crossing. In the *Bhadgaon Darbar* the name '*Sundari Chok*' cannot be found. The *Sundari Chok* is thought to be a former residence of a king and his family. W. Korn gives a detailed description of the *Sundari Chok* of the *Patan Darbar*[3]. According to his explanaton, 'the ground-floor rooms were used as stables, arenas, sanctuaries and for the palace guards; the first floor was used for living and sleeping quarters, and second floor was for kitchens and eating halls'.

Nevertheless, the present state of the *Sundari Chok* surpasses all imagination. In the case of traditional residence of the *Newari*, except for the use of the ground floor as a store or barn, the utilizations of other rooms are similar to those of the *Sundari Chok*. Such being the case, W. Korn's statements are found to be correct.

Especially on the street side of the second floor, there are bay-windows with open lattice doors (Plate 61). The rooms are therefore much brighter than the other rooms. The second floor also has a balcony with a wooden lattice screen around it, which connects each room (Plate 62).

From the above points, the *Sundari Chok* is said to be a building with a function of residence. In the centre of the courtyard of the *Sundari Chok* of the *Patan Darbar*, there is a bathing place called '*Tusa Hiti*' with a golden tap surrounded by stone carvings (Plate 60). In the courtyard of the *Kathmandu Darbar's Sundari Chok*, a similar bathing place can be found[4]. How and when this bathing place is used is not clear. However, it is often said that this kind of bathing place can be found in the courtyard of the *Newari* residence.

This fact seems to be another plausible piece of evidence that the *Sundari Chok* had a residential function in those days.

b) Mul Chok

'*Mul*' of the *Mul Chok* means 'main' or 'head' (office)[5]. Therefore, the *Mul Chok* is a building in the centre of the royal buildings. Probably it had the function of a political centre closely connected with religion.

Each of the three royal palaces has a building called '*Mul Chok*' around its courtyard. In the case of the *Kathmandu Darbar* and the *Bhadgaon Darbar*, the *Mul Chok* is constructed in the depths of the royal palace. So, in order to visit the *Mul Chok*, it is necessary to go through the *Hanuman Dhoka* as in the case of the

Kathmandu Darbar (Plate 27), and the *Sun Dhoka* (which means 'golden gate') as in the case of the *Bhadgaon Darbar* (Plate 37).

Since the entrance of the *Mul Chok* of the *Patan Darbar* (Plate 12), on the other hand, fronts onto the street, it is easily accessible. Its decoration is also different from that of the *Sundari Chok* and of the *Mani Keshav Narayan Chok* which are adjacent to each other. In short, the wood carvings decorating the entrances of the *Sundari Chok* (Plate 10) and the *Mani Keshav Narayan Chok* (Plate 18) can not be seen over the cornice at the level of the first floor, although they appear to be over the cornice because of the *Torana* set in front of the carvings, covering them. The decorations around the entrances of the *Mul Chok* which are sturdily built, are spread across the cornice at the level of the first floor and present a display of graceful scenes over the facade of the ground-floor and the first-floor.

The architecture in Nepal is usually characterized by its brick-laying system which is independent and separate on each floor. It is rare for the decoration of an entrance to cover the facade of both the ground and the first floors.

I think it proper to conclude that this graceful design on the front facade of the *Mul Chok* of the *Patan Darbar* is strongly influenced by the *Hanuman Dhoka* of the *Kathmandu Darbar* and by the *Sun Dhoka* of the *Bhadgaon Darbar*. The design is said to be consistent with a political centre closely connected with religion.

The practical use of the *Mul Chok* of the *Kathmandu Darbar* at present, is pointed out as the following in *An Introduction to the Hanuman Dhoka*[6]:

> Religious sites of descriptions, royal weddings, the investiture of the crown prince and the chief minister of the state as well as the coronation of the king himself took place here.

The following is a description of a '*Dasain*' which is held at the *Mul Chok* of the *Patan Darbar*.

'*Dasain*' is the biggest festival of Nepal. It is held in October, and in keeping with Nepal's agricultural society, has the characteristics of a 'thanks-giving' celebration. During the festival the city of Patan is filled with a festive atmosphere; a mask dance is dedicated to gods all day and night,day after day, and a long line of people are made to offer animals in sacrifice.

Fig. 2-1-5 Dasain at the Mul Chok of the Patan Darbar.

Around the low posts to which animals are tethered and the small gilt sanctuary in the court of the *Mul Chok*, groups of people gather playing homage in their own way. A group of people may cut the carotid artery of a buffalo with an edged tool and splash its spouting blood over the walls and floor of the sacred room (Fig. 2-1-5), whose golden doors with the casing decorated with *Torana* are opened only during the festival; This golden door is also an entrance to the tower dedicated to the god of *Agan*. The sacred room is situated in the centre of the south wing and is said to be dedicated to the god of *Taleju* during the festival.

Another group of people may carry the head of a buffalo on their shoulders into the courtyard, and after showing and pushing it, they carry it into the room in the north end of the west wing to pay homage. On the ground floor of the west wing is situated the only room that is decorated with *Torana* (Plate 76) and which is dedicated to the god of *Dasain*.

Another group of people may dedicate a mask dance, going around the small gilt sanctury in the courtyard. The *Local Kumari* of Patan usually pays homage, offering meals to the court in the room called *Kumari Kotha* in the middle of the first floor of the east wing[7].

The following two things should be noted. The first is that the room where homage is paid has a *Torana* on the entrance or the window. The next is that this *Torana* indicates the religious high rank of the room.

Through examination of the plan of the *Mul Chok*, it is clear that the *Mul Chok* is very much like the architectural style of a Buddhist monastery[8].

In particular, the architectural style of the *Mul Chok* resembles the two-storied court style building called '*Baha*'[9]. A typical example of a *Baha* is the *Chhusya Baha* (Plate 37, 127, Fig. 2-1-6) in Kathmandu which was constructed in the 17th century[10]. The construction of the *Patan Darbar* matches the *Chhusya Baha* in time.

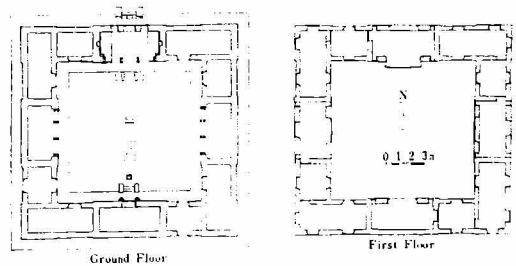


Fig. 2-1-6 Chhusya Baha, Brief Plan: Ref. W. Korn, *The Traditional Architecture of the Kathmandu Valley.*

The *Chhusya Baha* is a two-story building, 18 m. square, surrounding a courtyard 13 m. square. The characteristics of this building and its points of resemblance with the

Mul Chok of the *Patan Darbar* are as follows:

① Going into the front entrance of the north wing we find a hall called '*Dalan*' which fronts onto the courtyard and is divided by a peri-style. Another *Dalan* is found in the middle of the east and west wings.

② The sacred room is in the centre of the south wing, facing north.

③ There is no passage through the partition between rooms on the ground floor. Every room has an entrance on the courtyard side, but no windows on that side.

④ The rooms on the ground floor have no entrances or windows facing the street, except the entrance at the front.

⑤ We can go up the first floor by four flights of stairs at the corners.

⑥ Each suite of rooms has its own flight of stairs and cannot be reached by any other stairs, since there are no peripheries.

⑦ On the first floor there are windows facing not only the courtyard but also the streets. This is the basic difference between the ground-floor and the first-floor.

These are the similarities between the *Chhusya Baha* and the *Mul Chok* of the *Patan Darbar*. The differences are that the *Chhusya Baha* has an entrance on its north side and the *Mul Chok* has an entrance on its west side, that is, another entrance besides the front entrance on the facade facing the street.

However, considering the relation between the streets and the buildings and the special characteristics of the royal buildings, the differences between the two are not so great.

In conclusion, the characteristics of the *Mul Chok* are greatly influenced by religion and is very much like a Buddhist monastery in plan. In other words, it is a political centre closely connected with religion.

Notes:

1) *Standard Dictionary*, Delhi.
2) W. Korn: op. cit., (Preface, Section 5, Note 20, p. 55).
3) W. Korn: op. cit., p. 51.
4) C. Pruscha: op.cit., vol. 2, p. 61. (Preface, Section 3, Note 2).
5) Meerendonk, M: *Basic Gorkhali Dictionary*, Singapore, 1960.
6) *An Introduction to Hanuman Dhoka* (Preface, Section 5, Note 21).
7) By the instruction of an officer of the Department of Archaeology who is staying at the *Patan Darbar*.
8) *An Introduction to Hanuman Dhoka*, p. 38.
9) W. Korn: op. cit., p. 52. Resemblance between *Baha* and *Sundari Chok* is stated.
10) W. Korn: op. cit., p. 30.

3) Principles of Plan Constitution of the Royal Buildings with Court-yard

a) Four-Building-Independent Style and Four-Building-Chasing Style on Plan Coordinates

The historical change in the development of the building with court-yard, as is one of the important components of the urban-style royal palace, has not yet been clarified. As I mentioned above, however, the buildings with court-yard is similar to the *Baha* on the plan figure. On the other hand, most of the private houses of the *Newari* house have court-yards, so the court-yard style houses are not necessarily limited to the royal buildings. The difference between the private houses of the *Newari* and the royal buildings is that on the plan we can not find the completion and symmetrical arrangement of the court-yard in the private houses and that even the examples of the court-yards lying side by side can be found sometimes.

The following is the consideration of the principles of the plan constitution of the court-yard style royal buildings.

The Definitions of the Four-Building-Independent Style and The Four-Building-Chasing style

The four-building-independent style means the four main buildings connected by the 'L'-shaped buildings, forming square. The four-building-chasing style means the four straight buildings that stand surrounding the court-yard clockwise, forming square, as is shown in the figure (Fig. 2-1-7).

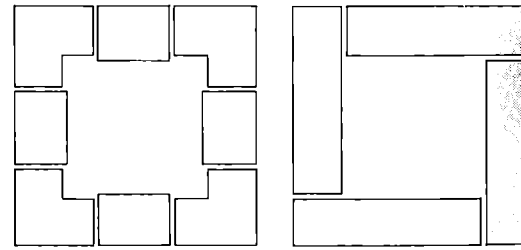


Fig. 2-1-7 Two Concepts of Planning Method.

Possibilities in the Existence of the Four-building-Independent style on the Plan

The possibility in the existence of the four-building-independent style can be found in the *Sundari Chok* of the *Patan Darbar* through the following observation.

① The walls of the main buildings push out into the court-yard about 10 cm from the walls of the 'L'-shaped buildings (Fig. 2-1-8).

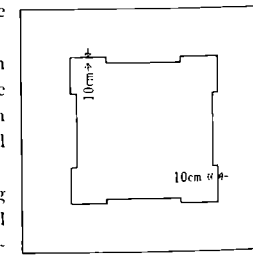


Fig. 2-1-8 Jutting of Walls.

② The struts supporting the corridor on the second floor are fixed with 135 degree to the wall in order that they finish at both ends of main building (Plate 63).

③ The lattice work on both sides of the corridor on the second floor can be seen only in the main buildings, but

not in the 'L'-shaped connecting buildings (Plate 9).

Next, let us pay attention to the reliefs in which buildings are carved. Such reliefs can be found in two places, that is, around the windows on the first floor of the *Sundari Chok* (2 W-45, 2 W-49) (Plate 52).

The windows are in general fitted with lattice doors and only these two windows are decorated with carvings of houses. This is a two-storied building supported by four big pillars, with a pyramidal roof.

This architectural style is the same as that of the Public Rest House and belongs to '*Sattal* of a two-storeyed *Pati* type' in W. Korn's classification[1].

The composition of buildings carved in the relief and the main buildings of the *Sundari Chok* have the same elements such as a wellhole constituted with four pillars and a lattice screen. The ground floor of the building carved in the relief is constituted of a wellhole and four pillars and this constitution is the same as that of the *Dalan* of the ground floor of the *Sundari Chok*. Moreover, both the second floor of the *Sundari Chok* and the first floor of the building in the relief have the same element as is constituted of the lattice screens upper and lower.

Considering the approximation to the external appearance and the decoration motif of the windows of those buildings, we come to a conclusion that this constitution is not only the characteristic of the *Sattal* (public rest house) but also a manifestation of the basic building style of ancient Nepal. In other words, the *Sundari Chok* may have been designed on the same style as the present one, but the existence of the consciousness of four main buildings and of 'L'-shaped buildings connecting them in the plan from the beginning can be easily imagined.

The building which has the possibility of the existence of four-building-independent style, in addition to the *Sundari Chok* of the *Patan Darbar*, is the south wing of the *Chhusya Baha* which has a sacred room. This south wing also has struts of 135 degrees, which cannot be seen in the north, east and west wings. Both sides of the main building of the south range of buildings there are ridges extending downward. These ridges seem to have had the purpose of decoration.

The walls in every wings jut out some 10 cm. These are all of the characteristics of the four-building-independent style. This south wing as well as the *Sundari Chok* seems to have been built after the ancient *Nepali* style, with the same architectural ideas. We can not find any element of the four-building-independent style in the *Mul Chok* of the *Patan Darbar*.

Possibilities in the Existence of the Four-Building-Chasing style on the plan

The plan of the four-building-chasing style can not be found in the *Patan Darbar* but can be found in the *Chhusya Baha*, which has close resemblances to the *Mul Chok* of the *Patan Darbar*. Looking at the *Chhusya Baha* from the court-yard, we find the building symmetrical. On the ground floor, the room which has *Dalan* or sanctuary lies in the centre of the three rooms. If we take a look at these rooms from the court-yard, the room on the right is a little longer from side to side and extends onto the corner. On the first floor, the arrangement of the rooms is different from that of the rooms on the ground floor, though the position of the partition wall between rooms is the same as that of the ground floor. There are four suites of three rooms on the first floor and in the room in the centre of each suite of three rooms can be found a flight of stairs. In other words, each 'L' shaped suite of rooms, whose center room has a flight of stairs, is surrounding the court-yard just like chasing one another (Fig. 2-1-9).

If we try to find the same constitution on the plan of the *Mul Chok* of the *Patan Darbar*, the same figure found there is as follows:

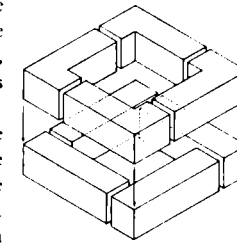


Fig. 2-1-9 Concept of Planning Mehtod in Chhusya Baha, Kathmandu.

① On the ground floor, the north end room (M1-3) in the west wing extends onto the north-west corner and the east end room (M1-16) in the south wing extends onto the south-east corner (Fig. 2-1-10).

② The arrangement of the rooms on the first floor is different from the arrangement on the first floor of the *Chhusya Baha*, and is very much like the four-building-chasing style found in the ground floor. In other words in detail, the east end room in the north wing (M2-7) extends onto the north-east corner and the south end room in the east wing (M2-11) extends onto the south-east corner and the south end room in the west wing (M2-15) also extends onto the south-west corner (Fig. 2-1-11).

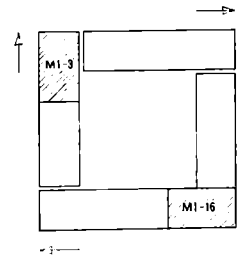


Fig. 2-1-10 General Plan, Ground Floor of the Mul Chok.

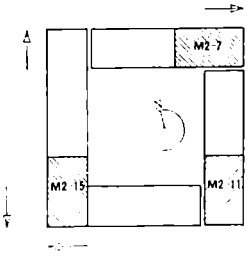


Fig. 2-1-11 General Plan, First Floor of the Mul Chok.

③ If we make it a rule that the four buildings are chasing clockwise, we cannot explain the arrangements of the south-east corner on the ground floor and of the south-west corner on the first floor, which are against the rule.

Thus, between the *Chhusya Baha* and the *Mul Chok* of the *Patan Darbar*, there are both similarity and difference,

though they are in tue four-building-chasing style. Dr. N. Gutschow also points out that as four-building-chasing style can be found in the religious buildings in India, there is much in common between the two[2]. However, the *Mul Chok* is characterized as a place for political and religious meetings, so there is something against the rule. But there seems to be a reasonable possibility of the adoption of the technique in the four-building-chasing style on the plan constitution. The elements of this four-building-chasing style cannot be found in the *Sundari Chok* of the *Patan Darbar*.

b) Planning Measurements of Sundari Chok Taken Inductively from Actual Plan Measurements

A system of measurements for planning and execution of the royal buildings with court-yard has not yet been clarified. In Nepal, a unit of length, '*gaj*' has been used until recently but it is not clarified whether this unit of length was used for the construction of royal buildings.

In this section I try to make an approach to the solution of the unit system of length. As an example, taking the *Sundari Chok* of the *Patan Darbar*, I inquire into the ratio of length of the opening space to width of the inside wall facing the courtyard and considers the way of measurement on the plan. The opening space includes the parts made of wood such as window frame; that is, the opening space means the opening parts of brick-wall (Fig. 2-1-12).

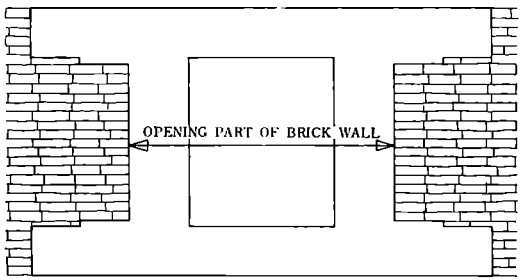


Fig. 2-1-12 Definition of Opening Part of Brick Wall.

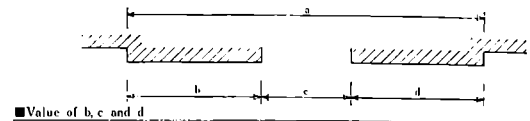
As I already mentioned above, the back sides of the north, south, east and west wings are facing the court-yard and surroud it and every wall can be divided into two parts; the part jutting some 10 cm and the parts of the rest.

First, I consider the result of the measurements of the jutting parts of the wall and apply the rule to the measurements of every wall.

① On the ground floor, there is an entrance in the centre of the jutting part facing the court-yard from the south. The measurement of every part of the jutting wall is as follows:

Total length of the wall a=6,530 mm
The left side wall of the opeing space b=2,430
The opening space c=1,650 mm
The right side wall of the opening space d=2,450

In order to draw out the proportional rule among a, b, c and d, we put $c/2=825=x$. Then, we get: $a\fallingdotseq 8x$, $b\fallingdotseq 3x$, $c=2x$, $d\fallingdotseq 3x$. Therefore we get: b:c:d=3:2:3. Hence, there exists possibility that the value, $x=825$ becomes one of the standard values (Fig. 2-1-13).



■Value of b, c and d

measurment (mm)	2,430	1,650	2,450
put x=825 (mm) then get	2.95x	2.0x	2.97x
value of propotion	3	2	3

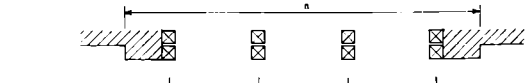
■Value of a

measurment (mm)	6,530
put x=825 (mm) then get	7.92x
value of propotion	8

Fig. 2-1-13 Jutting Part of Ground Floor of South Wing, Sundari Chok.

② On the ground floor, the jutting parts of the north, east and west wings are also facing the court-yard and consist of the *Dalan* of the three-span and the wing walls on both sides of the *Dalan*.

If we put 'a' as the total length of the wall, and 'e', 'f' 'g' as the length of each span (from the centre of the pillar to the centre of another one) from the left, we get the following value as the value of proportion among a, e, f and g; $a\fallingdotseq 8x$, $e\fallingdotseq 2x$, $f\fallingdotseq 2x$, $g\fallingdotseq 2x$, from the above mentioned value, $x=825$. Therefore, x as the standard value of inside and outside measurements of the brick walls of the south wing can be applied to the measurement from the centre of the pillar to another centre of pillar (Fig. 2-1-14).



■Value of e, f and g

North Wing	measurment (mm)	1,670	1,690	1,637
	put x=825 (mm) then get	2.02x	2.05x	1.98x
East Wing	measurment (mm)	1,660	1,663	1,675
	put x=825 (mm) then get	2.01x	2.02x	2.03x
West Wing	measurment (mm)	1,687	1,675	1,655
	put x=825 (mm) then get	2.04x	2.03x	2.01x
Mean value		1,672	1,676	1,656
	put x=825 (mm) then get	2.03x	2.03x	2.01x
value of propotion		2	2	2

■Value of a

North Wing	measurment (mm)	6,540
	put x=825 (mm) then get	7.93x
East Wing	measurment (mm)	6,530
	put x=825 (mm) then get	7.92x
West Wing	measurment (mm)	6,540
	put x=825 (mm) then get	7.93x
Mean value		6,537
	put x=825 (mm) then get	7.92x
value of propotion		8

Fig. 2-1-14 Jutting Part of Ground Floor of the North Wing, East Wing and West Wing, Sundari Chok.

③ In the middle of the jutting parts on the first floor, there is a large window and small windows on both sides of it. Here, in disregard of the existence of small windows, we put 'a' as the total length of the wall, 'h' as the length of the wall on the left side of the central window, 'i' as the length of the central window, 'j' as the length of the wall on the right side of the central window.

If we put $x=825$ in a, h, i, j, and inquire into the proportional value, we get; $a \fallingdotseq 8x$, $h \fallingdotseq 3x$, $i \fallingdotseq 2x$, $j \fallingdotseq 3x$.

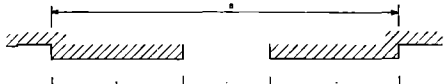
In the end, this value is the same as the value obtained from the consideration of the measurements of the walls on the ground floor of the south wing.

Moreover, we could make it clear that the position of the pillars on both sides of the centre span (that is, the length from the centre of the pillar to another centre of the pillar) coincides with the position of the central window on first floor (the inside measurement) (Fig. 2-1-15).

④ If we put 'k' as the length of the brick wing wall on the left side of the *Dalan* on the ground floor and 'l' as the length of the brick wing wall on the right side of the *Dalan*, then we get, as the mean value of 'k' and 'l', $k=657$, $l=650$.

This value is 4/5 of the value mentioned above, $x=825$.

If we set $y=x/5=165$ as one of the standard values, then we get $k' \fallingdotseq 4\beta$, $l' \fallingdotseq 4y$. Therefore, the value, $\beta=165$ has the possibility of the standard value for the brick measurement (Fig. 2-1-16).



■Value of h, i and j

		h	i	j
North	measurment(mm)	2,550	1,600	2,475
Wing	put x=825(mm) then get	3.09x	1.94x	3.00x
East	measurment(mm)	2,350	1,700	2,550
Wing	put x=825(mm) then get	2.85x	2.06x	3.09x
South	measurment(mm)	2,425	1,630	2,475
Wing	put x=825(mm) then get	2.94x	1.98x	3.00x
West	measurment(mm)	2,450	1,700	2,450
Wing	put x=825(mm) then get	2.97x	2.06x	2.97x
Mean value		2,444	1,658	2,488
	put x=825(mm) then get	2.96x	2.01x	3.02x
value of propotion		3	2	3

■Value of a

		a
North	measurment(mm)	6,625
Wing	put x=825(mm) then get	8.03x
East	measurment(mm)	6,600
Wing	put x=825(mm) then get	8.00x
South	measurment(mm)	6,530
Wing	put x=825(mm) then get	7.92x
West	measurment(mm)	6,600
Wing	put x=825(mm) then get	8.00x
Mean value		6,589
	put x=825(mm) then get	7.99x
value of propotion		8

Fig. 2-1-15 Jutting Part of First Floor, Sundari Chok.

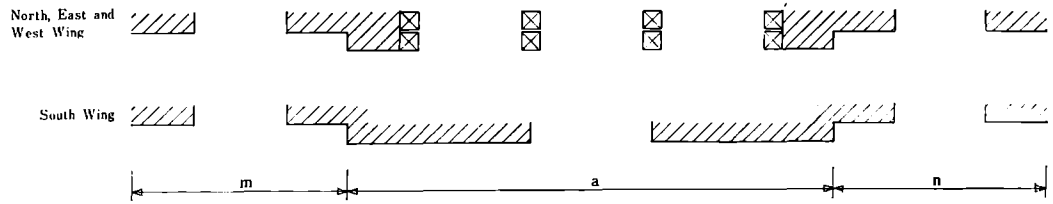
■Value of k and l

		k	l
North	measurment(mm)	655	665
Wing	put y=165(mm) then get	3.97y	4.03y
East	measurment(mm)	660	620
Wing	put y=165(mm) then get	4.00y	3.77y
West	measurment(mm)	655	665
Wing	put y=165(mm) then get	3.97y	4.03y
Mean value		657	650
	put y=165(mm) then get	3.98y	3.94y
value of propotion		4	4

Fig. 2-1-16 Wall in Jutting Part, Ground Floor of the Sundari Chok.

⑤ In order to find the proportional difference of the measurement between the jutting wall in the central part of the wing facing the court-yard and the walls on both sides of it as the rest of the total walls, we put 'm' as the length of the left side wall, 'n' as that of the right side wall.

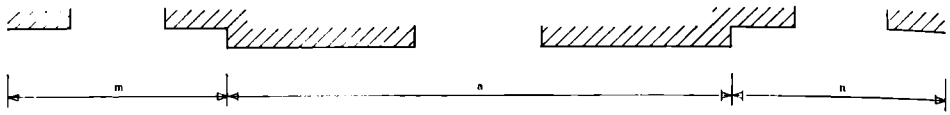
If we put the value of brick measurement, $y=165$ in 'm' and 'n', then we get the value, $a \fallingdotseq 40y$ both on the ground floor and on the first floor. However, the mean value of 'm' and 'n' numbering 16 both on the ground floor and on the first floor is m, $n \fallingdotseq 18.34y$. Therefore, the



■Value of m, a and n

		m	a	n
North	measurment(mm)	3,025	6,540	3,025
Wing	put y=165(mm) then get	18.33y	39.67y	18.33y
East	measurment(mm)	3,010	6,530	3,025
Wing	put y=165(mm) then get	18.24y	39.58y	18.33y
South	measurment(mm)	3,055	6,530	3,025
Wing	put y=165(mm) then get	18.52y	39.58y	18.33y
West	measurment(mm)	3,035	6,540	3,040
Wing	put y=165(mm) then get	18.39y	39.63y	18.42y
Mean value		3,031	6,535	3,029
	put y=165(mm) then get	18.37y	39.61y	18.36y
value of propotion			40	

Fig. 2-1-17 Each Wall of the Courtyard, Ground Floor of Sundari Chok.



■Value of m, a and n

North Wing	measurment (mm)	3,000	6,625	2,975
	put y=165(mm) then get	18.18y	40.15y	18.03y
East Wing	measurment (mm)	3,050	6,600	3,025
	put y=165(mm) then get	18.48y	40.00y	18.33y
South Wing	measurment (mm)	3,025	6,530	3,025
	put y=165(mm) then get	18.33y	39.58y	18.33y
West Wing	measurment (mm)	3,025	6,600	3,050
	put y=165(mm) then get	18.33y	40.00y	18.48y
Mean value		3,025	6,589	3,019
put y=165(mm) then get		18.33y	39.93y	18.30y
value of propotion			40	

Fig. 2-1-18 Each Wall of the Courtyard, First Floor of Sundari Chok.

value, $y=165$ applies to the measurement of the jutting wall to the court-yard, but not to the other walls on both sides of the jutting part.

Here, I can point out two cases in which $y=165$ does not apply to the measurements of the walls on both sides of the jutting wall; one is the case where the value of y is different between in the central part and in the rest parts; the other is the case where the value of y applies to the other measurements such as the measurement of the depth of the wall but not to the measurement value of 'm,' 'n' in the measurement of the length of the walls on both sides (Fig. 2-1-17·18).

As a result of this inquiry, we came to a conclusion: the measurements of the jutting part of the wall of the *Sundari Chok*, whose wall is facing the court-yard, are on the inside at the opening space and from the centre of the pillar to the centre of another one at the span between the pillars and the value is $x=825$. The standard value of the brick wall measurement is $y=165$ by which the length of the walls jutting to the court-yard is calculated.

But neither standard value x nor y applies to the measurements of the walls on both sides of the jutting part. This shows that these two parts are measured by use of the different standard values.

This result of inquiry seems to be one of the elements that prove the *Sundari Chok* belongs to the four-building-independent style on the plan.

The standard value, x and y do not apply to the measurements of the *Mul Chok*.

Accordingly, the *Mul Chok* is planed and executed by the different standard value or the different measurement from the planning and measurement of the *Sundari Chok*. The planning measurements of the *Mul Chok* will be explained later. (Jun Hatano)

Notes:

1) W. Korn: op. cit., (Preface, Chapter 5, Note 20).
2) By the instruction when he visited Japan in March, 1981.

Section 2. Structural System of the Royal Buildings

The basic architecture employed in the construction of *Darbar* (palaces) in Nepal is a system of a number of inner courtyards (*Chok*) enclosed by court-yard buildings, of from two to four stories high, and towers. For example, as has already been stated, the *Patan Darbar* consists of the *Sundari Chok*, the *Mul Chok*, and the *Mani Keshav Narayan Chok* running from south to north. The courtyard buildings surrounding the *Chok* are three stories high in the case of the *Sundari Chok*, two stories high in the case of the *Mul Chok*, and three stories high on all sides except the west side which is four stories high in the case of the *Mani Keshav Narayan Chok*. Between the *Mul Chok* and the *Mani Keshav Narayan Chok* there are two towers. The larger of these is the *Degu Talle*, and the smaller, which is octagonal in shape, is the *Taleju Mandir*. There is also a three-storied pagoda set on the roof of the south wing of the *Mul Chok*, which is a temple to the god *Agan*.

This Section will first deal with the structural system of the courtyard buildings, and then with the structural system of the towers.

1) Courtyard Buildings

The structure of the buildings surrounding the inner courtyards is basically brick-bonded with timber pillars being used for the recesses which are found at intervals.

Both the framework of the floor and the infrastructure of the roofs are of timber construction.

The structural system of the *Sundari Chok* and the *Mul Chok* in the *Patan Darbar* will be dealt with in detail as being representative of this type of architecture. For an explanation of the terminology used, reference should be made to *The Traditional Architecture of the Kathmandu Valley* by W. Korn.

a) Sundari Chok

The buildings of the *Sundari Chok* are all three stories high. The walls on the ground floor are brick and are 60 cm thick. In the centre of the north, east and west wings are *Dalan* (halls) in the form of large recesses supported by a row of double pillars (grouped columns) which forms three semiflat arches. The pillars measure from 22×22 cm to 26×26 cm and each is topped by a wooden bracket, which in turn supports the lintel. In section the lintel measures appoximately 22 (height)×20 cm (width). The ceiling of the ground floor is also the infrastructure of the flooring of the first floor, and in section the joists measure approximately 10 (heigh)×10 cm (width) and are set at intervals of 10 cm.

Each joist used on the ground floor measures approximately 2.5 m, and this measurement remains virtually unchanged from the ground to the second floor. The ends of the joists protrude beyond the brickwork, and the outside are faced with a cornice. The height of the ceiling measuring from the floor to the underside of the joists is approximately 2.4 m.

The external appearance of the timber framework surrounding entrances and windows is shown in the following diagram (Fig. 2-2-1).

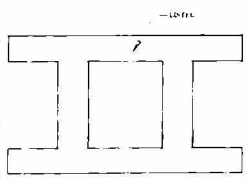


Fig. 2-2-1 Window Frame.

Apart from the lintel, a crossbeam, rather like an underlintel, is set under the jambs, and both the lintel proper and the under-lintel extend for some considerable length beyond the jambs. Viewed from outside the lintels of the windows on all floors appear to have been constructed from a single piece of timber, but in fact approximately six pieces of timber have been used and matched to the depth of the wall. The result is that the size of the window (opening) is smaller on the outside (Fig. 2-2-2).

The flooring of the first floor is an earth floor, constructed on top of the joists which, as mentioned earlier, form the ceiling of the ground floor. The construction of the walls and ceiling of the first floor is the same as for the ground floor with the exception of the *Dalan*, which does not exist on the first floor. On the other hand, one of the special features of this floor is that in the southwest corner the brick wall has been cut away to form an 'L'-shaped corner window. The height of the ceiling on the first floor is approximately 2.4 m.

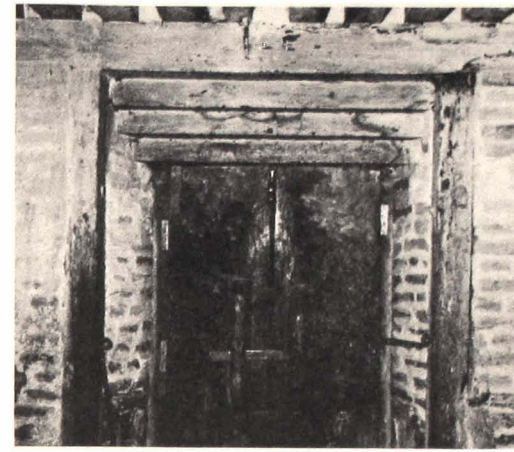


Fig. 2-2-2 Opening in the West Wall of the Room 'S1-3', Sundari Chok.

The structural system of the second floor is the same as the first floor, except that the floor has been extended to form a balcony that juts out approximately 65 cm from the brick wall all around the buildings on the courtyard side. Moreover, there are three bay windows overlooking *Darbar Square* from the western side of the building. In the case of the central window, the floor projects 35 cm beyond the face of the building and 20 cm in the case of the windows on the north and south sides of it. The bay window in the centre of the west side is supported by carved timber struts rather than joists. While the structural system of the building at this point is brick wall, where one would expect to find brick around the bay window, there is a row of double pillars instead. The pillars support wooden brackets and wooden lintels in the same manner as those to be found on the ground floor.

The structural system of the roof is comprised first of joists extending from wall to wall. Three short pieces are laid at right angles to the axis of these joists in such a way that they rest on each group of three joists and form the base for the perpendicular king post. The underside of the lowest (group-of-three joists) is at a height of approximately 1.9～2.0 m above the floor, and the distance between each group of three joists is 2～3 m.

The ridge beam rests along the top of the king posts, and it is the ridge beam to which the rafters are attached. No purlins are used in the structural system of the roof. The rafters are flat rectangular timbers with a height of approximately 7～10 cm, and are attached to the ridge board at intervals of approximately 40 cm apart. At the corners the distribution of the rafters is ragial in formation. Tile battens affixed to the rafters carry the roofing tile themselves. The pitch of the roof is approximately 5/10.

The eaves project approximately 1.7 m beyond the exterior of the brickwork, and an outside beam has been

affixed along the edge of the eaves at a point approximately 1.2 m apart from the exterior of the brickwork to take the lord. This outside beam is supported by carved struts. However, on the east wing on the courtyard side, the joists extend beyond the exterior of the brickwork to support the eaves in cooperation with the carved struts.

b) Mul Chok

The buildings surrounding the *Mul Chok* are all two stories buildings. The walls on the ground floor are brick and are 60 cm thick. As in the case of the *Sundari Chok*, there are *Dalan* in the centre of the north, east and west wings on the courtyard side. The *Dalan* in the *Mul Chok* are larger than in the *Sundari Chok*. They are supported in the same way by a row of double pillars (grouped columns) which form 5 semi-flat arches. The pillars in the east and west wings measure approximately from 20×20 cm to 23×23 cm, while the pillars in the north wing are slightly larger, measuring from 27×27 cm to 29×29 cm, and also differ in respect of their carved design. There is a strong possibility that the pillars of the north wing date from a later period. The pillars are topped by carved wooden brackets, which in turn support the lintel.

The infrastructure of the ceiling of the *Dalan* on the ground floor also appears as the infrastructure of the flooring of the first floor. The joists used here are the same size and are placed the same intervals apart as those to be found in the structural system of the *Sundari Chok*. The span is approximately 2.4 m in the north wing, 2.8 m in the east wing, 2.5 m in the south wing, and 2.6 m in the west wing. The ends of the joists rest on the cornice. At their extremities they are decorated with carvings in the shape of animals, and in this respect differ from the structural system of the *Sundari Chok*, where the extremities of the joists themselves are faced with the cornice. The height of the ceiling measuring from the floor to the underside of the joists is approximately 2.5 m. The structural system of the windows in the *Mul Chok* is the same as in the buildings of the *Sundari Chok*.

The flooring of the first floor is an earth floor constructed on top of the joists. The brickwork and the windows are the same as those on the ground floor.

The structural system of the roof comprises of joists formed into groups of threes supporting a piece. The king posts stand on the pieces and support the ridge beam, which runs along the top of them. The method of structuring used in the construction of the roof is basically the same as that to be found in the *Sundari Chok*. However, it differs in two points. Firstly, in the case of the buildings in the *Mul Chok*, brickwork is also to be found above the joists and extends as far as the rafters. The second point of difference is that the tiles appear to be attached to wooden boards which appear to be comparatively new. Moreover, some of the timber used in the central part of the north wing appears to be newly refurbished. This also seems to be the case with the *Agan Mandir*, but this will be discussed in more detail later.

2) Comparison between the Structural System of the Courtyard Buildings of Chok and other Newari Architecture

a) Sundari Chok and Newari House

The courtyard buildings of the *Sundari Chok* are said to have been the residential, or living quarters of the palace[1]. It would therefore be interesting to make a comparison between these buildings and the Newari house, since, viewed from outside there are a number of similarities between them including the design of the brickwork and the shape of the roof.

Making allowances for regional differences, there appears to be a common format to the traditional housing, i.e., the Newari housing of the Kathmandu Valley between the cities of Kathmandu, Patan and Bhadgaon. According to W. Korn, there are a number of features that may be suggested as being typical of the standard Newari house. For instance, he states that generally the Newari house is a three-storied structure, but four-storied structures are found in the centre of the towns. The average house has a depth of 6 m and is divided vertically by a central wall (pivot wall) that runs parallel to the front of the house into two rooms on the ground and first floors. On the top floor, the pivot wall is replaced by pillars.

According to a report[2] of repairs carried out on Newari houses in Bhadgaon, the walls are of brick and have an average thickness of 45～55 cm. The height of the walls on the first floor is approximately 1.9 m. As with the *Darbar*, the walls are rarely engaged with each other. The structure are not very stable. The reason for this may be assumed to be that there is a considerable difference in the quality and the size of the bricks used, since higher-quality fired bricks are used for the facing, but are baked with either poor-quality fired bricks or sun-dried bricks, also of poorer quality. This probably accounts for the reason why the external walls are given to cracking and ultimately sloughing off of the bricks.

Pillars used in the construction of the Newari house are found at entrances or openings on to either the street (front of the building) or the courtyard, and in place of the central dividing wall on the top floor of the building. The span between the pillars is approximately 1.0～1.4 m, and in many cases the pillars are set in two rows one immediately behind the other in close juxtaposition.

The infrastructure of the flooring consists of wooden joists set in alternately in crisscross fashion. Each joist spans only half the house, i.e., either from the outer wall to the pivot wall, or to the central beam, a distance of approximately 2.3 m. If the configuration of the joists is seen below from the central division of the house, joists coming from each outer wall appear to be alternating with each other. This configuration may be assumed to

be the reason why the walls break down so easily. Any number of actual examples of walls which have warped may be seen in the streets of Bhadgaon (Plate 131).

There is a slight structural difference in the infrastructure of the roofing of the *Darbar* and the Newari house, since in the latter case purlins are used in addition to rafters, probably because the span used in the Newari house is larger than that used in the palace architecture. Also, in addition to struts similar to those found in the *Darbar*, the Newari house has horizontal timbers which jut out from the walls to support the eaves.

Therefore, the two major differences between the structural system of the *Darbar* and the Newari house may be said to be the absence of a central dividing wall in the courtyard buildings of the *Darbar*[3], and the use of horizontal timbers as well as struts to support the eaves. However, in most other respects, the structural system of the *Darbar* and the Newari house may be said to closely resemble each other.

It is not clear whether the fact that there is a difference in the two methods for supporting the eaves indicates a historical development in architectural technique, or simply the existence of two such methods side by side.

In addition, there is a close resemblence between the buildings overlooking the courtyard of the *Sundari Chok* and the three-storied *Baha*, for example, the *Nauddha Kacha Baha*[4]in Patan, particularly in respect of the wooden balcony extending around the second floor and the fact that the joists extend to the entire width of the building. However, it should be noted that the structural system of the balconies in both cases is completely different. According to a series of drawing of the system made by W. Korn, in contrast to the brick walls on the third floor of the *Sundari Chok* of the *Patan Darbar*, the framework of the *Nauddha Kacha Baha* consists of two rows of square pillars one immediately behind the other in close juxtaposition, and beams. It would be interesting if it were possible to consider these timber pillars as being used as an alternative to the brick wall, but viewed chronologically, the *Sundari Chok* is the older of the two structures, being built in 1627, whereas the *Nauddha Kacha Baha* was not built until 1640. In addition to the fact that the function of both structures was different, it will be necessary to give consideration to a number of other examples, and this will probably be a subject for future study.

b) Mul Chok and Buddhist Monastery

The *Mul Chok* was used for ceremonial occasions and not for general living purposes. In form it most closely resembles the *Baha* (Newari Buddhist Monastery) which also was not used for general living purposes. Three-storied structures are also found among *Baha*, and today many of them are used for ordinary housing purposes rather than as religious buildings. The example of a *Baha* used for the purposes of this report will be a two-storied building resembling the *Mul Chok*.

A good example of the *Baha* is the *Chhusya Baha* in Kathmandu. The structural system of both the *Chhusya Baha* and the *Mul Chok* of the *Patan Darbar* are almost exactly the same. The *Chhusya Baha* differs from the *Mul Chok* only in respect of the following points:

① There is a greater expanse of wall and fewer windows in the outer wall of the ground floor.

② The span of the joists is approximately 2.2 m, which is slightly shorter than that of the *Mul Chok*.

③ There are only three spans in each of the *Dalan* (halls) opening on to the courtyard, two fewer than in the case of the *Mul Chok*. This is probably due to the fact that the inner courtyard of the *Chhusya Baha* is smaller than the courtyard of the *Mul Chok*.

④ On the basis of a sectional drawing produced by W. Korn, the walls of the first floor do not extend higher than the tie beams of the roof.

⑤ There is a large opening above the entrance on the courtyard side supported by pillars and beams.

It can therefore be said as a general statement with respect to the structural system of buildings constructed about an inner courtyard, that, with the exception of the differences ennumerated above, the structural system of the *Sundari Chok*, the Newari house and the three-storied *Baha* is the same, and that of the *Mul Chok* and the two-storied *Baha* is the same.

Notes:

1) W. Korn: op. cit., p. 52. (Preface, Section 5, Note 20).
2) G. Auer, & N. Gutschow: op. cit., p. 67. (Preface, Section 5, Note 15).
3) W. Korn states in his book, 'Some details of this differentiation are that, in spite of an impressive front facade, all rooms look mainly onto the inner courtyard. Also the rooms are built to surround the courtyard and there are no central structural walls or partitions' (p. 52).
4) W. Korn introduced the *Nauddha Kacha Baha* with its drawings in his book. The description of the *Nauddha Kacha Baha* in this writing is based on his explanation and drawing in his book.

3) Structural Systems of the Towers

a) Agan Mandir in Patan Darbar

The *Agan Mandir* stands on the south wing of the *Mul Chok* in the *Patan Darbar* (Plate 14). It is a three-storied structure built in the pagoda style. The roofs are tiered, and both the walls and the roofs decrease in area proportionately from the first to the second floors. All three stories are brickbuilt, and are edged with a cornice reaching to the face of the walls. There are openings on the ground and first floors in the centre of both the south and north sides of the tower. Timbers running around the top part of the walls support the rafters. The rafters, which are arranged in a radial distribution, are supported

by an outside beam affixed to the edge of the under side of the eaves. The outside beam is held in place by the carved struts which support the eaves. The roofs are tiled.

The *Agan Mandir* is located where the north wing of the *Sundari Chok* and the south wing of the *Mul Chok* meet. To see how the tower is supported, reference should be made to this section (See section of this part). The wall of the first story of the north side of the tower is supported on two girders each measuring 13 (height)× 25 (width) cm, which in turn are supported by a double row of square pillars set immediately one behind the other in close juxtaposition (Plate 78). There are a total of 8 pillars in all and they stand in the centre of the room on the first floor of the south wing of the *Mul Chok*. A single pillar in the north-east corner is ornamented with carvings, and since it appears to date from an earlier period than the rest of the pillars in the room, is assumed to be a recycled pillar that was originally used elsewhere (Plate 79). The double row of pillars on the first floor are supported by an identical double row of pillars located immediately below them on the ground floor of the building.

The southern side of the tower rests on the wall on the north side of the north wing of the *Sundari Chok*. However, since all the buildings of the *Sundari Chok* are three-storied, the wall on the north side of the north wing is intruded into slightly by the emplacement of the tower, and the wall of the first story of the tower rests on, and in fact, is continuation of, the wall of the second story of the *Sundari Chok*.

The east and west walls of the tower are supported on timber beams which stretch between the girders supported by the pillars in the room on the first floor of the south wing of the *Mul Chok* and by the south wall of the south wing of the *Mul Chok*.

The bricks of the outside wall are also the bricks that can be seen from the inside of the tower. From inside the tower it can also be seen that what appeared to be large windows from outside are topped by a six-layer timber lintel, and what appeared to be small windows are structured in such a way that each layer is set one with lintel over and back from the lintel below it. There is no flooring infrastructure in either the first or second stories, but two horizontal girders traverse the well of the tower.

The wall of the second story of the tower rests on a framework of crossbeams in the shape of a well crib, thus: # are formed into groups of three and supported by the wall of the first story. The structural system of these supports may be described as follows. Groups of three crossbeams with a north-south axis are first laid across the top of the wall of the first story so that they are positioned variously on the inner sides of each of the east and west walls of the tower. Subsequently a group of three crossbeams with an east-west axis are laid across these at right-angles to them, and are positioned variously on the inner side of the north and south walls. This structure is repeated in the case of the third story of the tower, which rests on the second wall of the tower as the second wall rests on the first. The result of such a structural system is that the size of the upper stories is reduced each time because of the gradual reduction in size of the well crib.

The other small tower in the *Patan Darbar* is the eight-sided *Taleju Mandir* which stands on the roof of a four-storied building to be found at the north-east corner of the *Mul Chok* (Plate 69). Simply from the appearance of the ground and first floors of the *Mul Chok*, the walls of this octagonal structure do not appear to go all the way down to the ground, but seem to be a tower resting on its upper floors. In addition, in old photographs of the *Patan Darbar*[1], there appears to be a tower standing between the *Taleju Mandir* to the north of the *Mul Chok* and the *Degu Talle*. All that is left there today is a three-storied building, and it would appear that the tower used to stand on the roof of this building.

b) Degu Talle in Patan Darbar

The *Degu Talle* is the largest of the towers to be found in the *Patan Darbar*. On its ground floor it has an area of 13×13 m and has an overall height of 27 m. Together with the *Basantapur Bhawan* of the *Kathmandu Darbar*, which will be discussed later, the *Degu Talle* is one of the largest types of tower to be found in Nepal. Both are characterized by the fact that the structural system of the walls is reinforced with timber. While it has some obvious differences in size, especially with regard to the walls, windows and eaves, when viewed from outside, its structural system may be said to be the same as that of the *Agan Mandir*.

According to W. Korn, this tower had as many as five stories before it was destroyed by fire[2]. It can be classified as a three-storied pagoda-style tower built on top of a four-storied building. In fact, when viewed from outside, the outside walls of the three-storied pagoda has an emplacement which is approximately 30 cm inside the walls reaching to the fourth-floor of the building, so that there is a gradation between the two structures.

However, the structural system of the four-storied building which supports a tower of this size is worthy of interest.

The load of the upper stories is supported first of all by the outer walls, which are constructed from brick with a total thickness of 1.0～1.2 m.

As will be explained in detail later, the thickness of the outer walls gradually decreases by as much as 7.9 cm per story. In other words, as can be seen from the plans of the building, the measurement (survey measurements) of the space between the inner side of the outside wall and the outer side of the inside wall gradually increase with each floor by an average of 7.9 cm (Fig. 2-2-3). Calculations based on interior measurements of the walls indicate

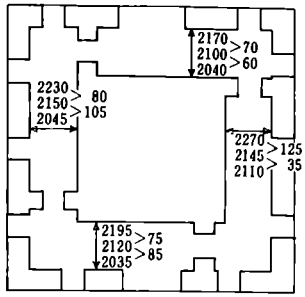


Fig. 2-2-3 Degu Talle, Brief Plan with Width of the Rooms (mm). Note: measurements are those of first floor, second floor and third floors in an order from the bottom.

that the change in the interior measurements is occasioned by the reduction in the thickness of the outer walls.

On each floor there are openings in the outer walls, and on the first floor in addition to the windows, there is *Dalan* (hall) on the east face of the building. (When viewed from the courtyard on the eastern side of the *Degu Talle*, this *Dalan* appears to be on the ground floor.) The supports for this *Dalan* comprise of a triple row of square pillars set one immediately behind the other in close juxtaposition, topped by brackets and lintels for forming three spans. Each pillar is 22×22 cm.

Other large openings are found in the east and west sides of the second and third floors. These are also supported by pillars, brackets and lintels to form triple spans. Apart from the double row of pillars to be found on the east side on the third floor, as in all other cases, the openings are supported by triple row of pillars.

There is a triple bay-window on the east and west sides of the second floor supported on joists protruding from the building on the west side. There is also an opening on to the balcony which runs around the entire third floor of the building. In all cases the pillars supporting these openings are 13×13 cm. The third floor balcony, which extends 50 cm beyond the brick wall, is supported by struts.

In addition, there is another wall which assists in supporting the load of the upper stories of the building. This wall encircles the inside of the building at a distance of approximately 2 m from the outside wall, and forms the core of the structural system of the building. This brick wall is, in fact, reinforced with timber (Plate 85). As can be seen from the plan of the building, pillars are located in each corner of this inside wall and at two further points both equi-distant from the centre of each wall. The size of the pillars is approximately 13 cm. The heads of the pillars are attached to wooden beams which lie along the top of the walls. The width of the wooden girders is approximately the same as that of the pillars, and where the girders and pillars cross, it is possible to see the cut end of the timber. While the internal structure of the walls is not known, they are strengthened by timber pillars and beams running in two directions.

There are also timber beams extending between the outer walls and the core of the inner walls. The space between each beam is equivalent to the width of the beams themselves. In addition, the structural system of the building is completed by four brick walls extending from each corner of the core to the outer walls of the building (Fig. 2-2-3).

The structural system of the pagoda can only be judged on the basis of its external appearance. Since it seems to have been constructed with brick walls which support girders which are crossed at right angles by what appears to be the cut-off end of timber beams, it may be assumed that the structural system of the pagoda is similar to that of the lower floors.

c) Basantapur Bhawan in Kathmandu Darbar

The *Basantapur Bhawan* in the *Kathmandu Darbar* is a further example of a structural system where the walls are reinforced with a central core of timber. It is a tall pagoda of nine stories measuring approximately 31 m in height but with only four roofs which give it an external appearance of being only a seven-storied structure, and a mezzanine floor between the fifth and sixth stories.

The plan of the structural system of the tower shows that the main features comprising the structural system of the tower are a thick outer wall of four layers of brick and a wall running through the centre of the building on an east-west axis (the longer axis of the building). The quadrille wall extends from the ground to the sixth floor. The central or pivot wall extends from the ground to the eighth floor and is constructed from brick up to the fifth floor and seventh floor, and on the sixth and eighth floors is replaced eintirely by timber pillars. Openings in the walls are found only in one spot in the centre of the pivot wall. In contrast to the numerous openings in the outer wall, the single opening in the pivot wall fulfills an effective role in the structural system of the whole building.

Although the *Basantapur Bhawan* now forms one building together with the *Lohon Chok*, it may be considered to be an independent structure unconnected with the four-storied *Lohon Chok* since its structural system extends from the ground floor to the upper floors. This theory is supported by the fact that viewed from the *Nasal Chok* which is located to the north of the *Basantapur Bhawan*, the windows towards the eastern side of the first floor on the north side of the *Basantapur Bhawan* appear to be half hidden by the wall of the *Chok*, and, moreover, viewed from the *Darbar Square*, the tower appears to rise from among the buildings of the *Lohon Chok*. Both these factors would indicate that the walls of the *Lohon Chok* were built after the walls of the *Basantapur Bhawan*.

To return to the structural system of the *Basantapur Bhawan* itself. While the eighth floor of the tower is constructed mainly from timber pillars and a little brick is used, the outside walls of both the eighth and ninth

stories of the tower have an emplacement inside the interior face of the outer wall which extends from the ground to the sixth floors. The interior face of the outside wall of the first seven stories extends beyond the exterior face of the outside wall of the eighth and ninth floors by approximately 95 cm along a north-south axis, and by approximately 32.5 cm along an east-west axis. This indicates that the walls of the seventh and eighth floors are supported by cross-beams in the well crib formation, i.e., # seen in the *Degu Talle*, and are resting on the top of the walls of the sixth floor. However, as will be mentioned later, there is no band of timber in the walls of the seventh and eighth floors. The struts supporting the eaves seem relatively new in the case of both the top two floors, and it would seem that they had undergone considerable repairs.

However, the structural system of the *Basantapur Bhawan* is not confined to brick walls. Timber pillars and beams also fulfill a major function. This is because, with the exception of the small windows on the sixth floor of the tower, openings have been created by removing the ends of the timber beams or girders, and therefore where there are openings in the form of entrances they have been formed by cutting away the wall from floor to ceiling (i.e. to the height of beams or girders), with the result that the wall is not of a solid and continuous construction.

For example, where there is a door in the centre of the pivot wall, an opening has been made in the wall along an east-west axis, and continuity is preserved by the use of timber pillars and beams. Another case in point would be the external appearance of the outside walls. For instance, viewed from outside, the wall on the ground floor of the south side of the *Basantapur Bhawan* appears to be solid. However, the bricks above the windows are simply built up in the form of steps on top of the lintels and therefore are supported by the lintels, with the result that this section of the wall is not very effective in terms of the overall structural system.

Having given a general outline of the structural system of the *Basantapur Bhawan*, the brick walls and timber pillars and beams will be described in greater detail.

The thickness of the brick walls is shown in the following table (Table 2-2-1).

On the first floor the thickness of the outside walls is 195 cm and of the pivot wall (inside central wall) is 190 cm. The thickness of the pivot wall gradually decreases by 13～17 cm with each upper floor to the fourth floor. The thickness of the outside walls also decreases gradually with each upper floor with the exception of the fourth and fifth floors where the thickness of the walls remains approximately the same. The decrease in thickness of the outside walls per floor is not standardized, but averages 18.6 cm per floor. Generally speaking, the size (area) of the rooms on each floor increases by the same amount by which the thickness of the outside walls decreases, with the exception of the outside walls on the fourth floor where the inner face of the walls is aligned to the inner surface of the outsde walls of the third floor.

Table 2-2-1: Thickness of the Brick Wall of Basantapur Bhawan (cm).

	Outside Wall	Pivot Wall
The Ground Floor	195	190
The First Floor	152	173
The Second Floor	140	147
The Third Floor	126	134
The Fourth Floor	98	118
The Fifth Floor	97	123
The Sixth Floor	72	—
The Seventh Floor	60	72
The Eighth Floor	46	—

In addition, the brick walls from the ground to the fifth floors are reinforced by a band of timber created by timber pillars, half buried in the walls and visible from the interior of the rooms comprising responds with timber beams running between them (Plate 102).

The timber pillars on the ground floor each have a width of 18～21 cm and are sandwiched between the brick walls which each have a length of 135～148 cm. The pillars on the first floor measure approximately 19 cm in width and are sandwiched between the walls which each measure 100～112 cm in length. The pivot wall is 174 cm in length and the width of the pillars used in this wall is approximately 15 cm each. Details of the measurements for the walls and the pillars used in the ground to fifth floors are given in Table 2-2-2. As these measurements indicate, the circumference of the pillars on different floors varies, i.e. those on the third floor have a width of 17～21 cm; those on the fourth floor of 16 cm, and those on the fifth floor of 13～15 cm. The indication is that the intervals between the pillars are no more than at least 180 cm.

Table 2-2-2: Pillars of the Wall and Length of the Wall in Basantapur Bhawan (cm).

		Width of Pillars	Length of Wall between Pillars
The Ground Floor	Outside Wall	18～21	135～148
	Pivot Wall		
The First Floor	Outside Wall	19	100～112
	Pivot Wall	16	174
The Second Floor	Outside Wall	18	172～174
	Pivot Wall	20	176
The Third Floor	Outside Wall	17～21	102～106
	Pivot Wall	17～18	167～170
The Fourth Floor	Outside Wall	16	177～180
	Pivot Wall	16	174～185
The Fifth Floor	Outside Wall	13～15	75～110
	Pivot Wall	13～15	170～180

This wooden band in the infrastructure of the brick walls is found on every floor from the ground to the fifth floor, and in all cases has been positioned so that it approximately trisects the height of the walls. In other words,

there is a gap of 90~100 cm. The width is 8.5~9 cm. Timber band is found as a cornice on the outer side of the outside walls, and the cornices are visible from the outside as far as the second floor. The cut ends of timber, which measure approximately 9×12 cm, are visible where the bands and the pillars cross. They appear to prevent the outside wall from warping outwards. It can therefore be seen that timber plays a significant part in reinforcing the structural system of the walls of the *Basantapur Bhawan*.

Timber pillars and beams also play an important role in the structural system of the *Basantapur Bhawan* as a whole, independent in their part of strengthening the brick walls. It has already been stated that there are a number of openings of various kinds in the brick walls of this structure, with the result that the perpendicular construction of the brick walls is not continuous on every floor. This is because they are interrupted by the joists and beams which run from north to south and the crossbeams running along the top of the brick walls which support them. It would therefore be possible to describe this construction as one where the brick walls have been fitted in between the timber pillars and beams in what might be called a timber-reinforced brick structure.

There are no free-standing pillars on the ground and first floors of the *Basantapur Bhawan*: all the pillars on these two floors are in the form of responds. Free-standing pillars are found on the other floors, but the number of spans between them differs depending on the floor and the location of the pillars. For instance, pillars with three spans are found on the south side of the second floor, the south and north sides of the third, fifth and sixth floors, and on all four sides of the seventh floor. Pillars with five spans between them are found in a row across the middle of the sixth and eighth floors. These pillars are either 16×16~17.5 cm or 20×20 cm. The pillars are topped with brackets which support the beams. The beams are rectangular in shape, and are used horizontally and laid side by side. Since they measure approximately 12.5~20 cm in width, the configuration differs with each floor. The joists with a north-south axis are separated by an interval equivalent to their own width. The reason for this is that each joist extends for only the length of a single span of pillars, so that joists extending from beams on the northern side to the central beams which support them alternate with the joists extending from the beams on the southern side to the central beams.

Table 2-2-3: Depth of Beams and Joists of Basantapur Bhawan (cm).

	Beam	Joist
The Ground Floor	16.5	
The First Floor	16	
The Second Floor	12.5	17.5
The Third Floor	17.5	16.5
The Fourth Floor	15	16.5
The Fifth Floor	14.5	16
The Sixth Floor	15	12.5
The Seventh Floor	12	13
The Eighth Floor	20	10.5

As with the beams, the depth of the joists varies with each floor (Table 2-2-3). However, on the sixth floor alone, since this infrastructure is supporting the walls of the seventh floor, the beams, which run along a north-south axis, measure 30 (height)×13 (width) cm and support 4~5 joists each. The radial distribution of the rafters and the manner in which a balcony extends beyond the walls of the tower are the same as for the structural system of the towers of the *Patan Darbar*.

The towers described here represent three different structural systems of tower architecture. Of the three, it can be said that the *Basantapur Bhawan* is the one which represents the most heavily timber-reinforced type of structure.

Notes:

1) P. Landon: op. cit., Vol. I, p. 213. (Preface, Section 5, Note 3).
2) W. Korn: op. cit., p. 55. (Preface, Section 5, Note 20).

4) Structural Systems in Newari Architecture

Taking into consideration the lack of stability of the walls, and the fact that large open-span construction is precluded so that all rooms are built on a small-span construction using pillars for support, the structural systems of Newari architecture cannot be said to have reached an advanced stage of development. This contrasts significantly with high grade of craftsmanship apparent in the rich carvings to be found on the outside of the buildings.

While it may be apparent that the stability of the brick walls is reinforced by the timber used for window frames, the following may be suggested as the more obvious elements where timber has been used in this architecture.

① The maximum use is made of timber in the construction of the *Darbar* in the Kathmandu Valley.

② The 'resthouses' found on most street corners, although at first glance appearing to be structured with brick beams, are a good example of how this architecture employs timber beams inside building[1]. The resthouses are an example of a structural system which uses timber pillars and timber beams.

③ There are many examples of timber pillars used to support the corners of temples, towers (pagodas) and resthouses.

④ The use of timber pillars and beams of a slightly smaller scale than the walls themselves within the brick walls of the *Bramhayani* (constructed in 1717) at Panauti (Plate 42).

It is not clear where this style of structural system has its origins. Nor is it known whether the basic construction is of brick or timber. However, according to

G. Auer and N. Gutschow[2], the reason for the confusion may be caused by the fact that the structural system of this culture was adapted from a system using both brick and timber. Further detailed study will be required into the question of whether it would be best to give consideration to historical vicissitudes of the Newari culture as has been done in the case of India, where timber construction is thought to have preceded stone construction. (Katsuhiko Watanabe)

Notes:

1) M. S. Slusser & G. V. Vajracarya: op. cit., (Preface, Section 5, Note 16).
2) G. Auer & N. Gutschow: op. cit., pp. 67～68. (Preface, Section 5, Note 15).

Section 3. Description of Individual Designs

1) Pillars

From remarks already made in this report, it will be clear that the term 'pillars' as used here refers exclusively to timber pillars.

The structural system of the buildings surrounding the three *Chok* (courtyards) which make up the *Patan Darbar* is mainly brick, with the result that the number of timber pillars to be found in the architecture of the *Darbar* is not numerous. However, depending on their location within the structural system, they can be divided into two main types: (a) thick pillars used on the ground floor of the *Chok* (Fig. 2-3-1); and (b) slender pillars used on the second floor of the *Sundari Chok* (Fig. 2-3-2).

Fig. 2-3-1 Thick Pillar of East Wing, Sundari Chok.

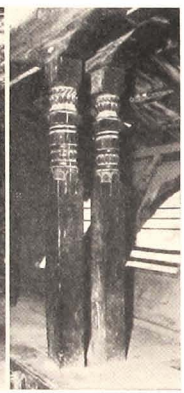


Fig. 2-3-2 Slender Pillar of West Wing, Sundari Chok.

a) Thick Pillars

Where they appear on the ground floor of the *Chok*, the thick pillars have been used in the construction of the large halls (*Dalan*) in the form of recesses which overlook the inner courtyards of each of the *Chok*. Since there are no recesses in the east wing of the *Mani Keshav Narayan Chok*, nor in the south wing of either the *Mul Chok* or the *Sundari Chok*, it means that pillars are found in only three wings of these *Chok* (Plate 9·71·88). They have been erected in the form of grouped columns of two pillars each.

The number of spans formed by the pillars total five each for the alcoves in the *Mani Keshav Narayan Chok* and the *Mul Chok*, and three each for the alcoves in the *Sundari Chok*. In addition to the piers forming the bays of the alcoves there are also responds, and together these make a total of twelve pillars in the case of each of the five-span recesses, and eight pillars in the case of each of the three-span recesses. Apart from these there are grouped columns of three pillars each forming a series of three bays at the ground floor entrance to the east side of the *Degu Talle* which, inclusive of the responds, makes a total of twelve pillars (Fig. 2-3-3).

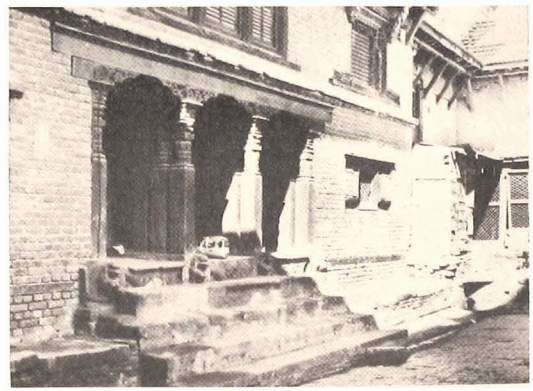


Fig. 2-3-3 East Side of Degu Talle.

All of the pillars on the ground floor are thick square pillars, heavily decorated with carving on their top halves. Brackets, to which moulding is attached, rest on them and in turn support cross-beams. Some slight differences in the execution of details ars apparent, particularly in the case of the pillars on the eastern side of the north wing of the *Mul Chok* which differ slightly in design of both pillars and brackets from the rest of the pillars in the same *Chok* (Fig. 2-3-1). However, generally speaking it is probably safe to assume that they all date from around the same period. However, if some attempt at classification should be made, it may be said that the pillars of the *Degu Talle* most closely resemble those found in the *Mul Chok*, while the greatest

points of similarity may be found in the pillars of the *Sundari Chok* and the *Mani Keshav Narayan Chok*.

In all cases the pillars measure from 22 to 28 cm. Details of the many types of ornamentation carved on them in a number of gradations are all to be found in a suggestive nomenclature in Newari, although there are some slight differences in the arrangement of them depending on where they appear[1]. The most striking of these is the *Amasa* (jewel or beading), which is a design to be found in the second gradation from both the top and the bottom of the carved section of the pillars. The outstanding feature of the *Amasa* is the relief carving to be found on the upper part of the pillars. There is some difference in the execution of this design as it appears on the pillars to the entrance of the west wing (Plate 71) and the recess on the north wing of the *Mul Chok*; with a portion of the pillar being left to form an octagon at the lower half of the carved part in the case of north wing (Fig. 2-3-4). However, in the case of the *Sundari Chok*, the carving is graduated at its upper and lower sections in the style known as *Cho* where it resembles a number of boards stacked one on top of the other to which is affixed a panel with the carving of a deity on it (Plate 57). While the *Cho* is missing from the lower part of the carved section in the case of the pillars in the *Mani Keshav Narayan Chok* (Plate 91), they bear a resemblance to the pillars in the *Sundari Chok* because they, too, have panels with carvings of deities on them. In other words, it is important to note that, depending on their location, there are some slight differences of design even in the case of pillars found in the same *Chok*, but at this stage it will be difficult to distinguish the stages of the evolution in the details of the pillars where it may be assumed development took place over a limited period of time.

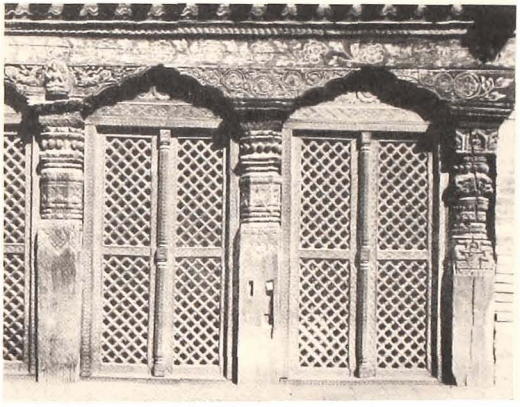


Fig. 2-3-4 Pillars of North Wing, Mul Chok.

A further distinct feature is found in the pillars of the recess in the north wing of the *Sundari Chok*. The pillars here are in the form of grouped columns comprising two square pillars, whith smaller, cylindrical pillars standing outside them (Plate 58). There is no carving *per se* on the surface of the square pillars where they come into contact with the cylindrical ones, but instead the smooth surface has been scored to achieve a distinctive 'scrubbing board' effect. A similar effect is also to be found in some of the window frames, but compared to the *Cho* style of carving, this method gives the impression of being slightly later in chronology.

While the designs of the brackets that rest on top of the pillars to support the crossbeams are varied, generally speaking they can probably be described as having the same shape. For the most part they are curved with two thorns on the lower part of each side (Plate 90). However, a trend towards a more complex style can be seen in the brackets in the *Sundari Chok*, which have carvings in the shape of animals attached to the underside of the curve, and the second thorn carved in relief in the form of leaves and flowers (plate 59).

b) Slender Pillars

The slender pillars to be found on the second floor of the *Sundari Chok* are completely different from the pillars discussed in the previous section. They are plain, unornamented pillars measuring approximately 13.5 cm. However, pillars similar in style and shape to these have been recycled and used again on the first floor of the south wing of the *Mul Chok* (Plate 79) and so on. But as shall be mentiond later, due to the style of them, there is some doubt as to whether they date from the same period as the thick pillars on the ground floor. It is thought possible that some of the old timber was re-used just as it was at the time of re-construction of the *Darbar*.

Note:

1) S. B. Deo: op. cit., p. 22. (Preface, Section 5, Note 9).

2) Struts

The long struts which provide support for the deep eaves common to the buildings in Nepal are decorated with carvings of deities and winged dragons, and as an important form of exterior decoration are one of the main features of Nepalese architecture. The distances between the struts are in no way standardized, and the completely irregular distribution of them gives the impression of an extremely ad hoc method of construction. Based on the apparent relationship of the struts to the surface of the brickwork, they can be divided into the following two types: a) struts forming right angles to the surface of the brickwork (Plate 17); and b) struts forming an angle of 135° to the surface of the brickwork (Plate 16).

Generally the struts supporting the eaves project at a horizontal angle of 90° to the surface of the brickwork with the exception of those placed at the corners which, since the buildings are facing inwards onto a courtyard, are forced to make a horizontal angle of 45° to the

surface of the brickwork. However, the central part of each of the faces of the buildings overlooking the courtyard of the *Sundari Chok* have been built out slightly, with the result that the struts affixed to each side of these protuberances also make an angle of 135° to the surface of the brickwork (Plate 63), and in this respect differ significantly from those found in the other *Chok*. Judging from the manner in which the struts are used, there is a possibility that originally the buildings of the *Chok* were four separate structures facing inwards and overlooking the central courtyard, and that only latter were the corners completed by the construction of 'L'-shaped buildings to form the completed square as it can be seen today. Therefore it can be assumed that even when the *Sundari Chok* was reconstructed, the older style of architecture was reproduced, whereas in the case of the other *Chok*, the builders ignored the slight unevenness of the surface of the brickwork and placed all the struts at an angle of 90° to the surface of the brickwork.

The struts can also be divided into two types depending on the style of carving decorating them: c) carved deities (Plate 17); and d) carvings of dragon-like[1] creatures with wings (Plate 16).

Generally speaking struts placed at 90° to the surface of the brickwork (type a) tend to be decorated with carvings of deities (type c) and the carvings of winged dragons (type d) tend to be used with struts placed at 45° to the surface of the brickwork (type b), however, in some cases there are examples of type a) struts being decorated with type d) carvings. For example, only four of the struts on the north wing of the *Mani Keshav Narayan Chok* were found to be decorated with carvings of dragons (Plate 93). But at present the significance of the carvings is not clearly understood.

Note:

1) D. R. Regmi: op. cit., Part II, p. 873. (Preface, Section 5, Note 7).
'Struts of this style are called *Kumsala* literally meaning the horses of the corner.'

3) Comparison of Architectural Styles

a) Pillars and Brackets

The pillars to be found standing at the entrance to the deep recesses located in the centre of the four faces of the wings overlooking the inner courtyards of each of the *Chok* in the *Patan Darbar* are in the form of large, heavily carved square pillars set in two rows one immediately behind the other in close juxtaposition. While some silght differences are discernible between the pillars now standing in the three *Chok*, there is a general resemblance between them, and they would all seem to date from approximately the same period.

Reconstruction of the *Mul Chok*, the central of the three *Chok*, is said to have taken place in 1666, and of the *Sundari Chok* in 1670, while the *Mani Keshav Narayan Chok* was reconstructed sometime later in 1761[1]. In addition, reconstruction of the *Degu Talle* is thought to have taken place in 1662, and of the *Taleju Mandir* in 1666, so that it may be assumed that reconstruction of the entire *Darbar* was undertaken in the latter half of the 17 th century.

The only structure of the buildings that made up the palace in Bhadgaon is the famous building with 55 windows, and the reconstruction of this was completed in 1702, so while it is slightly more modern in construction than the *Patan Darbar*, the distinctions in the styles used in the two palaces would indicate a few more age difference between them. However, slight differences are apparent in the architecture to be found in the three cities of the Kathmandu Valley, and therefore it would seem a little dangerous to attempt to make a direct comparison between them on the basis of details of style. While there are regional differences in style to be found in any country, it is extremely interesting to find them existing between three cities located in the same narrow valley. However, while such regional differences can be clearly seen to exist, the distinction between them need not be considered to be so great, and therefore the present study will concentrate on the style of the pillars themselves rather than distinguishing between them on the basis of regional differences.

Examples of structures using timber pillars of any great age are extremely rare in the Kathmandu Valley, but the most important of those that still exist is the *Kashta Mandap* (Plate 36, 117, 118, 119), the public resthouse purported to have been constructed entirely from a single great tree, located in Kathmandu.

The *Kashta Mandap* is a three-storied wooden structure with each upper story being slightly smaller in area than the one below it. Although some brickwork is to be found in some parts of its walls, as a whole it can be considered to be a timber structure. The *Kashta Mandap* is thought to have first been constructed in either the 11 th or 12 th century[2], but there is no definite evidence to support this date[3]. While some experts believe that the structure dates from the 11 th century, it has in fact been repaired many times, with the result that pillars from earlier and later periods exist side-by-side including those that may be assumed to be the original pillars.

The majority of the pillars in the *Kashta Mandap* are square, but for about one-sixth of their length from the middle upwards the corners have been cut away to form an octagon with eight flat planes. Brackets have been used to hold the crossbeams in place. The brackets are unique in style being carved in the shape of circle at the tip and the base. Their overall shape is very simple and since more primitive shapes can be found in the pillars in the caves at Ajanta, it may be assumed that this style ac-

tually came to Nepal from India[4]. There are also some differences in the size of this style of pillars, but it is assumed that the slender ones among them date from an earlier period.

A slightly more advanced form of the same style may be found in the pillars of the *Na Bahi* (Plate 123), also in Kathmandu. Here the octagonal portion is divided into two sections, with figures in the shape of Latin crosses appearing in rows in the middle section of the upper half of the pillar. The lateral band of crosses appears in the carving on the later pillars and not on the pillars in the *Kashta Mandap*. It must therefore be presumed that the style of pillars to be found in the *Kashta Mandap* is a very old one.

However, simplicity of the style of the pillars cannot automatically be assumed to indicate a style of greater antiquity. It is quite possible that use of a simpler style of pillar was determined by where they were to be positioned within the structural system. However, it is worth noting that the style of the recycled pillars to be found on the first floor of the *Mul Chok* is the same as those to be found on the second floor of the *Sundari Chok* (Plate 65), and in both cases may be considered to date from an earlier period than the pillars surrounding the inner courtyards of the *Patan Darbar*.

It is possible to distinguish two styles in the recycled pillars to be found on the first floor of the *Mani Keshav Narayan Chok*. One style is to be found in the independent piers and the other is to be found in the responds, and it may be presumed that both styles of pillar were used in the recesses of the inner courtyards on the ground floor before the *Darbar* was reconstructed. These pillars measure approximately 13×13 cm and are therefore much slender than the pillars presently found on the ground floor of the *Darbar* which measure approximately 22×22 cm. They are carved in shallow relief and the style of the carving is simple. The upper part of the carved section consists of smooth planes decorated with the traces of a lateral band in Latin crosses. One of the features of these pillars is the *Amasa* (jewel or beading); carved above the upright, crosses, and the rows of whorls known as *Jan* (matted hair); found in profusion above and below this portion of the carved section. Immediately below the side band, the surface of the pillar is smooth and has been formed into an octagonal shape. Below this is a single row of oblate ellipsoids called *Memikha*, and below this again are octagonal carvings in the shape of tongues. Below these carved section, the pillars are square with smooth surfaces.

However, there are some Buddhist monasteries within the city of Patan where pillars in a style closely resembling those in the *Patan Darbar* may be found. Two such temples are the *Su Bah* (Plate 39). and the *Uku Baha* (Plate 127). The pillars to be found in the *Uku Baha* are in a particularly good state of preservation since their positioning on either side of the entrance to the temple has resulted in their being protected from exposure to the elements. These pillars may be described as half pillars since their original function was as a support for wooden benches (no longer in existence). Since they are not full-sized pillars, the lower sections of carving have been omitted, and instead the brackets remain well preserved. While there are a lot of examples of this design existing in Patan, the majority of them appear to be reproductions of the same style produced at a later date. These pillars are generally larger in size than pillars found in the *Uku Baha*, and while the style of carving has been made to resemble the old pillars, there are almost none to be found that have the sharp curve to the lower tip of the bracket of the veranda posts to be found in the *Uku Baha* (Plate 128).

However, a general strength of line is a feature common to all the brackets attached to the veranda posts in the *Uku Baha*. The pillars in the *Su Baha*, which were attached some time after 1536, have inscribed copper plates on them, but those in the *Uku Baha*, which dates from around 1653, do not. It is reasonable to assume, therefore, that when the *Uku Baha* was completely reconstructed in the middle of the 17 th century, the veranda posts were the only part of the structure found to be sound since they had not be exposed to the elements, and were not replaced but used again for their original purpose in the reconstructed temple.

One of the features of these pillars is that a band of *Amasa* (jewel/beading) and *Jan* (matted hair) are found carved both above the flat lateral band section of the carved portion of the pillar, but such a design where the *Amasa* and *Jan* are combined and the height of the *Amasa* is raised as a result is not uncommon in the Kathmandu Valley.

The most numerous examples of this design are to be found in the *Lokeshvar Mandir* in Banepa (Plate 38). The temple is built on an 'L'-shaped plan, in the centre of which is a small tower forming the small second tier which stands on the first floor. The date of the building is not clear, but it has undergone frequent repairs. However, in one section where the roof has presently collapsed there is a pillar of 16.8×16.8 cm (Plate 124) which is more slender than the other pillars which are 20×20 cm. Both the pillars and the brackets are identical in style of decoration with the other pillars, but the fact that the standard of workmanship on its bracket is far superior is indicated by the beauty of its line and shows that it dates from an earlier period, and suggests that the other pillars and brackets date from a later period and were modelled on it at the time of one of the reconstructions of the temple.

While the style of the older brackets differ slightly from those to be found in the *Uku Baha*, they share the same sharpness and beauty of curved line, and it may be presumed that in both cases they were used in the original construction of the buildings.

While no inscriptions are to be found in the *Lokeshvar*

Mardir, if the fact that Banepa became an independent state at the end of the 15th century, and the dates shown by the inscriptions on the plates in the previously mentioned temples in Patan are taken into consideration, it can be assumed that these pillars and brackets were used around the end of the 15th century. Accordingly, it is probably reasonable to assume that the seemingly original pillars used in the *Patan Darbar*, i. e. those to be found on the first floor of the *Mani Keshav Narayan Chok* and the *Mul Chok*, the second floor of the *Sundari Chok* where first used in the construction of the *Darbar* at the time that Patan became an independent state about the end of the 15th century.

While there are many examples of monasteries in the Kathmandu Valley where pillars of the design mentioned above may be found, from their large size and from the design of the brackets, the majority of them should be seen as adopting the older style of design, but dating from a later period. Even when the design of the brackets may be considered the same, a close inspection will show that the curves of the earlier period have been replaced by straighter lines, and that the original vitality is lacking. Moreover, while they retain the same design, examples of round pillars can also be found. Such examples can be found on the first floor of the *I Baha Bahi* (Plate 41) and on the ground floor of the *U Baha Bahi* in Patan (Plate 125), but in both cases the carved design at the crown of the pillar is repeated again, half-way down. Inscriptions found on plates in the *U Baha Bahi* carry dates of 1391 and 1552, and the *I Baha Bahi*, a date of 1427. In addition, an inscription found on a plate in the *Narayan Tum Baha* shows a date of 1575, and if all these dates are taken into consideration, it may be assumed that pillars with this design were probably being used from the 15th to 16th century.

However, a considerable change and development can be seen in the pillars and brackets to be found in the *Bhinchhe Baha* in Patan (Plate 126). The pillars, which stand at the entrance to the structure, make it possible to estimate their age by the plate indicating the date of the building with a date of 1636. But, although in design they closely resemble the older pillars to be found in the *Patan Darbar* and the veranda posts in the *Uku Baha*, they differ in that they have carving on the lateral band of the carved section. In addition, the shape of the brackets is different, and the two oblate ellipsoids are replaced by two hooks in the shape of thorns at the lower tip of the curve, and have the shape resembling that of a dragon-like carving on its side. However, these pillars are still fairly slender. Therefore, even judging from this single example, it is possible to estimate the development of the pillars from early times to the ones to be found in the *Patan Darbar* at the present time. In other words, from the examples to be found in the *Patan Darbar*, the pillars of the early part of the 17th century tended to be heavily carved and generally more ornamented and the pillars of the latter half of the same century to be thick and sturdier. It is believed that by the 18th century the general standard of carving had improved.

b) Struts

The struts supporting the eaves are decorated with carvings of deities or dragon-like creatures, but it is difficult to judge its evolution in style on the basis of the present struts. An example of a long, but very plain style of strut may be found on the third tier of the *Kashta Mandap*, the building considered to be the oldest timber structure in the Kathmandu Valley. Yet, since the *Kashta Mandap* has undergone frequent repairs, it does not provide good comparative data, but it is likely that struts from an earlier date had their origins in unvaried, practical struts such as those to be found here.

A structural system where struts are used to support the eaves as they are in Nepal is not found in the wooden architecture of either China or Japan. While this structural system where eaves are supported by struts can be seen in the castles in Japan, this was a technique devised in Japan at a later period, and therefore has no connection with the wooden architecture of China. Therefore, since a structural system employing struts to support the eaves has no connection with Chinese architecture, it is difficult to substantiate the theory that Chinese influence contributed to the construction of the three-storied and five-storied pagoda-style structures in Nepal which use this system of struts.

On the other hand, a few examples of architecture which uses such a structural system to support the eaves can be seen outside Nepal. Such examples are to be found in the temples of the Malabar region on the west coast of India, and in the temples of the Karakoramu Range in the Himalayas in north-west India.

With regard to the pagoda-style temples of Malabar, R. Bernier suggests that the struts found in the structural systems of Nepal were developed independently of the architecture of this region because there is no relationship between the anthropomorphic figures used in the two styles[5]. A. H. Longhurst also states that although there is a resemblance between the styles used in Nepal and the Malabar region, there is no direct connection between them, and explains with photographs the resemblance of the latter to the former[6]. On the basis of a photograph showing the underside of the eaves of the *Beyhore Temple* in Malabar, it can be seen that the employment of the struts is similar to that of Nepal, but the style of the rafters and the design of the carving on the struts bears no resemblance to examples found in Nepal. While the question of regional differences may arise, it is probably too early at this stage to recognize a direct connection between the two styles of architecture simply on the basis of the manner in which the struts are used.

A. H. Longhurst recognizes India as being the place of origin of the pagoda-style architecture of Nepal. How-

ever, with the present lack of data available on the early period of wooden structures in India, it is considered unreasonable to make such a judgement. Moreover, it may be assumed that attempts to recognize India as the origin of the pagoda-style architecture to be found in China and Japan, may be said to be based on an incomplete understanding of Chinese architecture.

To summarise, the structural system used to support the eaves in Nepalese architecture not only differs from the system used in the architecture of China, but is characterized by the use of struts for this purpose and the ornamentation of those struts. Such a structural system for the support of the deep eaves common to buildings in Nepal could have been devised by anyone on account of a rational solution in structure, and therefore it would be dangerous to make a connection between the architecture of China and Nepal merely on the basis of a superficial similarity of styles. Moreover, with the present lack of data which would establish the origin of such styles in India, it is reasonable to assume for the moment, or until further information is forthcoming, that such a structural system was an independent develoment of Nepalese architecture.

Notes:

1) C. Pruscha: op. cit., vol. 2, p. 165. (Preface, Section 3, Note 2). NB: W. Korn states in his work, op. cit., p. 35, that the *Sundari Chok* was rebuilt in 1627. (Preface, section 5, Note 20).
2) W. Korn: op. cit., p. 94.
3) C. Pruscha: op. cit..
4) Takada, Osamu: *Ajanta*, Tokyo, 1971, Plate Nos: 135 & 137.
5) R. M. Bernier: *The Nepalese Pagoda*, p. 186. (Preface, Section 5, Note 10).
6) Longhurst, A. H.: *The Story of the Stupa*, Colombo, 1979, p.29.

Section 4. Description of Windows

1) Opening Part of a Building

a) Classification of Windows

The wooden windows, doors and string-courses decorated with minutely subtle engravings as well as the decorations of pillars and struts are the central elements which are to determine the chief characteristics of the designs of traditional architecture in the Kathmandu Valley. Especially, the main interests of architectural decorations seem to have been concentrated on the decorations of the windows, as the *Bhadgaon Darbar* has been symbolically called *Pachapanna Jhyal* (which is literally translated into 'a building having fifty-five windows').

In the following I will endeavor to architecturally explain the structural charactristics of the window-frames and their decorative forms by classifying the windows of the *Patan Darbar* according to the way they are opened and the form of attachment to the walls[1].

① Classification According to Numbers of Openings and the Ways They are Attached to the Walls

There are more than 160 windows decorated with engravings at the *Patan Darbar*. They are classified into the following two types according to the relationship in which they are attached to the wall-planes.

a-type: windows which are attached to the inside planes of the brick walls (Fig. 2-4-1).
b-type: windows which are projected from the planes of the brick walls (the so-called 'bay windows') (Fig. 2-4-2).

On the other hand, the windows are also classified into the following three types accrding to the number of their openings.

A-type: a single, individual window (Fig. 2-4-3).
B-type: a serial of windows of three or five frames (Fig. 2-4-4).
C-type: a balcony-style of window with a lattice, using the whole plan of a certain story (Fig. 2-4-5).

Corelations of these classifications show that all windows belonging to *A*-type are included into those of *a*-type, whereas some belonging to *B*-type are included into those of *a*-type, others into those of *b*-type. But the ratio of *B*-type windows included into *b*-type is slightly high.

The windows belonging to *C*-type are found on the second floor of the *Sundari Chok*, the third floor of the *Degu Talle* and the second floor of the *Mani Keshav Narayan Chok* at the *Patan Darbar*, and they are all *b*-type in the way they are attached to.

The combination made by my classifications is as follows:

A-a-type of windows.
B-b-type of windows.
B-a-type of windows.
C-b-type of windows.

The number of A-a-types is the highest (about 77% of all), that of B-b-types is the next highest (about 9%) and that of B-a-types is about 7% of the whole (Table 2-4-1).

② Classification According to Types of Window-Frames and the Way They are Supported

The windows belonging to a-type fundamentally have common structures of window-frames irrespective of their number of openings. Namely, they are structures of lintel-extensions and window sill-extensions added to their jambs, their appearance in design being the horizontal 'H'-type of frames.

The structures of these window-frames are chiefly classi-

Table 2-4-1

	ground floor		first floor		second floor		third floor	
	No.	Type	No.	Type	No.	Type	No.	Type
			50	a-A-α-R	68	b-B•3-C-V		
			51	a-A-α-F	69	a-A-α-R		
			52	a-A-α-R	70	b-B•3-S-L		
			53	a-A-α-R	71	a-A-α-R		
			54	a-A-α-R	72	b-B•6-C-V		
			55	a-A-α-F	85	a-A-α-R		
			56	a-A-α-F	86	b-B•3-C-V		
			57	a-A-α-R	87	a-A-α-R		
			80	a-A-α-F				
			81	a-A-α-F	3F-N	b-B-S-L		
			82	a-A-α-R	3F-E	b-B-S-L		
			83	a-A-α-R	3F-S	b-B-S-L		
			84	a-A-α-R	3F-W	b-B-S-L		
			2W-45	a-A-α-R				
			-46	a-A-α-R				
			-47	a-A-α-Ar				
Sundari Chok			-48	a-A-α-R				
			-49	a-A-α-R				
			-50	a-A-α-R				
			-51	a-A-α-R				
			-52	a-A-α-R				
			-53	a-A-α-R				
			-54	a-A-α-R				
			-55	a-A-α-R				
			-56	a-A-α-R				
			-57	a-A-α-Ar				
			-58	a-A-α-R				
			-59	a-A-α-R				
			-60	a-A-α-R				
			-61	a-A-β-R				
			-62	a-A-α-R				
			-63	a-A-β-R				
			-64	a-A-α-R				
	11	a-A-α-R	42	a-A-α-R				
	13	a-A-α-R	43	a-A-α-R				
	19	a-A-α-R	44	a-A-α-R				
	21	a-A-α-R	45	a-A-α-R				
	1W-14	a-B-α-R	46	a-A-α-R				
	-16	a-B-α-R	47	a-A-α-R				
			48	a-A-α-R				
			49	a-A-α-R				
			2W-21	a-A-α-R				
			-22	a-A-α-R				
			-23	a-B•5-β-R•Ar				
			-24	a-A-α-R				
			-25	a-B•5-β-R•Ar				
			-26	a-B•3-β-R•Ar				
			-27	a-A-α-R				
Mul Chok			-28	a-A-γ				
			-29	a-B•5-β-R•Ar				
			-30	a-A-γ				
			-31	a-A-α-R				
			-32	a-B•3-β-R•Ar				
			-33	a-B•3-β-R•Ar				
			-34	a-B•3-β-R•Ar				
			-35	a-A-α-R				

			-36	a-A-α-R				
			-37	a-B•3-β-R•Ar				
			-38	a-B•3-β-R•Ar				
			-39	a-A-α-R				
			-40	a-A-γ				
			-41	a-B•5-β-R•Ar				
			-42	a-A-γ				
			-43	a-A-α-R				
			-44	a-B•3-β-R•Ar				
			90	a-A-α-R				
			91	a-A-α-R				
			92	a-A-α-R				
	1W-3	a-A-γ-R	93-1	a-A-α-R	95	b-B•3-CL-V	74	a-B•18-γ-R
	-8	a-A-γ-R	93-2	a-A-α-R	96	a-A-α-R		
	-10	a-A-γ-R	93-3	a-A-α-R	97	a-A-α-R		
			93-4	a-A-α-R	98	b-B•3-CL-V	5 F	
			94	a-A-α-R	99	a-A-α-R	103	a-B•3-γ-Ar
			28	a-A-α-R	100	a-A-α-R	102	a-B•3-γ-Ar
			29	a-A-α-R	101	b-B•3-CL-V	73	a-B•3-γ-Ar
			30	a-A-α-R	58	b-B•3-CL-V	104	a-B•3-γ-Ar
			31	a-A-α-R	59	a-A-α-R	106	a-B•3-γ-Ar
			32	a-A-α-R	60	a-A-α-R	105	a-B•3-γ-Ar
			33	a-A-α-R	61	b-B•3-CL-V	76	a-B•3-γ-Ar
			34	a-A-α-R	62	a-A-α-R	107	
			35	a-A-α-R	63	a-A-α-R		
			36	a-A-α-R	64	b-B•3-CL-V		
			37	a-A-α-R				
Mani Keshav			38	a-A-α-R	3F-N	b-C-S-V		
Narayan Chok			2W-1	a-A-α-R	-E	b-C-S-V		
			-2	a-A-α-R	-S	b-C-S-V		
			-3	a-A-α-Ar	-W	b-C-S-V		
			-4	a-A-α-R				
			-5	a-A-α-R				
			-6	a-A-α-R				
			-7	a-A-α-R				
			-8	a-A-α-R				
			-9	a-A-α-R				
			-10	a-A-α-R				
			-11	a-A-α-R				
			-12	a-A-α-R				
			-13	a-A-α-R				
			-14	a-A-α-R				
			-15	a-A-α-R				
			-16	a-A-α-R				
			-17	a-A-α-R				
			-18	a-A-α-R				
			-19	a-A-α-R				
			-20	a-A-α-R				
	7	a-A-α-R	124	a-A-α-R	125	a-A-α-R	78	b-C-S-L
	9	a-A-α-R	39	a-A-α-R	126	a-A-α-R	77	b-C-S-L
			40	a-A-α-R	65	a-A-α-R	79	b-C-S-L
			41	a-A-α-R	66	b-B•3-CL-V	121	b-C-S-L
			127	a-A-α-R	67	a-A-α-R		
			128	a-A-α-R	129	a-A-α-R		
Degu Talle			116	a-A-α-R	130	a-A-α-R	5 F	
			117	a-A-α-R	118	a-A-α-R	108	a-A-α-Ci
					119	a-B•3-γ-R	110	a-A-α-Ci
					120	a-A-α-R	111	a-A-α-Ci
							113	a-A-α-Ci

						114	a-A-α-Ci
						122	a-B•12-γ-R

Notes: a: Window attached to the inside planes of walls.
b: Bow window.
[Opening Figure]
R: Rectangular
Ar: Arch-like
Ci: Circular
F: Multifoliate

A: Single, individual window
B: A serial of windows: number shows that of opening.
C: Balcony-style of window.
[Way of Supporting]
CL: Cantilevers
S: Struts

α: 
β: 
γ: Others.
V: Vertical pane
L: Lean pane

fied into two types according to the presence or non-presence of their decorative materials (Fig. 2-4-6).

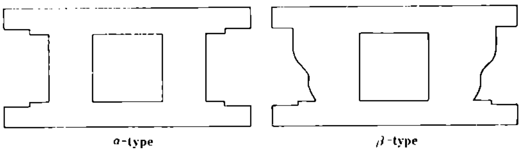


Fig. 2-4-6 Types of Window Frames.

The β-type windows may be considered to be originally α-type ones added with gill-like decorative plates, but at the present state, most of these gill-like decorations are combined into the materials of their horizontal frames.

As far as the *Patan Darbar* is concerned, the windows belonging to a-A-type are almost those of α-type, but a few of them are also β-type.

a-A-α-types	116 cases[2]
a-A-β-rypes	4 cases
a-B-β-types	10 cases

Besides, a slightly special A-a-types of windows are found at the court-sides of the *Mul Chok* and the *Sundari Chok* (Fig. 2-4-7). They are all small windows and those of the *Mul Chok* have the decorative plates inlaid under their window-sills, having a little lintel and sill-extensions, and these windows are found four places on the first floor. The windows of the *Sundari Chok* are so-called 'blind-windows' having no openings. They may rather be called a niche, and have an image of a deity enshrined inside (Fig. 2-4-8). They are constructed adjacently at both sides of each door on the ground floor. Moreover, the windows at the western court-sides and outsides of the third floor of the *Mani Keshav Narayan Chok*, and the windows at the northern sides of the first and the second floors of the *Mul Chok* are attached to the walls, but have not the structures of the horizontal 'H'-type of frames. The 17 windows at the outside and the inside of the third floor of the *Mani Keshave Narayan Chok* are of several types, and their lintels and window-sills are at the position of their jambs. The square-measure of their openings is larger, compared with others. The windows of the fourth floor of the *Mani Keshav Narayan Chok* and those of the first and second floors of the *Mul Chok* have the above-explained post and bracket-capital structures, having fittings built on them.

All the windows belonging to b-type (irrespective of A, B or C) are classified into two types according to their ways of supportings. One is the CL-type of windows (Fig. 2-4-2), which are supported by the cantilever over-hanging from the wall. The other is the S-type of windows whose cantilever is further supported by the strut (Fig. 2-4-9).

On the other hand, the windows belonging to b-type are also classified into two types according to the angles of the way they are attached to the window-panes. One is V-type of windows (Fig. 2-4-2), whose panes are vertical. The other is L-type of windows (Fig. 2-4-9), whose panes are lean.

Combination of these classifications show that there are three types of windows...CL-V, S-L and S-V...found at the *Patan Darbar*, but CL-L type cannot be found there[3].

In the *Patan Darbar* B-b-types have both CL-V and S-L-types, and C-b-types have either S-L or S-V-type[4]. The windows belonging to B-b-type cannot be found along the court-sides of the *Patan Darbar*, but they can be found only along the road-sides there. The windows belong to B-b-CL-V-type are found in six places on the second floor of the *Mani Keshav Narayan Chok*, one place on the second floor of the *Degu Talle* and in three places on the second floor of the *Sundari Chok*[5].

The windows belonging to C-b-S-V-typs are found along the court-sides of the second floor of the *Mani Keshav Narayan Chok*, in the four planes on the third floor of the *Degu Talle* and along the court-sides of the second floor of the *Sundari Chok*. This type of the windows is almost all used on the highest floor and is never used on the ground floor of the building expect in the multi-storied tower-buildings.

③ The Structures of the Window-Frames

Mouldings, reliefs or decorative minute pillars are added along the window-frames and finished so delicately that their materials cannot be easily distinguished. They are, in a sense, forming up unique plastic arts. Specially, the horizontal 'H'-type of the window-frames are attached to the walls so complicatedly in structure. I try to explain in the followings.

α-type

The fundamental structure of this α-type window can be understood almost in the following wise. The lintels, sills and jambs are engraved step-like inwardly from the border of the brick wall into the centre of the window

Fig. 2-4-1 Window '2W-64', Sundari Chok.

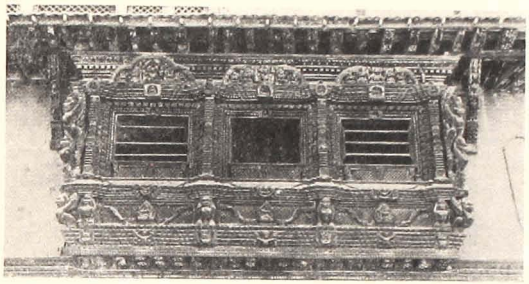
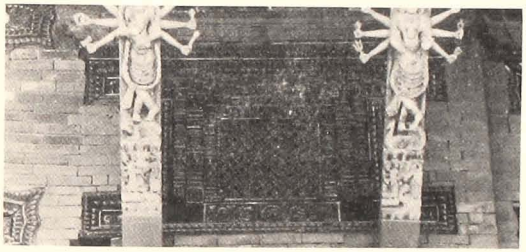


Fig. 2-4-2 Window 'WF-64', Mani Keshav Narayan Chok.



Fig, 2-4-3 Window 'WF-44', Mul Chok.

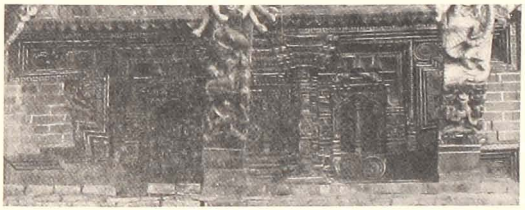


Fig. 2-4-4 Window '2W-26', Mul Chok.

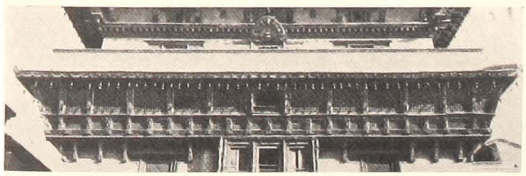


Fig. 2-4-5 Windows in the West Facade, Degu Talle.

Fig. 2-4-6 Types of window Frames
(In the Text. p. 62).

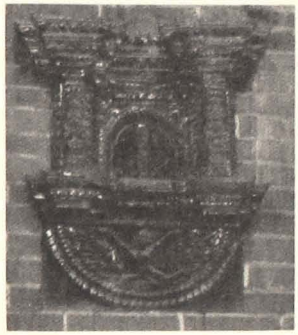


Fig. 2-4-7 Window '2W-30', Mul Chok.

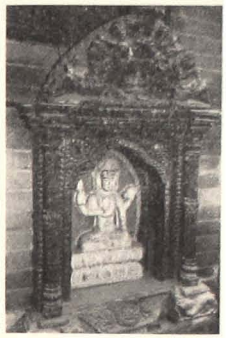


Fig. 2-4-8 Nich beside Entrance '1W-35', Sundari Chok.

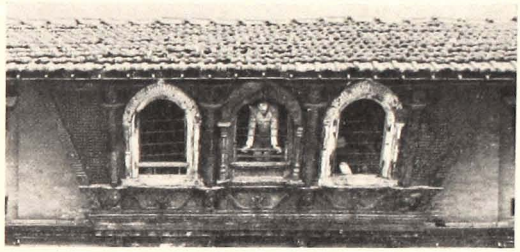


Fig. 2-4-9 Window 'WF-70', Sundari Chok.

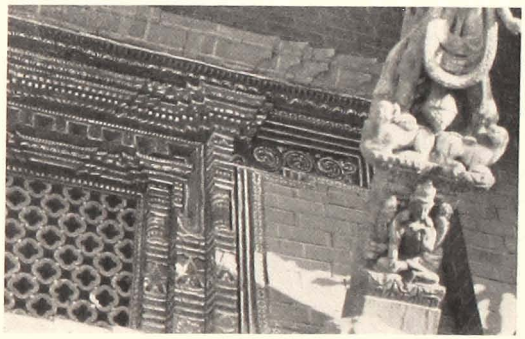


Fig. 2-4-10 Window '2W-39', Mul Chok.

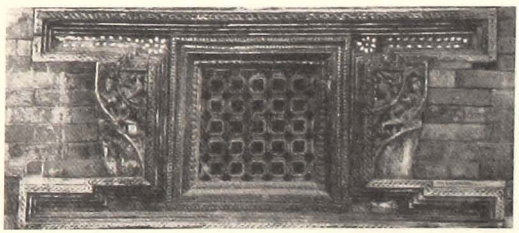


Fig. 2-4-11 Window '1W-16', Mul Chok.

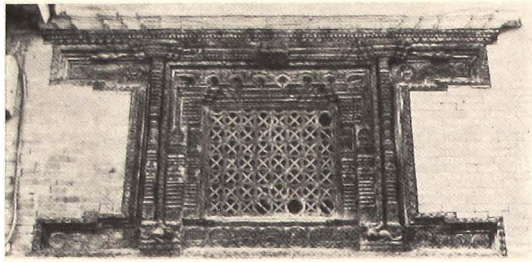


Fig. 2-4-12 Window 'WF-50', Mul Chok.

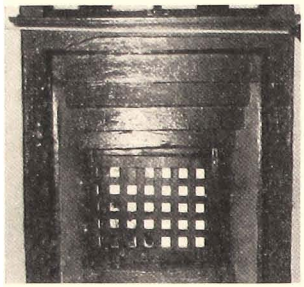


Fig. 2-4-13 Window 'WF-35', Mani Keshav Narayan Chok.

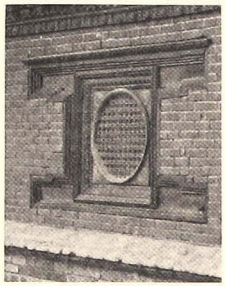


Fig. 2-4-14 Window of the Fourth Floor, Degu Talle.

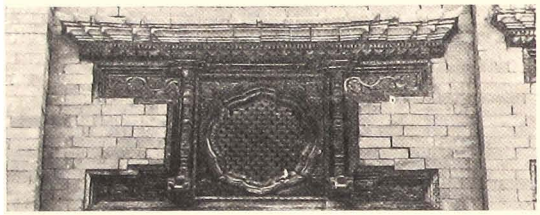


Fig. 2-4-15 Window 'WF-51', Sundari Chok.

Fig. 2-4-16 Window '2W-3', Mani Keshav Narayan Chok.

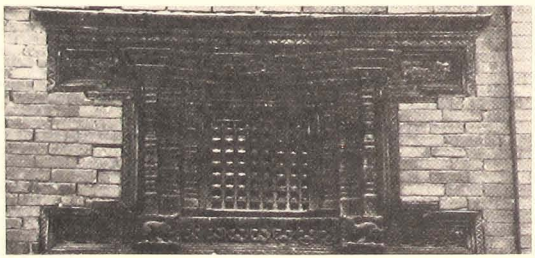


Fig. 2-4-17 Window 'WF-31', Mani Keshav Narayan Chok.

Fig. 2-4-18 Window '2W-56', Sundari Chok.

Fig. 2-4-19 Window '2W-53', Sundari Chok.

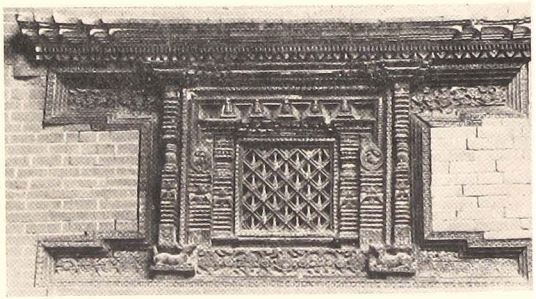


Fig. 2-4-20 Window '2W-55', Sundari Chok.

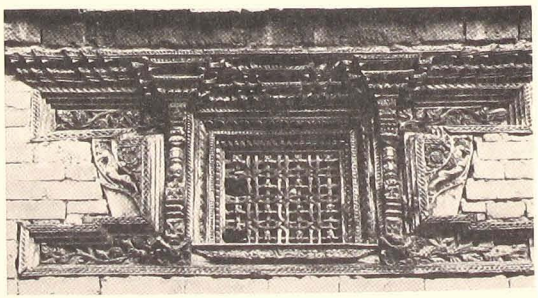


Fig. 2-4-21 Window '2W-61', Sundari Chok.

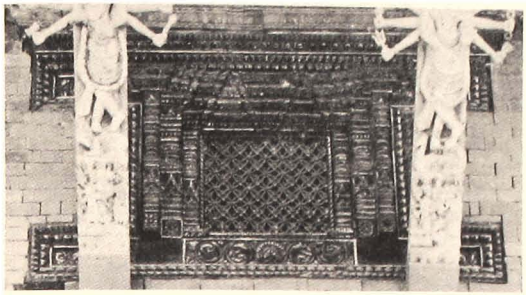


Fig. 2-4-22 Window 'WF-44', Mul Chok.

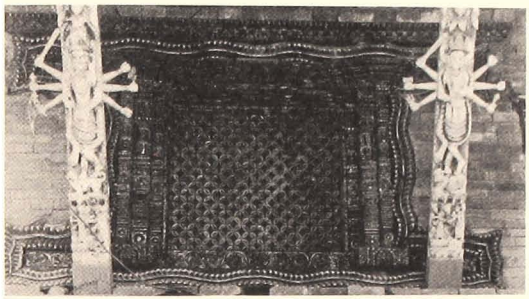


Fig. 2-4-23 Window 'WF-43', Mul Chok.

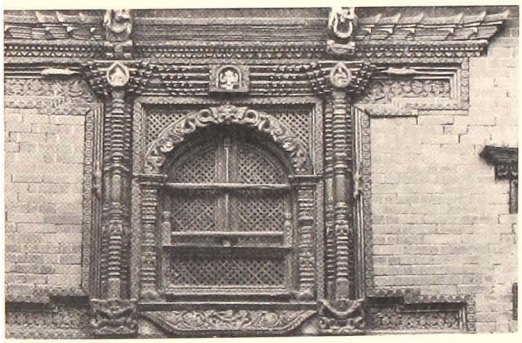


Fig. 2-4-24 Window '2W-47', Sundari Chok.

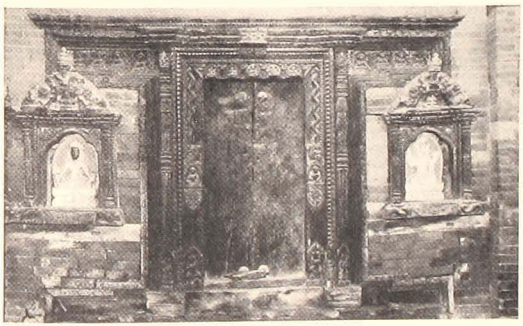


Fig. 2-4-25 Window '1W-35', Sundari Chok.

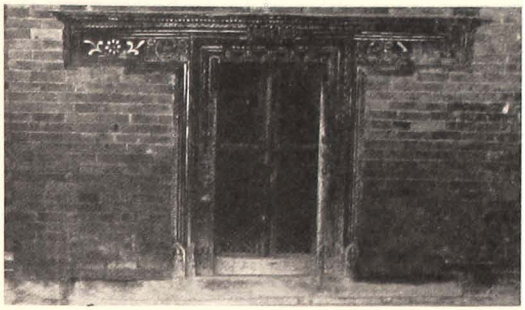


Fig. 2-4-26 Window '1W-18', Mul Chok.

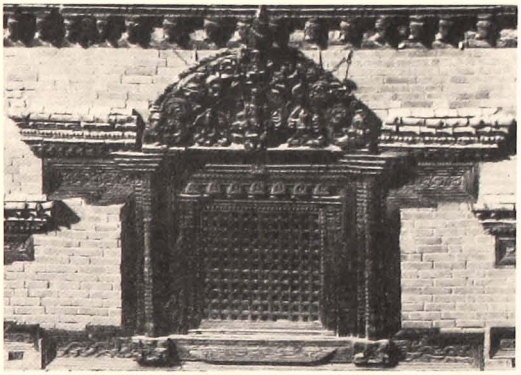


Fig. 2-4-27 Window with a Trana.

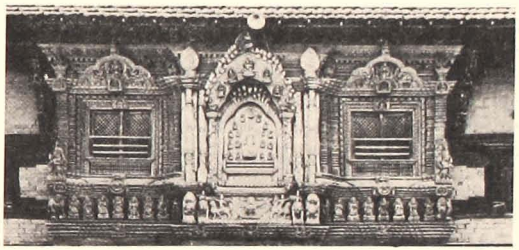


Fig. 2-4-28 Window 'WF-61', Mani Keshav Narayan Chok.

Fig. 2-4-29 Window 'WF-72', Sundari Chok.

(Fig. 2-4-10). Almost all the steps engraved are three or five in number. And the inner window-frames are attached to the hollow-engraved bottom……the part nearest to the centre of the wall-depth. The inner window-frames are set backwith their size narrowed, and they are decorated with the mouldings of beadings or tongue-like crest-designs (Fig. 2-4-11). The lattice-screen is inserted from inside at the deepest position. At the same time both lintel-extension and sill-extention are narrowed toward the centre-line from the wall-plane step-like, and they are forming up a kind of concave (Fig. 2-4-10). When the decorative art progresses, the pillars with many mouldings are added (Fig. 2-4-12). In many cases, these pilasters are placed on the cantilever-beams. As far as the present state is concerned, the cantilever-beams are only posted to the window-sills and it seems that they have no structural meanings at all. In many cases, the headers of these cantilever-beams have their own reliefs on the pilasters (Fig. 2-4-13). The eaves with cornice-like steps are mounted. Usually one pilaster is mounted on each jamb, and the inner window-frames are sometimes constructed into a pillar-like form. The structure of *a*-type window gives the effect of depth like the archivolte of the Gothic architecture.

B-b-type

The bay window is constructed with the wooden frames combined cage-like. Its height is almost the same as that of the storey-height, so it may be called the balcony-type of the window. The slender pilasters with mouldings are added to the outside of the pillar. The cornices, which have fewer steps than those attached to the wall-plane, are encircling at a height of 30～40 cm from the floor. The waist-part of this type of the window is forming a kind of wainscot. The cornices at the floor level are decorated with mouldings, succeeding to those at the wall-plane, but the former are more exact in the degree of decoration than the latter. There are two types of the sash-frames found here; a rectangular-type and an arch-type. Three *L*-types of the second floor of the *Sundari Chok* are of arch-type, and other *V*-types use an arch-type and a rectangular type together.

C-b-type

The *C-b*-types are, as explained before, classified into *V-type* and *L*-type. Both types are slightly different from each other in their structures. The struts of *C-b-L*-types which are as thick as the pillars are constructed on the projecting beams with cornice-like decorations. Between the struts the lattices are inserted. And like the *B-b*-types, the cornices are also inserted along their waist-position, dividing the window-plane into two parts. Under the waist-cornices, small struts are constructed between the large struts. At the centre of the lattice windows, the openings are constructed, and the types of their openings are rectangular at the *Sundari Chok* and arch-type at the *Degu Talle*. The rectangular openings of the *Sundari Chok* are almost the same as those of *a-A*-type windows without their lintels, sills and jambs. The arch-type openings with *torana* on small pillars will be explained later.

The *C-b-V*-type windows are found along the court-side of the *Mani Keshav Narayan Chok*, and they are constructed with the lattice screens which are divided into upper and lower parts inserted into the slender pillars.

④ Opening figures of *a*-type of the Windows

Most of the openings of this type are very small, compared with the size of the whole frame. Their forms are fundamentally rectangular along the window-frames, but they are sometimes circular, multifoliate or arch-like according to the manners of their inserting panels (Fig. 2-4-14・15・16). Their sashes are fundamentally of various types of lattices, on which reliefs are sometimes added.

Most of the sashes, especially round and multifoliate sashes, are fixed.

The windows which are not fixed are openable to inside only. One of the windows are hinged at the upper sides, but the other windows are openable horizontaly to both sides. The openings of the latter are slightly wider than those of the former and the fixed types of window.

⑤ Decorations of the Frames of *a*-type of the Windows

This *a*-type has the fundamental structure of the horizontal 'H'-type of frames set back with several step-like window-frames, sometimes pilasters and eaves being added to them. Various kinds of designs of reliefs are engraved to their materials and their sashes.

Let's see their lintels, sills and jambs, inner window-frames, pilasters and hood-moulds respectively.

Lintels, Sills and Jambs

As explained before, lintels and sill extened are engraved step-like narrowly toward the centre. So are jambs one-sidedly toward the centre. The narrowly engraved bottoms of lintels and sills are sometimes flat, on most of which are placed the reliefs with such motifs as guilloche or rosetta. The motifs of their decorations are centred on animals, plants or images of gods. These decorations are sometimes not taking the forms of reliefs, but those of paintings. Those of paintings seem to have been newly made at the time of recent repairings…they cannot be affirmed to have been descended from the ancient time. Engraved beadings and designs of chains are often found around the outside of these lintels, sills and jambs. Moreover, brick hood-moulds are added to most of them. Woods of saw-toothed patterns of decorations are often inserted between these hood-moulds and lintels.

Inner Window-Frames and Pilasters

On the vertical materials of the window-frames many steps of astragal are engraved from the upper part to the lower part, and some of them further have medalion-like reliefs or jewels engraved. On the horizontal materials, decorations are often omitted in the lower part. On the upper part manyde corations……such as rosetta-like reliefs or snake-engravings are found. And dentil patterns are employed there most frequently. Furthermore, along these window-frames more mouldings are often added step-like.

At the central openings of the windows of serial type many pilasters including pillar-like frames are piled up and at the openings of both right and left hands the number of the pilasters are reduced, producing a kind of feeling of wave-motion.

Hood-Mould

Where there are no pilasters piled, hood-moulds cannot be found.

Hood-moulds are pushed out counter-step-like, giving the forms of the cornices from the eaves. They are of the different size……from the hood-moulds emphasizing the pushing to the moulds added moderately.

⑥ Sash-Decorations of *a*-type of the Windows

The sashes are originally the combined lattices. The way of making the lattices is the same as that of combining the horizontal materials with the vertical ones at the right angle (Fig. 2-4-17) and sometimes at 45° diagonally (Fig. 2-4-18). At the *Sundari Chok* the bones of the lattices are combined in a radial manner or in a concentric circle (Fig. 2-4-19). The various designs are seen in the lattice-bones[6] (Fig. 2-4-20～23).

The windows with reliefs on these combined lattices are found at the *Sundari Chok*. It should be noted that these have the high floor houses as their motifs (Plate 52).

On the windows whose openings are round or multifoliate, the plate with reliefs is inlaid into the square frames (Fig. 2-4-16•25). On the windows whose openings are arch-like, there are two types, namely, the windows inlaid with the relief-plates and those inserted with the lattices. On the meterials of these windows, engravings are made forming a kind of 'arch'. Most of these windows have the double-leafed hinged sashes.

⑦ Decorations of *B-b*-type of the Windows

Decorations of *B-b*-type of the windows are not fundamentally different from those of *a-A*-type of the windows, but the degree of decoration is rather low,...for example, the numbers of the pilasters are fewer.

The sashes of *B-b*-type of the windows are free to open, and the lattices are simply combined diagonally at 45°. These lattices are changed later and they cannot be compared with those of *a-A*-type of the windows. Their wainscots are the lattices combined diagonally at 45°, and the braid-like materials are positively attached on them.

The arch-type window-frames at the road-sides of the first floor of the *Sundari Chok* are said to be made of the animal-bones or the ivories. The central windows at the road-sides of the second floor of the *Mani Keshav Narayan Chok* are covered with the brass-plates and only their sashes are not of the lattices but of the brass-plates with beaten patterns.

⑧ Decorations of *C-b*-type of the Windows

As explained before, there are two types...V-type and L-type……to the C-b-type of the windows. On the windows of *C-b-V* type of the windows at the *Mani Keshav Narayan Chok*, decorations are hardly made. Compared with those of a-type or others, it is very interesting. Only simpler mouldings are made rectangularly, and shallow reliefs of the images of animal-gods are engraved on the struts supporting the cantilevers. Furthermore, the windows of C-b-V-type at the *Mani Keshav Narayan Chok* seem to have been constructed quite recently, judging from their materials. It is rather uncertain whether their forms are descendant from the ancient time.

The main decorations of this C-b-L-type are the engravings on the pillars or struts inlaid, the lattice patterns and the cornice-like patterns at the positions of the floor-levells and on the wainscots. The *C-b-L*-types are also found at the *Degu Talle* and the *Sundari Chok*, but their styles of decorations are slightly different from one another. Engravings on the pillars or struts are divided into two kinds according to the positions of their cornices on the wainscots. At the *Sundari Chok*, on the divided upper and lower parts each image of God is engraved, whereas at the *Degu Talle* on the lower part an image of God is engraved but on the upper part the rosette-like relief called '*Cho*' is mounted. On the struts supporting the cantilevers an image of God is commonly engraved. On the lattice-windows the lattices are combined vertically and horizontally at the *Degu Talle*, and their combinations are the same at the upper and lower parts of the cornices. At the *Sundari Chok* there are some types of the combinations of the lattices, namely, diagonally at 45°, and sometimes horizontally and vertically. The combinations are different at the upper and the lower parts. Certain variations are found among the lattices between each pillar.

The lattices of *a*-types are various in kind, but they are not so rich in variation.

The upper cornices around the wainscots are not so complex as those around the floor-levells. For example, at the *Degu Talle* the cornices around the floor-level form five rows of beadings, whereas those at upper part of the wainscots form one row of beadings. At the *Sundari Chok*, the cornices both at the wainscots and around the floor-levells are three rows of beadings, but the cornices at the wainscots are half as high as those around the floor-level.

b) Around Doors (Entrance and Exits)

Constuctions and decorations around the doors (entrances and exits) are almost the same as those of *a*-type of the windows, except the proportions of their openings being vertically longer than those of windows. But at the *Patan Darbar* there cannot be found more than two openings juxtaposed[7].

The forms of their openings are square on *α*-type and multifoliate on *β*-type.

The door-leaves are of two kinds...of lattice-type and of wooden plate-type (Fig. 2-4-26, 27). Some of the lattice-type door leaves are fixed and others openable. All the openable doors have double leaves hinged inwardly. The fixed door are more delicate in their decorations than the openable ones, though they are simpler than those of the windows.

The door-frames of *β*-type are not found except at the

main doors of the *Sundari Chok* and the *Mul Chok*. Almost all the door-frames are composed of *a*-type of constructions.

But the fact that the openable doors are more apt to be consumed than the fixed ones, shows that their materials are of more recent age than those of the fixed ones. This can be said to be the difference of the period of their construction.

The lattice-doors have their crosspieces inserted at the waist-positions, and there are various patterns of their insertions, producing some effects of decorations.

Some of the wooden plate-type doors are of flat/plain plates and others are of engraved plates (Fig. 2-4-25, Plate 10). Their variations of the latter cover the door with the brass-plates.

Some of the flat plate-doors are very new and others which are eroded by time are made of plain wood-plates cut with adze. The latter doors are obviously of ancient origin. The doors of engraved plates are found only at the main gate of the *Sundari Chok*. Those of brass-affixed doors are found at the main gate of the *Mani Keshav Narayan Chok* and at the southern central gate of the *Mul Chok* along the court-sides (Plate 75). The doors of brass-affixed plates have brass spread on a part of the door-frames. Moreover, these plate-type doors are openable and double-hinged.

c) Torana

On most of the main entrances and exits and on some of windows, a kind of decorative plate called '*Torana*', semi-circular or Lancet-arch-like, is frequently mounted. Torana is not inlaid there, but it is only hung by chains on the lintels (Fig. 2-4-27). On the door frames of the gate with *Torana*, pilaster-like or cornice-like eaves are positively attached. But *Torana* is not necessarily mounted on all the doors with pilaster-like or cornice-like eaves.

There are three windows with *Torana* at the court-sides of the *Mul Chok* and two at the outsides of the *Mani Keshav Narayan Chok*, and all of them are *B*-types of windows.

The windows of the *Mani Keshav Narayan Chok* are exactly three-fold *B-b*-types, and on each opening of these three windows *Torana* is mounted. Each *Torana* is somewhat different from others. *Torana* on the central opening is horseshoe-like and others multifoliate-arch-like (Fig. 2-4-28).

The windows of the *Mul Chok* are five-fold *B-a*-types, and only on the opening of the centre *Torana* is mounted. As is the same with the doors, the window with *Torana* has either pilaster-like or cornice-like eaves.

Moreover, *Torana* is found on every Nich at the both sides of the doors of the ground floor of the *Sundari Chok*.

Notes:

1) I will exclude the explanation of the eastern outside windows except those of the *Degu Talle* and those of the fifth, sixth and seventh floors of the *Degu Talle*.
2) The outside windows at the south-eastern corners (the first floor of the *Sundari Chok*) are the corner-windows having the horizontal 'H'-type of frames which have been broken at the centre. I include these here.
3) No arrangement of CL-L types was able to be found in our twice survey.
4) *B-b-s-V* type are found at the *Basantapur Bhawan* in the *Kathmandu Darbar*.
5) The windows at the south-western corner of the second floor of the *Sundari Chok* are the corner-windows with bended openings (Fig. 2-4-29).
6) About the kind of lattice used here, S. B. Deo: op. cit., (Preface, Section, 5, Note 9).
7) Though not many, serial doors juxtaposed are found at some temples. Cf. *Unmanta Bhairab* at Panauti.

2) String-Courses

Around the outside walls at the boundary of each storey, namely, at the floor-level, string-courses are engirdled. Most of string-courses are made of woods, but some of them of cearmics at the *Degu Talle*. Others use both woods and cearmics mixedly. Most of the wooden string-courses have five steps of mouldings.

Ceramics found at the ground floor, the first floor, and the second floor of the *Degu Talle* are merely forming a kind of ridgeline. Mouldings on the wooden string-courses are mostly beadings, but some of them have wave-patterns or tongue-like-patterns. String-courses are engirdling around the bottoms of the openings or of the lattice-windows. The string-courses around the openings are succeeding to those at the walls, but they have different patterns from those at the walls.

String-courses found at the *Mul Chok* and the *Degu Talle* at the boundary between the fourth and fifth floors should be specially noted among those at the *Patan Darbar*. Both of them are wooden and have small wooden pieces copying animals' faces put side by side projectingly at about 20 cm intervals. They have materials of saw-tooth-like patterns mounted on these small wooden pieces and further have three steps of tiles piled on, forming a kind of small eaves. The materials copying animals' faces seem to be decorating the rafter-ends or the joist-ends. As far as string-courses of the *Mul Chok* are concerned, certain relations do not seem to exist between the positions and intervals of the joists and those of the materials of animals' faces. But the same styles of string-courses found at the *Pachapanna Jhyal* of the *Bhadgaon Darbar* or at the *Katmandu Darbar* are different from those of the wooden string-courses having brick-walls directly on their mouldings or of the ceramic string-courses. They positively have tiles covered in the way of the small eaves.

It may safely be assumed from the above-explained statements that the string-courses with animals' faces set are of different origin from that of the purely wooden or cera-

mic string-courses. (Hisataro Gotoh)

3) Character and Process of Development in Opening Part

The character and the process of development of an architectural style in the opening part such as an entrance or a window are as follows:

One of the great characters of an architectural style lies in the opening part. There are many kinds of form as to the opening part as they are classified in Section 4-1), but the fundamental characters are a horizontal bar of the foundation of an entrance or of the bottom of a window, a lintel of the upper part of an opening and the way of constructing a vertical pillar which supports a main pillar between the above two parts. Though there are many complicated sculptures on them, one of the most important characters of the Nepal traditional architecture is the upper and lower horizontal bars extending longer than the width of the two vertical pillars which support main pillars and receive a door or a window. In detailed sculptures Indian influences are found but the way of horizontal and vertical combinations of lumber is peculiar in Nepal and cannot be found in existing instances in India.

The way of construction that the upper and lower horizontal bars are longer than the width of the vertical pillars is seen in woodenwork, not in masonry. These upper and lower horizontal bars are used to receive the weight of above bricks and transmit it to the lower part but materials of masonry part are not so strong that wooden bars seem to strengthen a buiding. Therefore this way of construction can be considered mixed construction with wood and brick.

When and how this form of an opening part comes from are not known exactly because there are no materials for study at present, but we can give an example which can suggest the early form of this construction. It is shown in Plate 129, which is the opening part of the *Uku Baha* in Patan. Now it is closed in order not to go in and out, in which the foundation is placed in the lower part, and two pillars are set on and ancones are put on the pillars to receive a lintel. This temple was built after the year of 1653 according to the historical materials, but the older parts are found in the opening part, so it is assumed that the building was built earlier than in 1653. The pillars in the photo have the same design as those ones in the *Sundari Chok* and in the *Lokeshvar Mandir* in Banepa, and the acute curve of ancones seems to be very old. In general the ancones extend from the pillars with the same form right and left, but in this case the pillars don't stand by themselves and are supported by the wall, so the brackets on the wall-side are left as rectangular lumber which is cut vertically. As the lintel extends farther thereon, there comes out difference in level as a matter of course. Generally in the opening part the difference of the length of the upper and lower horizontal bars outside the pillars is very reasonable from the dynamical point of view, and the principle of this idea lies in this form of ancones.

Plate 130 shows the front entrance of the *Uka Baha*. It is one of the typical entrances of Nepal architecture. There is not so much decorative sculpture and the simple form shows the primitive sort of an entrance. But the pillar form is different from the one in Plate 129 and a frame is put into around the door. The door is simply a wooden door, but this kind of door needs a frame in order to be put into the entrance because the pillar form is not convenient. Though we cannot judge that the form of Plate 130 was developed from the form of Plate 129, but it is noticeable that while the lower foundation is a piece of simple rectangular lumber there is much difference in level in the projecting part of the lintel. We notice that the projecting part is so long that the top of it hangs down a little. These kinds of form are more seen in the entrance on the first floor facing the patio in the *Mul Chok*. Much more decorative sculpture is seen on and around the frame, but the methods are the same. The projecting part of the lintel decreases a little and that of the foundation increases a little to the contrary. The entrance of the *Degu Talle* has the same method as this one.

On the other hand the entrance facing the patio of the *Sundari Chok* in Plate 55 is a little different from the examples of Plate 129 and Plate 130. Decorative sculpture increases much more than the above one. The pattern which was drawn at the top of the lintel of the *Mul Chok* is sculptured. And moreover on the upper part of the lower foundation we can see difference in level as on the lintel. There are some foundations which have sculptured in the centre. As the difference in level of the lower horizontal bar can be also seen in the window of the second floor facing the patio in the *Mul Chok*, this kind of form might be come from the window. But in the *Degu Talle* there is no difference in level on the upper and lower horizontal bars of the window facing the road. As the *Degu Talle* was rebuilt in 1662, the *Mul Chok* in 1666, and the *Sundari Chok* in 1670, it is probable that a little variation has come into being little by little.

On both sides of the vertical pillars of the opening part which is characterized as B-shape we can see decorative boards of branchial form. This opening type can be seen in and after the 18th century. So this type seems to be relatively new chronologically, but it is seen in the *Patan Darbar*, so it is supposed to have come out in the middle of the 17th century. For example Plate 13 shows the window of the first floor facing the south of the patio on both sides of the entrance to the shrine and the window has decorative boards with branchial form between the upper and lower horizontal bars. These branchial decorative boards are in many cases made together with vertical pillars, but in the case of Plate 13 there is some room between the decorative board and the pillar, so it is possible to think that bricks are cut and put into the gap. And

in the chained windows in the middle of the west side on the second floor there is remarkably developed branchial decoration. It is a kind of projection whose shape is diamond under a branchial part. It is thought that the diamond shape seems to be used in the important part and used not to intensify the lintel but to produce a good effect on the whole opening. Furthermore in the front window of the west side on the second floor of the *Mul Chok* a projecting part has waved curve and it is made to be very decorative. They thought the projection to be effective according to the position chosen.

Both in the *Mul Chok* and in the *Sundari Chok* the front entrances of the west side have special design as is shown in Plate 10 & 12. There is no wooden foundation under the vertical pillar and the vertical pillar is set directly on the stone foundation. The lintel in the upper part is not in a straight line with difference in level but has a curved line. Especially in the case of the *Sundari Chok* it is remarkable that branchial boards are put into the outside of the vertical pillars. And the more progressed design can be seen in the fact that both entrances have arched sculpture on the upper part. Without doubt this arch came from a Buddhist niche in India and it is often found in art influenced by India. Originally it is an architectural method which is often used in stone building, but it is not reasonable from the point of strength in wooden building. When we look at the entrance of the *Mul Chok* the curved lintel on the part of projection of the left and the right ends go through horizontally above the arch. The top of the arch goes into the lintel only a little in the middle of it. In case of the *Sundari Chok* the arch goes farther into the above lintel and furthermore there is another arch on the slender pillar in front of the vertical pillar. We can see there the more developed character than the case in the *Mul Chok*.

We have already described this sort of arch has no rationality in wooden building, and for that reason, as a result of changing method it might be reborn as *Torana* form above the entrance which is the important part of a building. In the case of *Torana* of the *Mul Chok* in Plate 75 the sculpture in the middle seems to be broken, but we can see an arch clearly around it. In the other cases of *Torana* in the *Mul Chok* it is not so clear as this one, but some forms of these arches remain. But in the case of *Torana* of the *Mul Chok* in Plate 77 the part of an arch has gone away and the whole of it becomes a pattern which is recognized as a further development. We can think of it as a kind of completed form.

We would like to describe the change of detailed decoration around the opening space so fully, but we intend to write about it in the next report. (Michio Fujioka)

ネパールの王宮建築

ネパール王国古王宮調査報告書

1981

日本工業大学ネパール王国古王宮調査団

APPENDIX

REFERENCE TO THE TERMS in English, Devanagari and Japanese.

付：用語表

(1) The following table shows the Newari and Nepali of the main words in this book in English, Devanagari and Japanese letters.
(2) Most of these English spellings are based on Carl Pruscha ***Kathmandu Valley*** 2 vols., (Vienna 1975).Although the Author of this book employs some new words. E. G. Mandir.

(1) この表は、本書におけるネパール語およびネワール語の、英文字、デバナガリ文字、邦字による表記の対照表である。
(2) 英文字表記は Carl Pruscha ***Kathmandu Valley*** 2 vols. Vienna 1975を基本としているが、編者がMandirなどの語を補なったものもある。

English	Devanagari	Japanese	English	Devanagari	Japanese
Agan Mandir[1]	आगन मन्दिर	アガン寺	Lohan Hiti	लोहं हिटी	ロハン・ヒティ
Arniko	अरनिको	アーニコ(阿尼哥)	Lokeshvar Mandir	लोकेश्वर मन्दिर	ロケシュワラ寺
Bagmati River	बाग्मती खोला	バグマティ川	Malla	मल्ल	マルラ
Baha[2]	बहा	バハ	Mani Hiti	मनि हिटी	マニ・ヒティ
Banepa	बनेपा	バネパ	Mani Keshav Narayan Chok	मनि केशव नारायण चोक	マニ・ケシャブ・ナラヤン・チョーク
Basantapur Bhawan	बसन्तपुर भवन	バサンタプール・バワン	Mohan Chok	मोहन चोक	モハン・チョーク
Bauddha Nath Mandir[3]	बौद्ध नाथ मन्दिर	ボーダナト寺	Mul Chok	मूल चोक	ムル・チョーク
Bhadgaon Darbar	भादगाउँ दरबार	バドガオン王宮	Na Bahi	ना बहि	ナ・バヒ
Bhaktapur	भक्तपुर	バクタプール	Naka Bahi	नक बहि	ナカ・バヒ
Bhandar Khal	भन्दार खाल	バンダル・カール	Narayan Tum Baha	नारायण टुम बहा	ナラヤン・トム・バハ
Bhimchhe Baha	बिच्छे बहा	ビチェ・バハ	Nasal Chok	नासल चोक	ナサル・チョーク
Bishwa Nath Mandir	बिश्व नाथ मन्दिर	ビシュワナト寺	Nauddha Kacha Baha	नौदह कछ बहा	ナウダ・カチャ・バハ
Dishnumati River	विष्णुमती खोला	ビシュヌマティ川	Nepal	नेपाल	ネパール
Bramhayani Mandir	ब्रम्हायनी मन्दिर	ブラマヤニ寺	Nepali	नेपाली	ネパール語
Char Narayan Mandir	चार नारायण मन्दिर	チャル・ナラヤン寺	Newar	नेवार	ネワール
Chhusya Baha	छुस्या बहा	チュシャ・バハ	Newari	नेवारि	ネワール語[4]
Chok[4]	चोक	チョーク	Nyatapola	न्यातपोल	ニャタポーラ
Dalan	डलान	ダラン	Pachapanna Jhyal	पचपन्न झ्याल	パチャパナ・ジャール
Darbar Square	दरबार स्क्वायर	王宮前広場	Panauti	पनौति	パナウティ
Dasain	दशैं	ダサイン	Pashupati Nath Mandir	पशुपती नाथ मन्दिर	パシュパティナト寺
Degu Talle	डेगु तल्ले	デグ・タレ	Patan Darbar	पाटन दरबार	パタン王宮
Dharmashala	धर्मशाला	ダルマサーラ	Prithivi Narayan Shah	पृथ्वी नारायण शाह	Prithivi Narayan Shah
Ghar	घर	ガール	Rana	राणा	ラナ
Gorkha	गोरखा	ゴルカ	Sattal	सत्तल	サッタール
Hanuman Dhoka	हनुमान ढोका	ハヌマン・ドカ	Su Baha	सु बहा	ス・バハ
Hanumante River	हनुमन्ते खोला	ハヌマンテ川	Sun Dhoka	सुन ढोका	スン・ドカ
I Baha Bahi	ई बहा बहि	イ・バハ・バヒ	Sundari Chok	सुन्दरी चोक	スンダリ・チョーク
Kantipur	कान्तीपुर	カンティプール	Swayambhu	स्वयम्भू	スワヤンブー
Kashta Mandap	काष्ठ मण्डप	カシタマンダパ	Taleju Mandir	तलेजु मन्दिर	タレジュ寺
Kathmandu Darbar	काठमौडौ दरबार	カトマンズ王宮	Taumadhi Tol	तौमढी टोल	タウマディ・トール
Kirtipur	कीर्तिपुर	キルティプール	Thakuri	ठकुरी	タクリ
Krishna Mandir	कृष्ण मन्दिर	クリシュナ寺	Torana	तोरण	トラナ
Kumari Dyo Chhen	कुमारि द्यो छें	クマリ・ディオ・チェン	Tusa Hiti	तुसा हिटी	トゥサ・ヒティ
Kumari Ghar	कुमारि घर	クマリ・ガール	U Baha Bahi	उ बहा बहि	ウ・バハ・バヒ
Lalitpur	ललितपुर	ラリタプール	Uku Baha	उकु बहा	ウク・バハ
Lichhabi	लिच्छबि	リッチャビ			
Lohon Chok	लोहं चोक	ローン・チョーク			

(Jun Hatano)

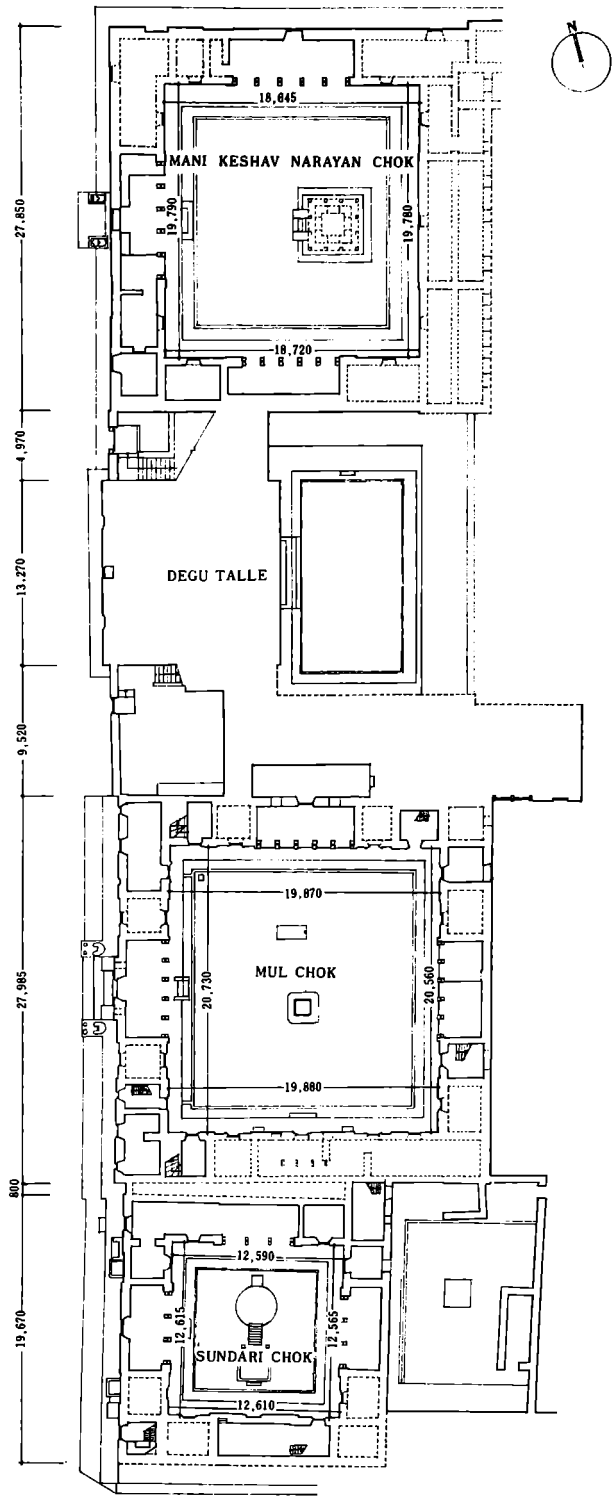
Notes:
1) Agan Chhen (आगन छें) in Newari.
2) This is the way of Newari spelling. Bahal (बहाल) in Nepali.
3) Bauddha (बौद्ध) in Newari, in many cases.
4) This is a Newari, Chauk (चौक) in Nepali, in many cases.

注)
1) ネワール語では Agan Chhen (आगन छें)。
2) ネワール語による。ネパール語では Bahal (बहाल)。
3) ネワール語では Dauddha (बौद्ध) とのみ表記することが多い。
4) ネワール語による。ネパール語では Chauk (चौक) とする場合が多い。

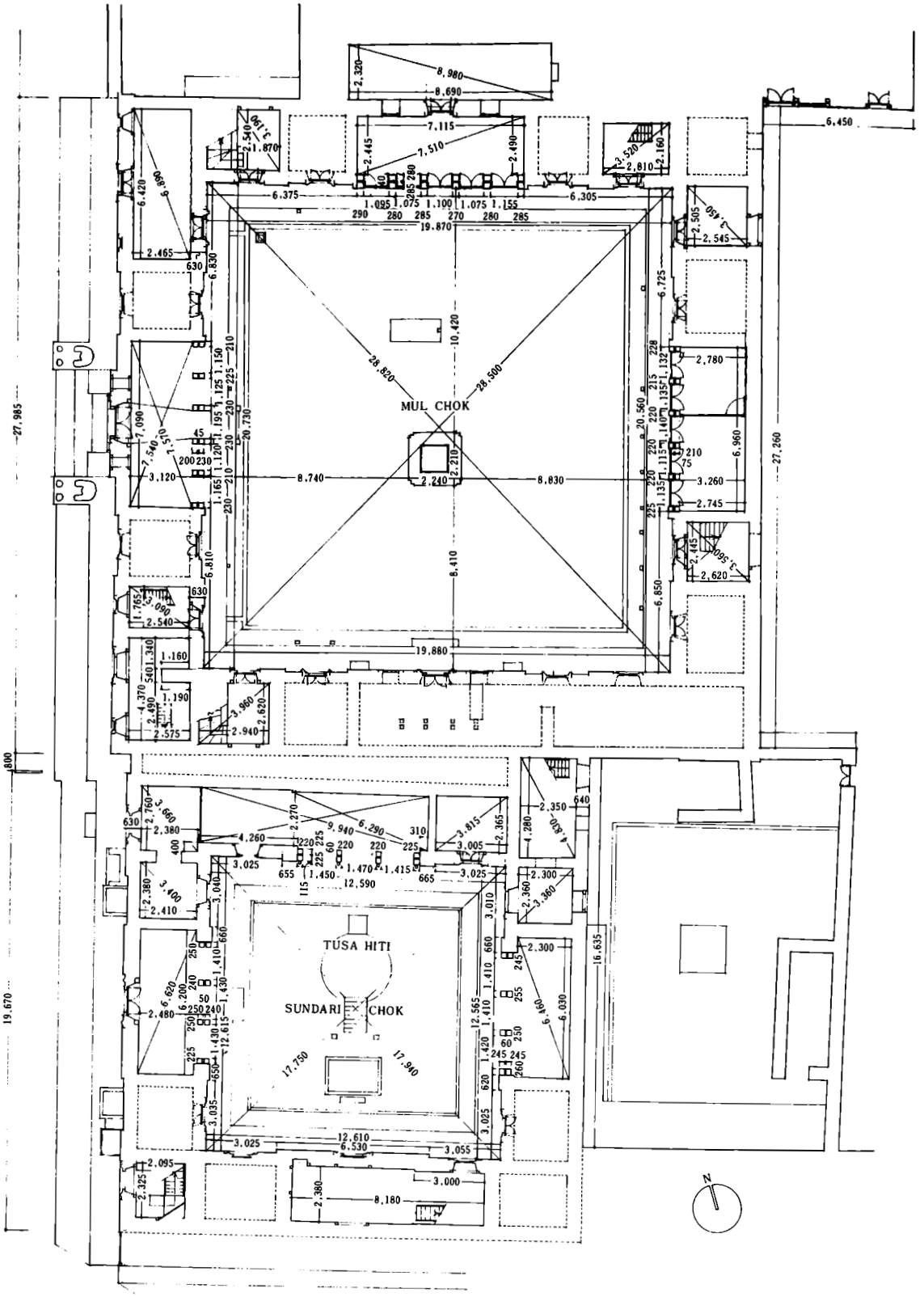
Appended Figures

Explanatory Notes

1. As a stereometric camera, we used T.M.K. (manufactured by Karl Zeiss) of Nippon Institute of Technology and T.S. 120 (manufactured by Nikon) of Tokyo Technical High School.
2. We could use Telagraph of Tokyo Institute of Technology as well as PK-1 Drawing System of Nippon Institute of Technology.
3. The depth of a timber which could not be measured was drawn as a timber with a square section.
4. Measured values (millimetre).

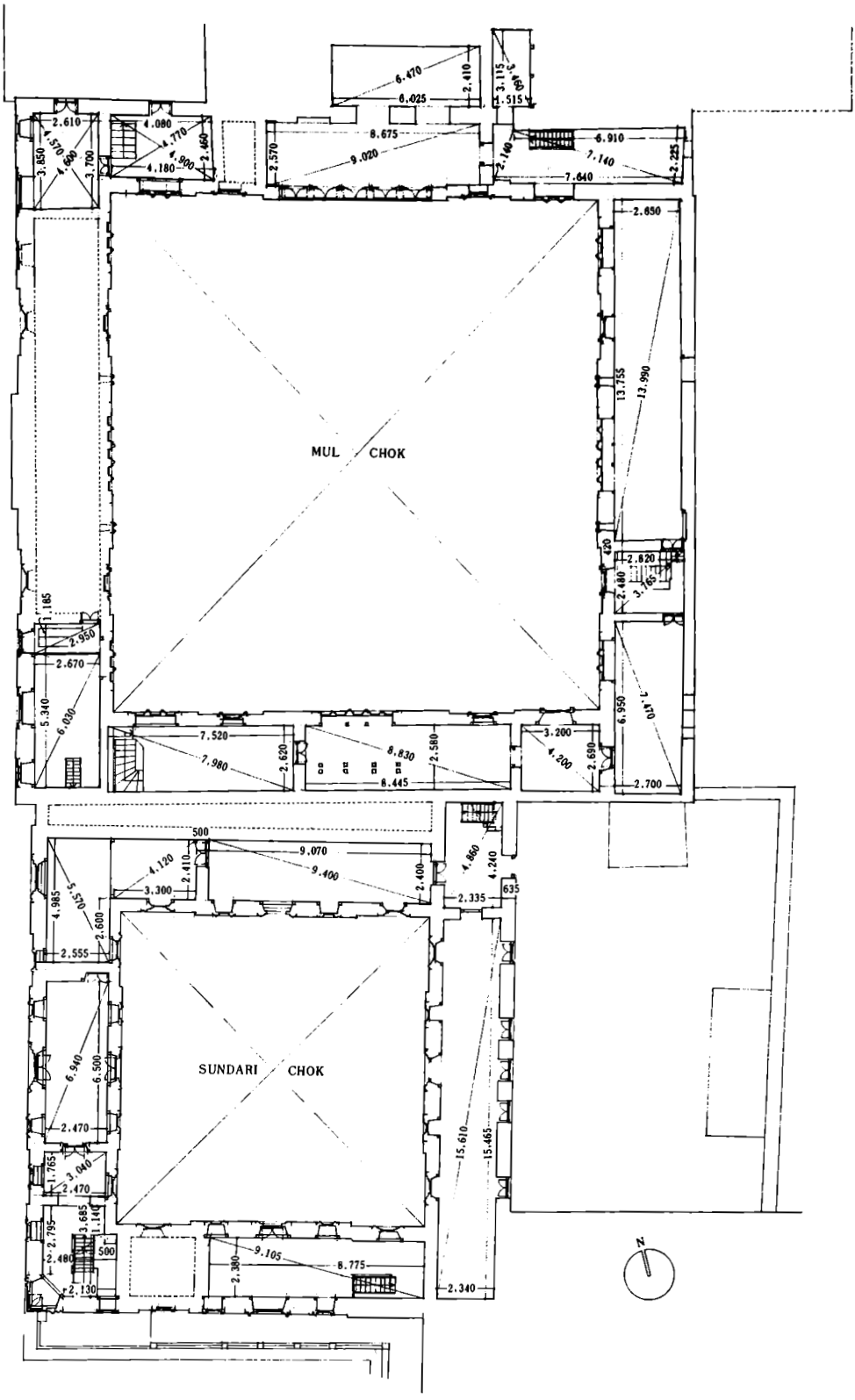


PATAN DARBAR
BLOCK PLAN. SCALE 1 : 400 1



PATAN DARBAR
SUNDARI CHOK & MUL CHOK
GROUND FLOOR PLAN, SCALE 1 : 200

2



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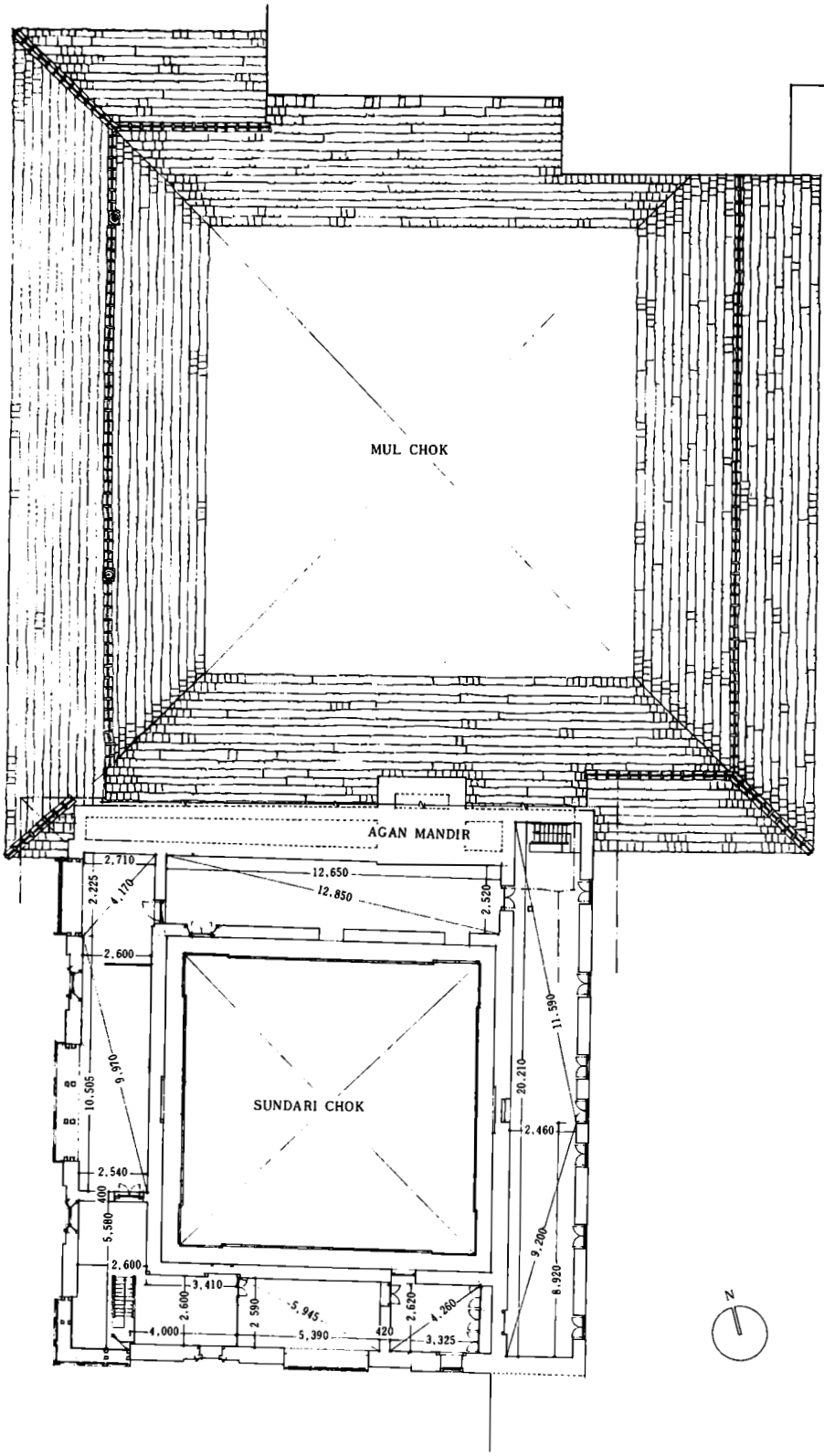
FIRST FLOOR PLAN, SCALE 1 : 200

3



PATAN DARBAR
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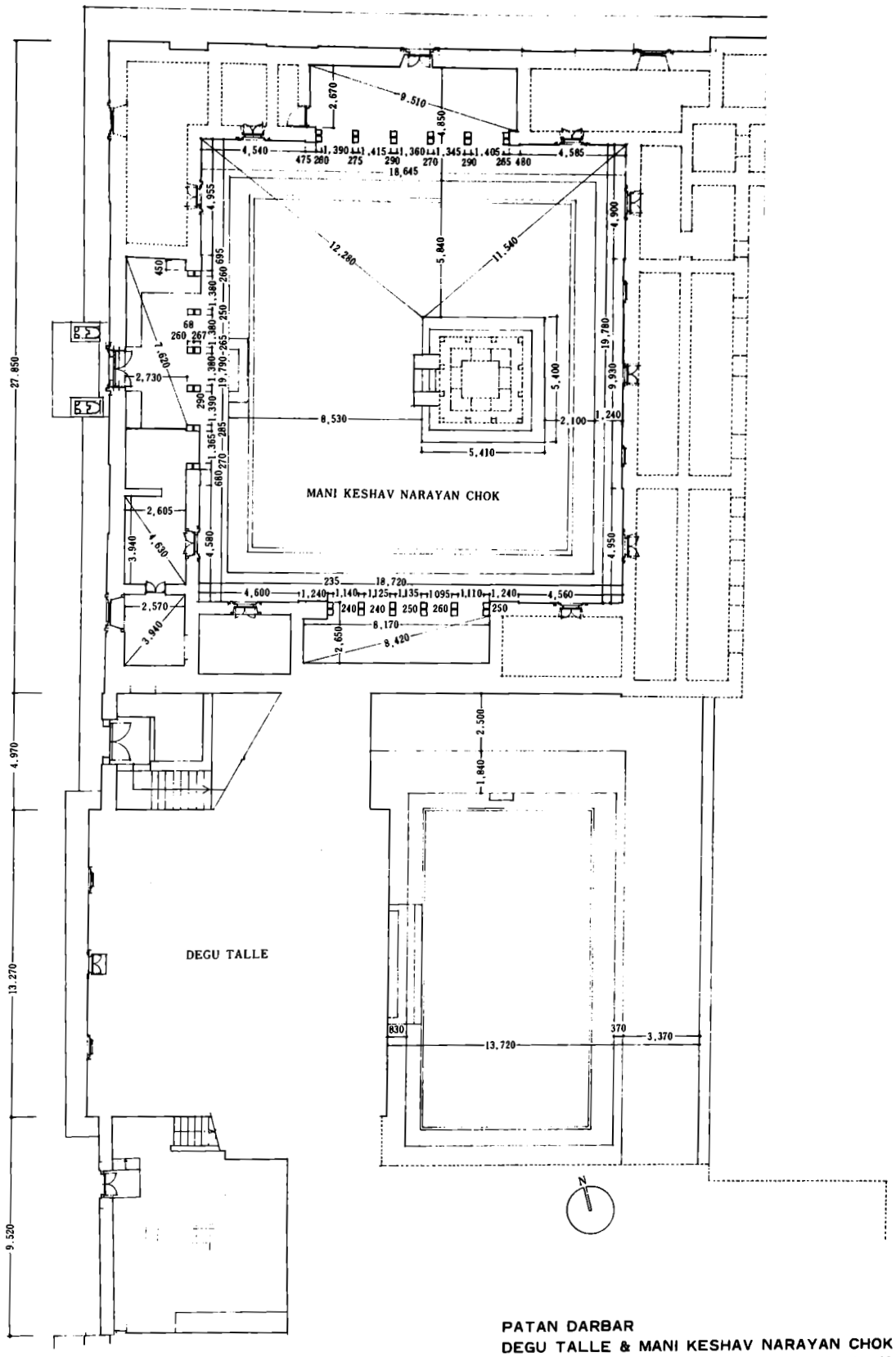
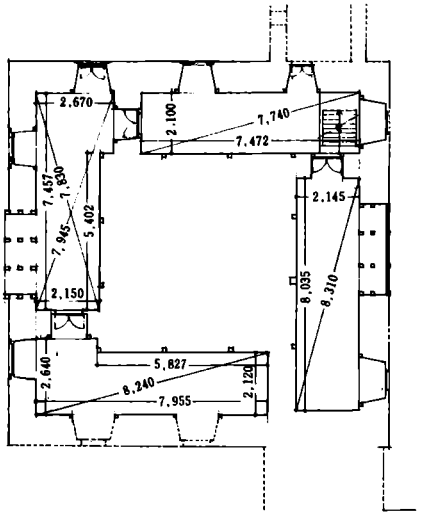
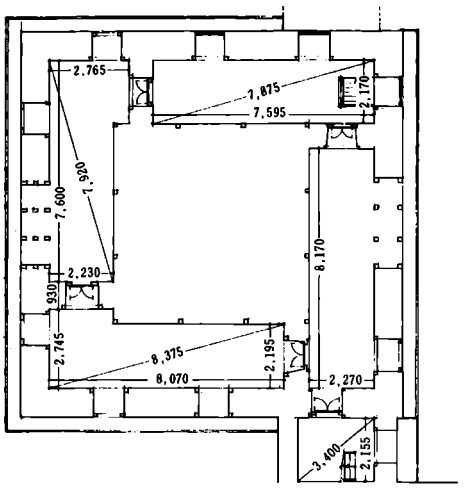
SECOND FLOOR PLAN. SCALE 1 : 200 4



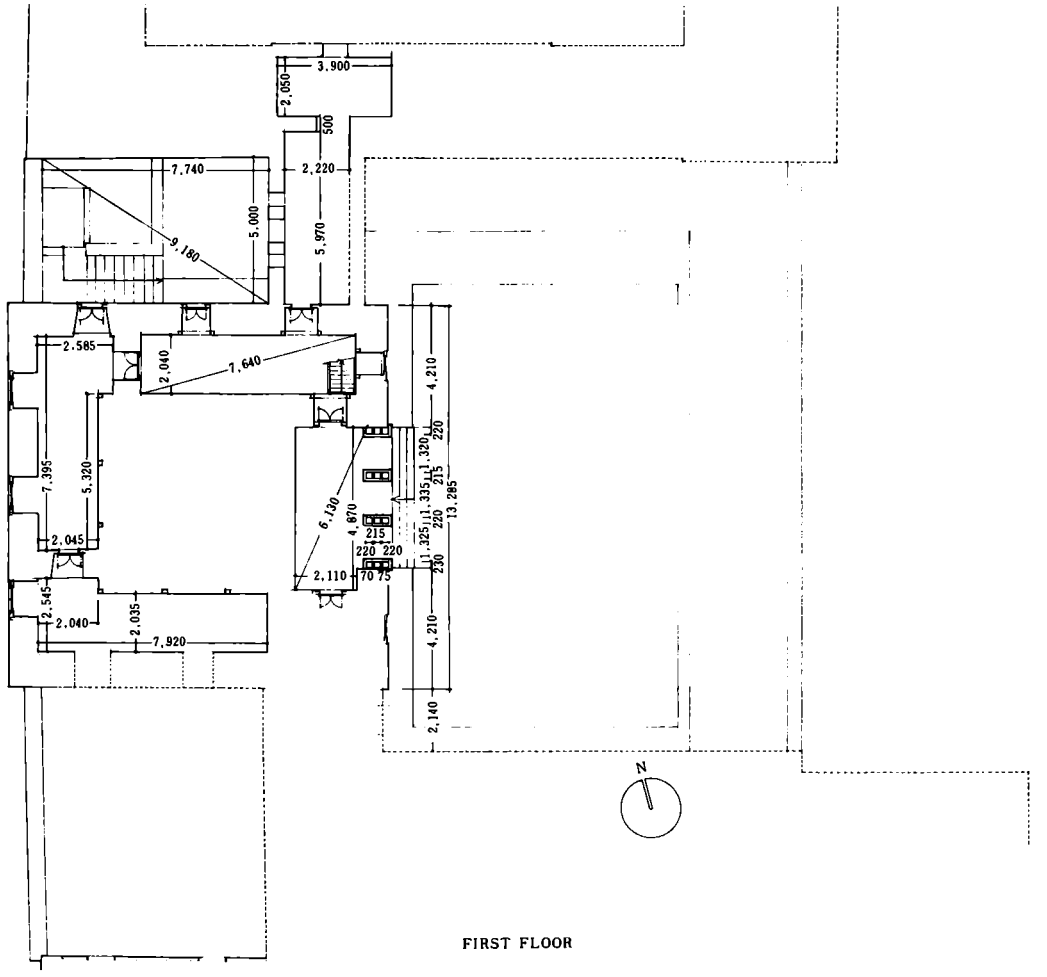
PATAN DARBAR
DEGU TALLE & MANI KESHAV NARAYAN CHOK
GROUND FLOOR PLAN.
SCALE 1 : 200
5



SECOND FLOOR

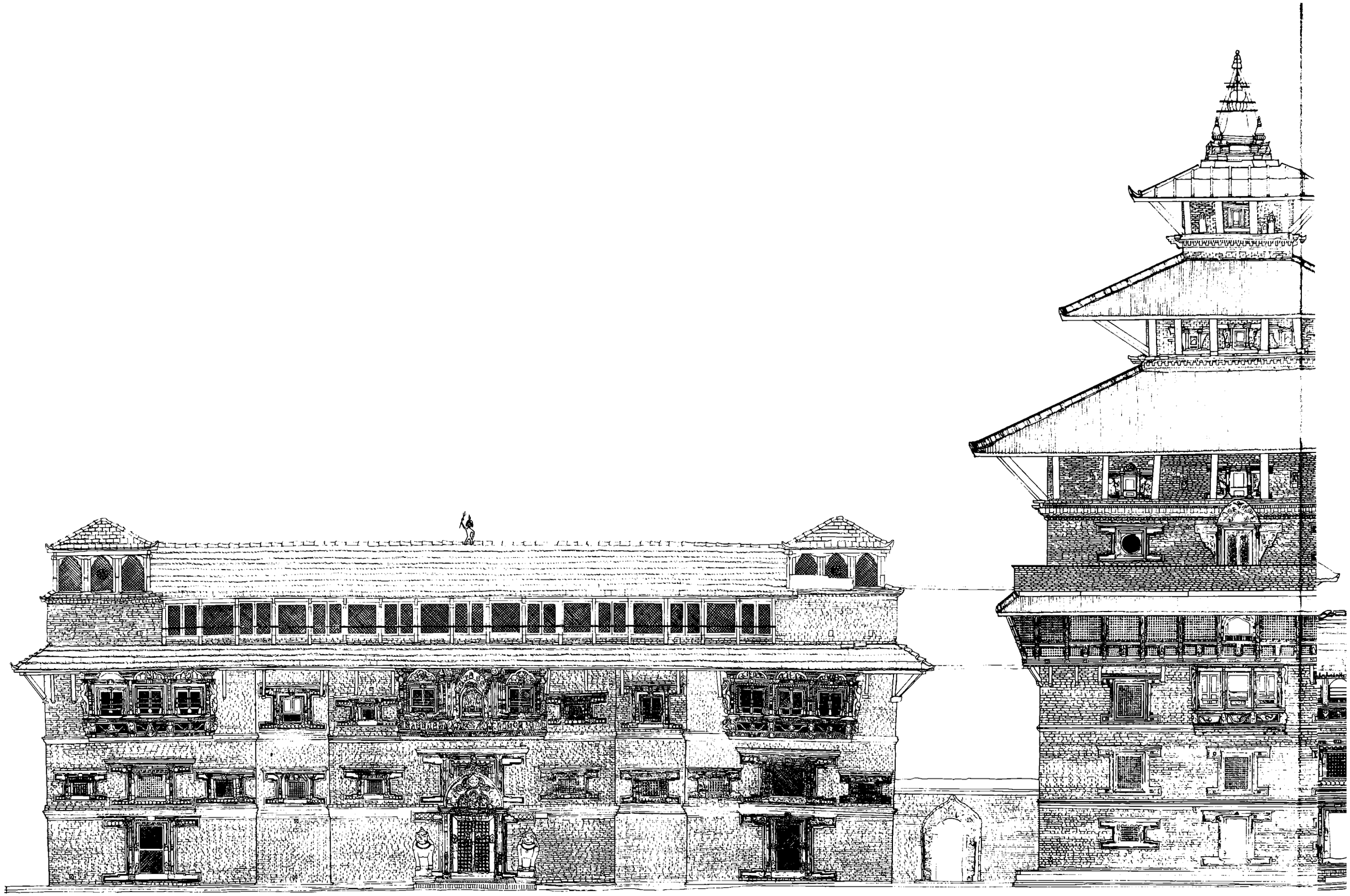


THIRD FLOOR



FIRST FLOOR

PATAN DARBAR
DEGU TALLE
FIRST, SECOND & THIRD FLOOR PLAN, SCALE 1 : 200

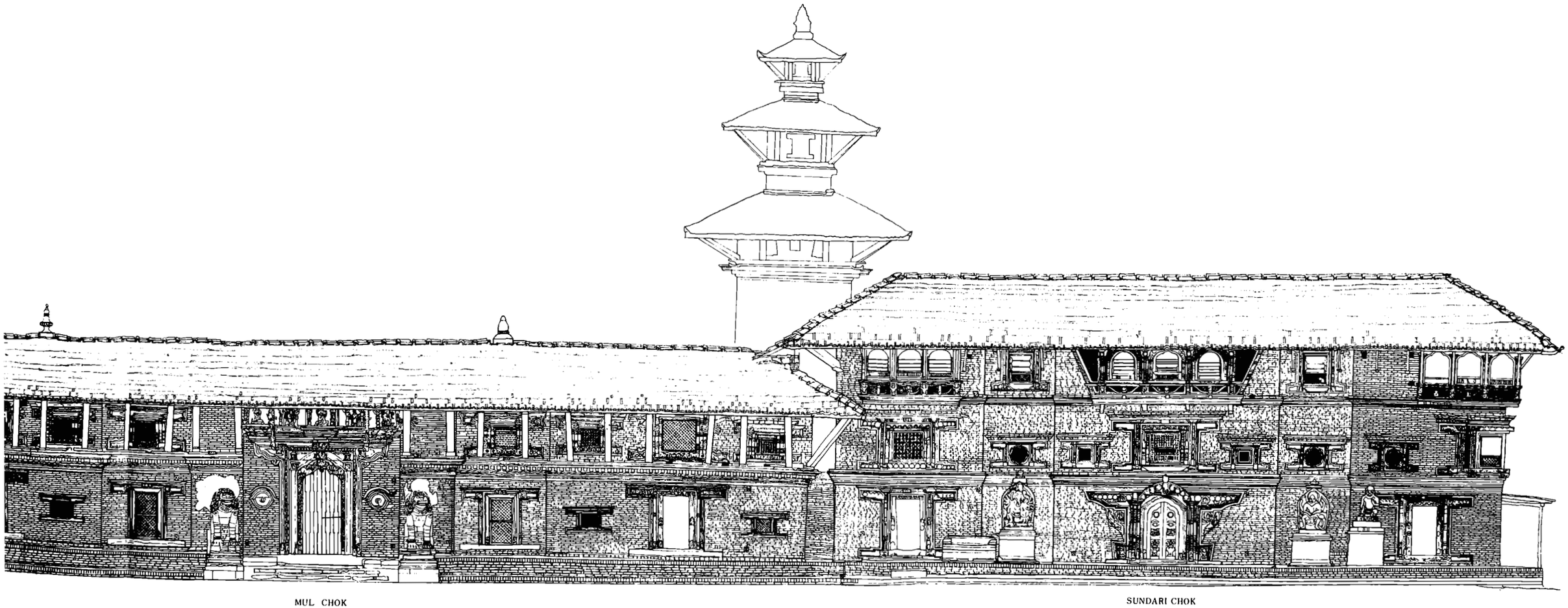


MANI KESHAV NARAYAN CHOK

DEGU TALLE

DEGU TALLE

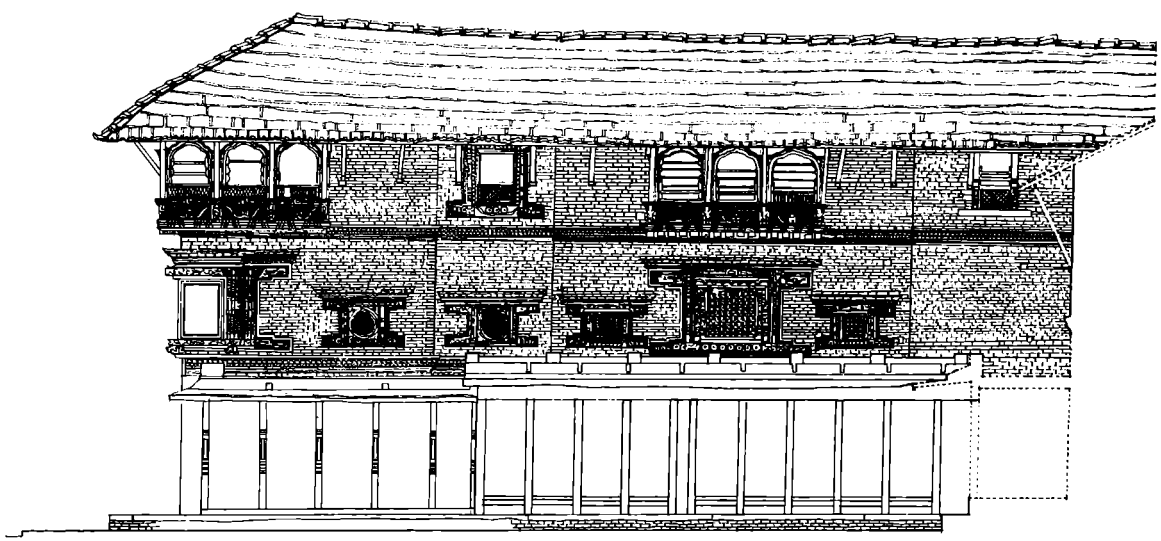
MUL CHOK



MUL CHOK

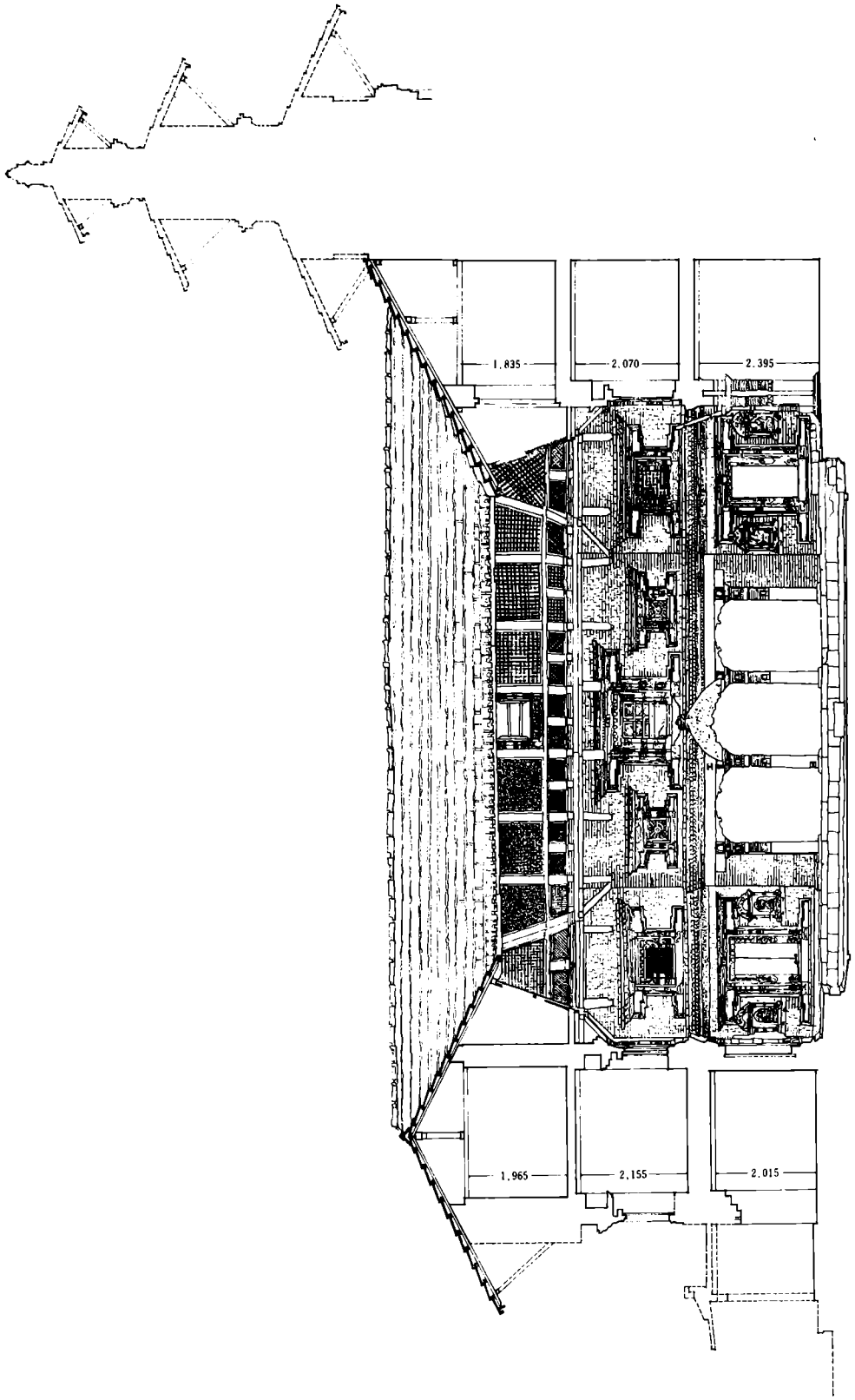
SUNDARI CHOK

PATAN DARBAR
WEST ELEVATION. SCALE 1 : 100

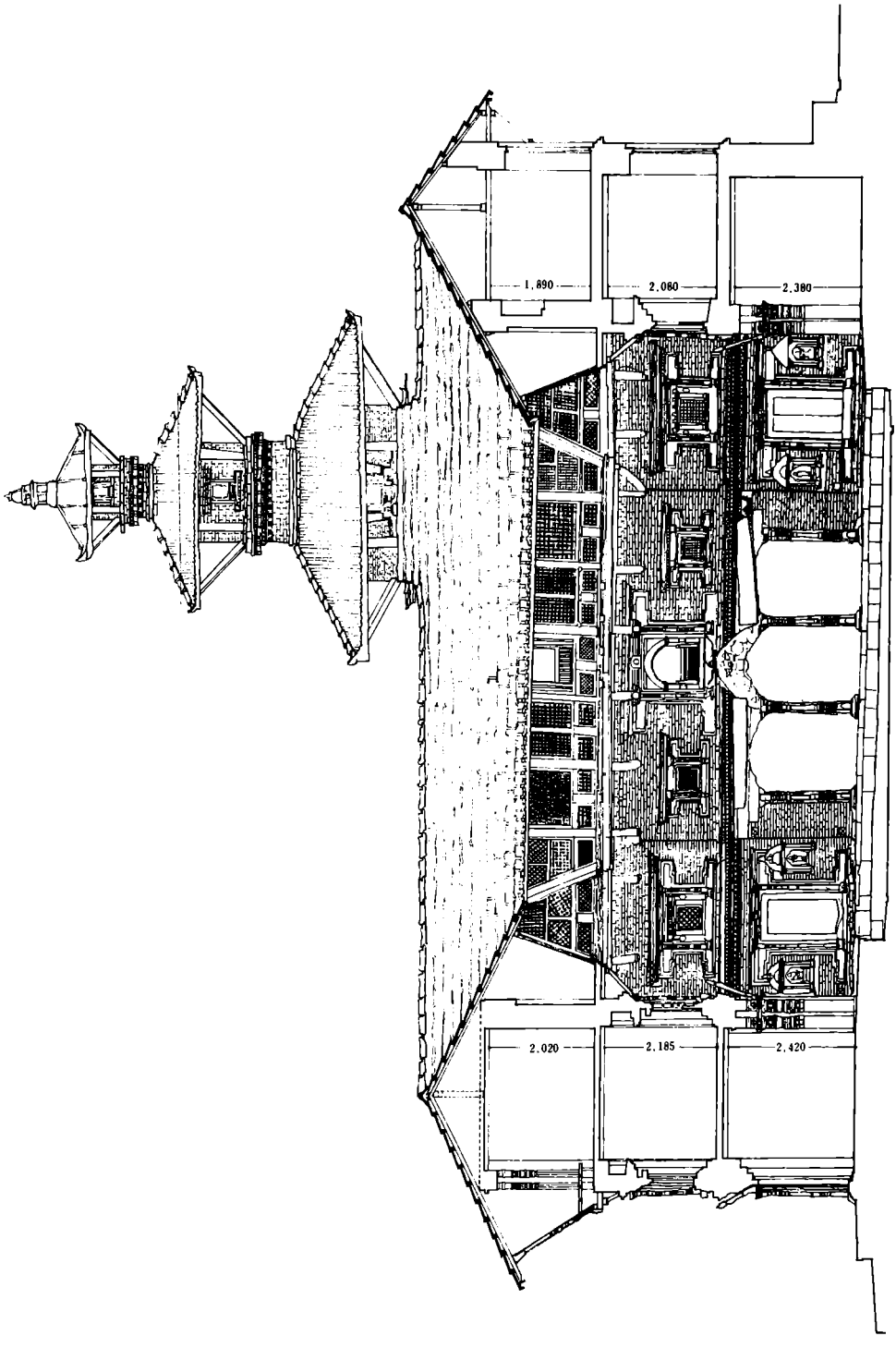


SUNDARI CHOK

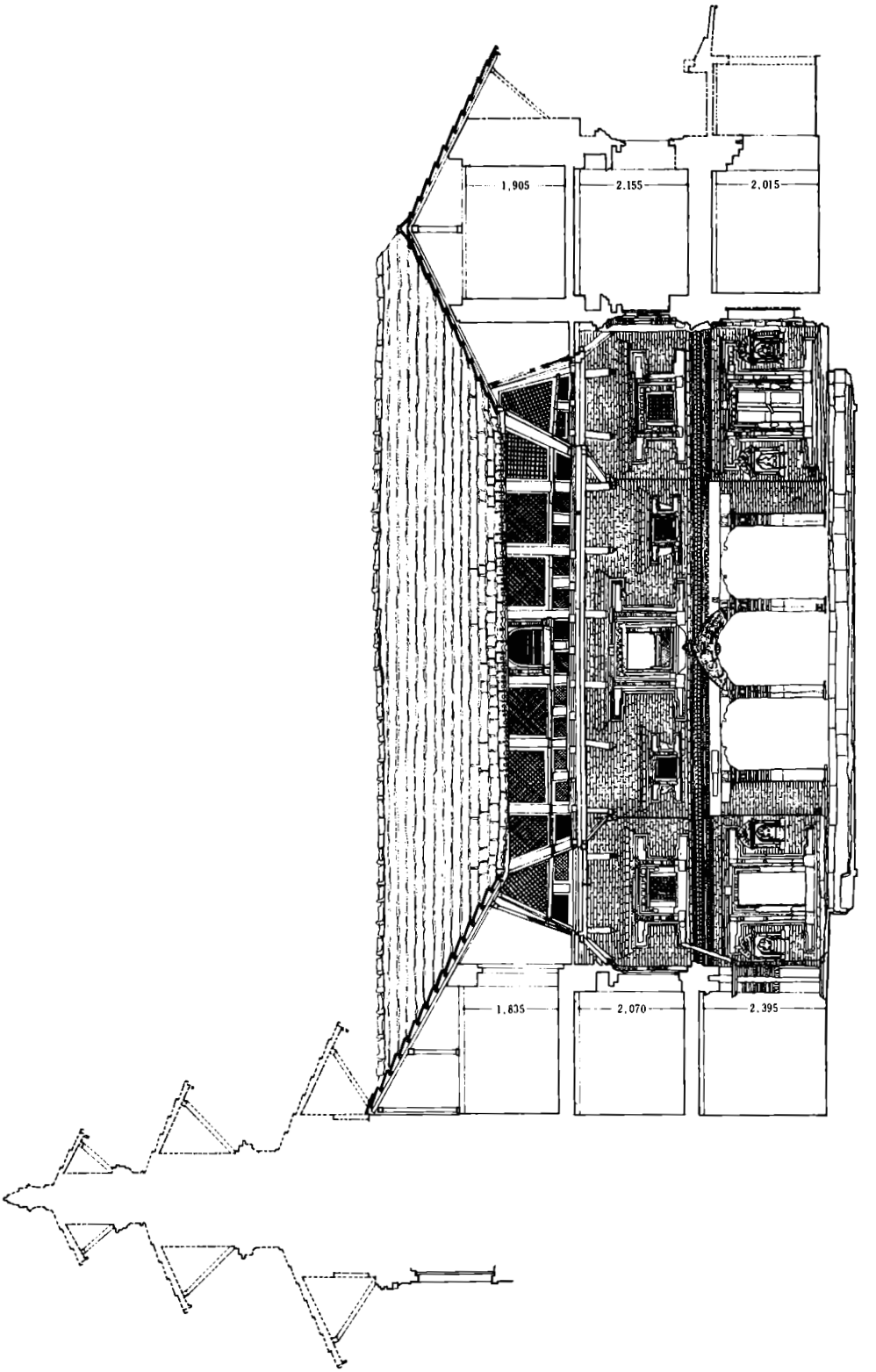
PATAN DARBAR
SUNDARI CHOK
SOUTH ELEVATION, SCALE 1 : 100 **8**



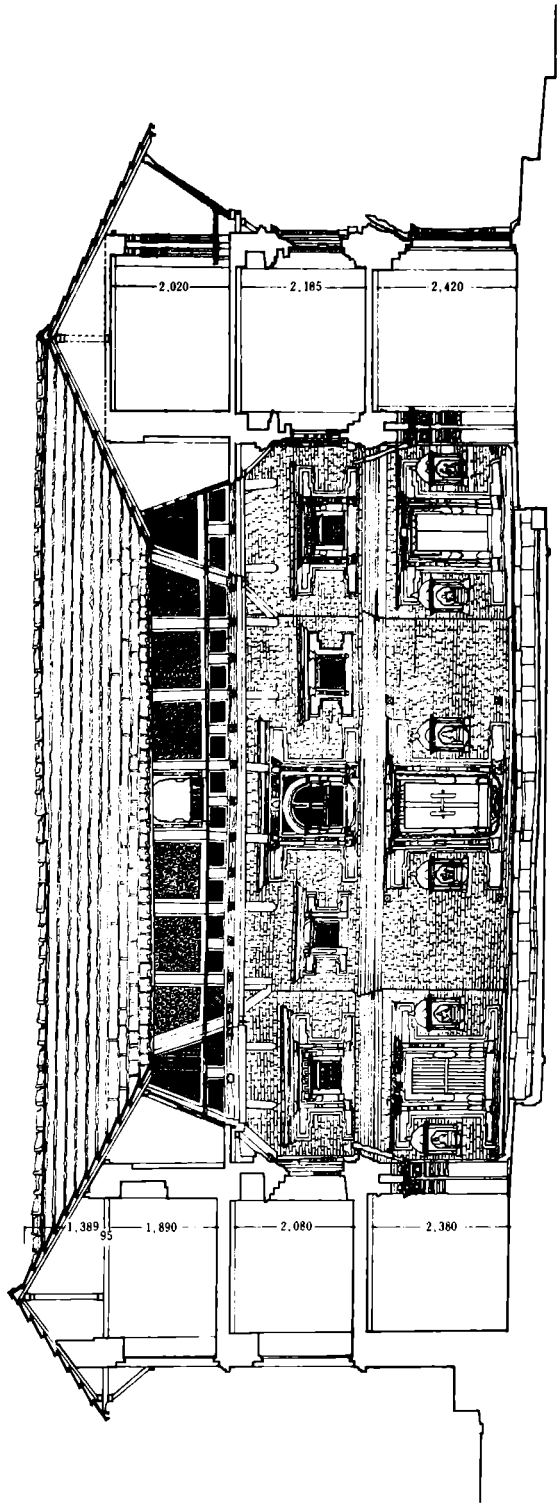
PATAN DARBAR
SUNDARI CHOK
SECTION, FACING WEST, SCALE 1 : 100



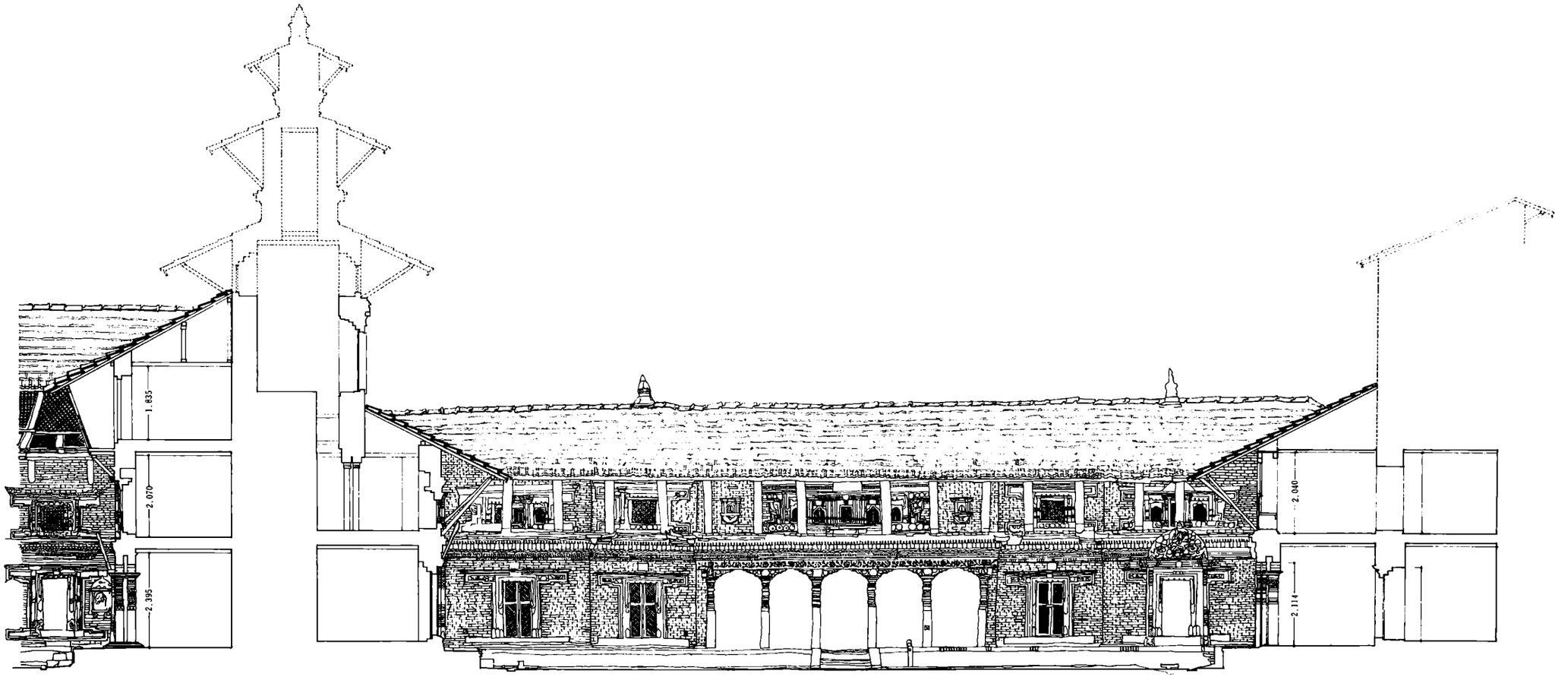
PATAN DARBAR
SUNDARI CHOK
SECTION, FACING NORTH. SCALE 1 : 100



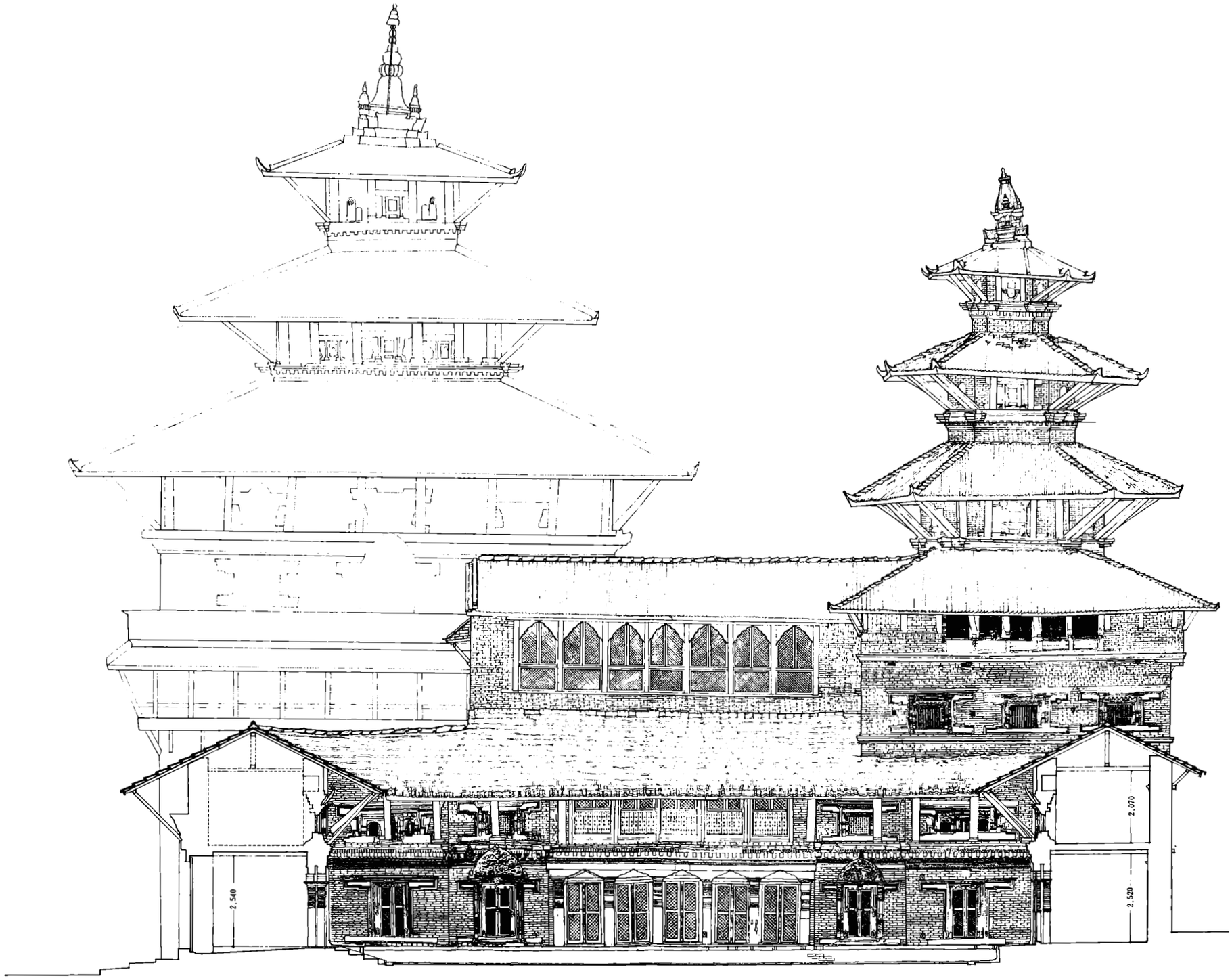
PATAN DARBAR
SUNDARI CHOK
SECTION, FACING EAST, SCALE 1 : 100



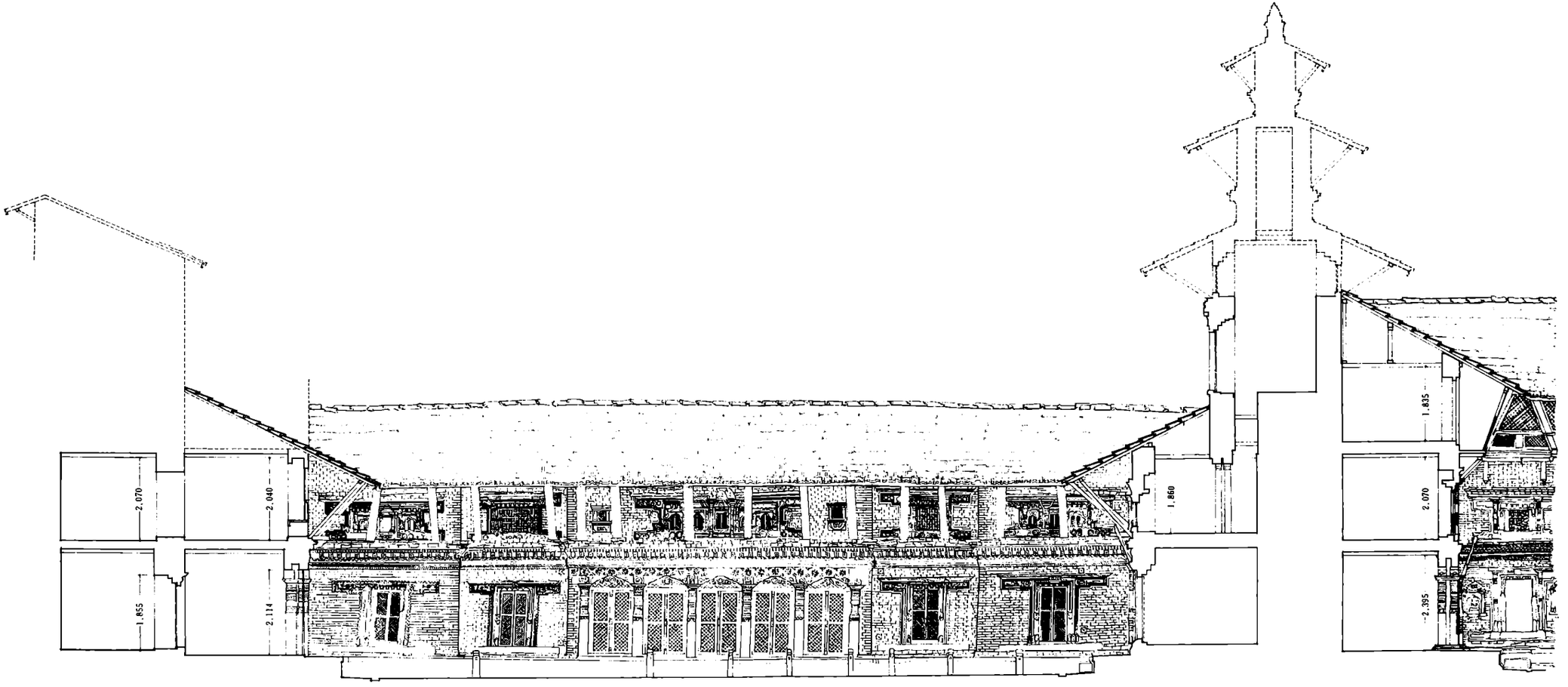
PATAN DARBAR
SUNDARI CHOK
SECTION, FACING SOUTH, SCALE 1 : 100 12



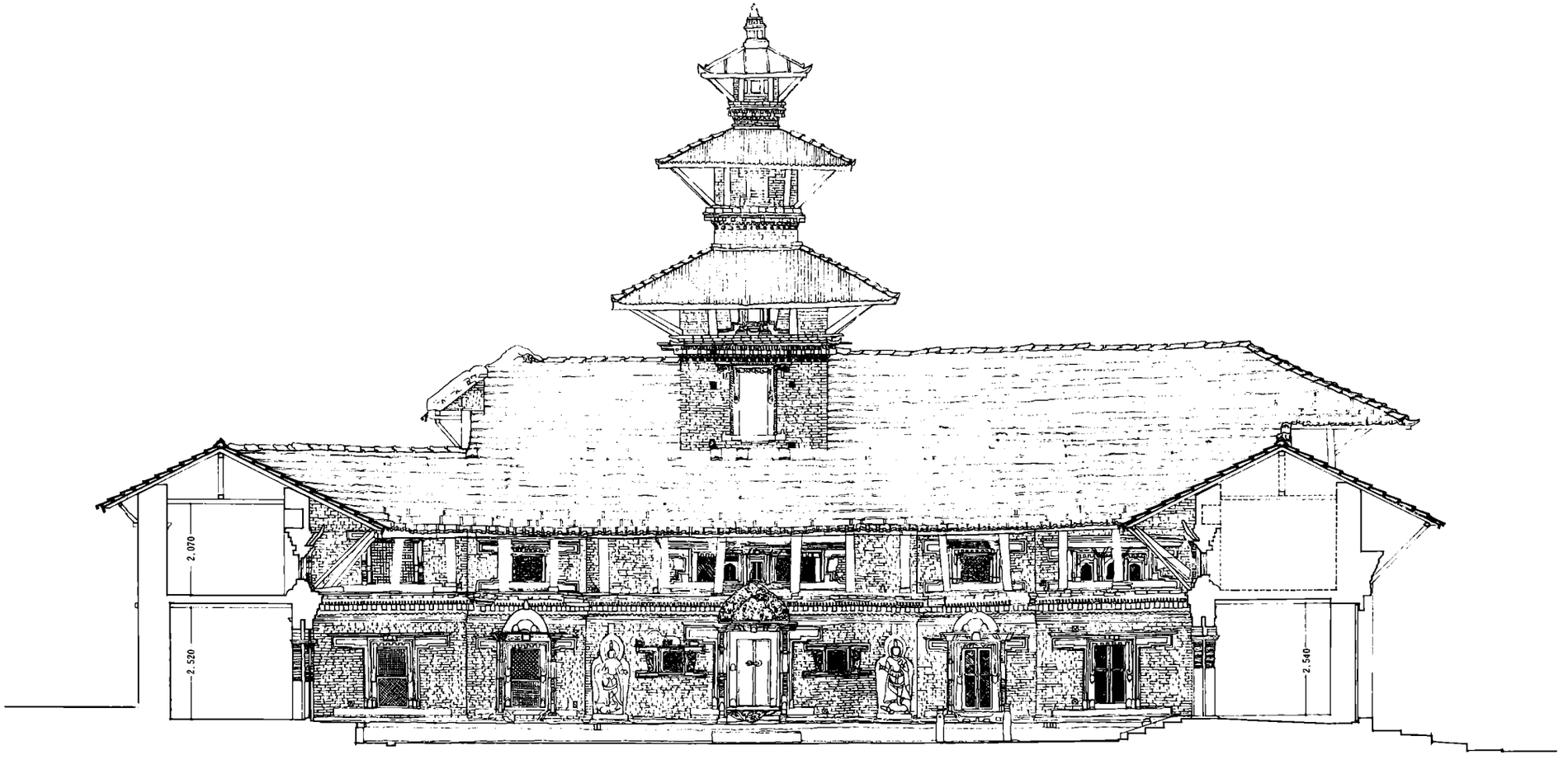
PATAN DARBAR
MUL CHOK
SECTION, FACING WEST, SCALE 1 : 100



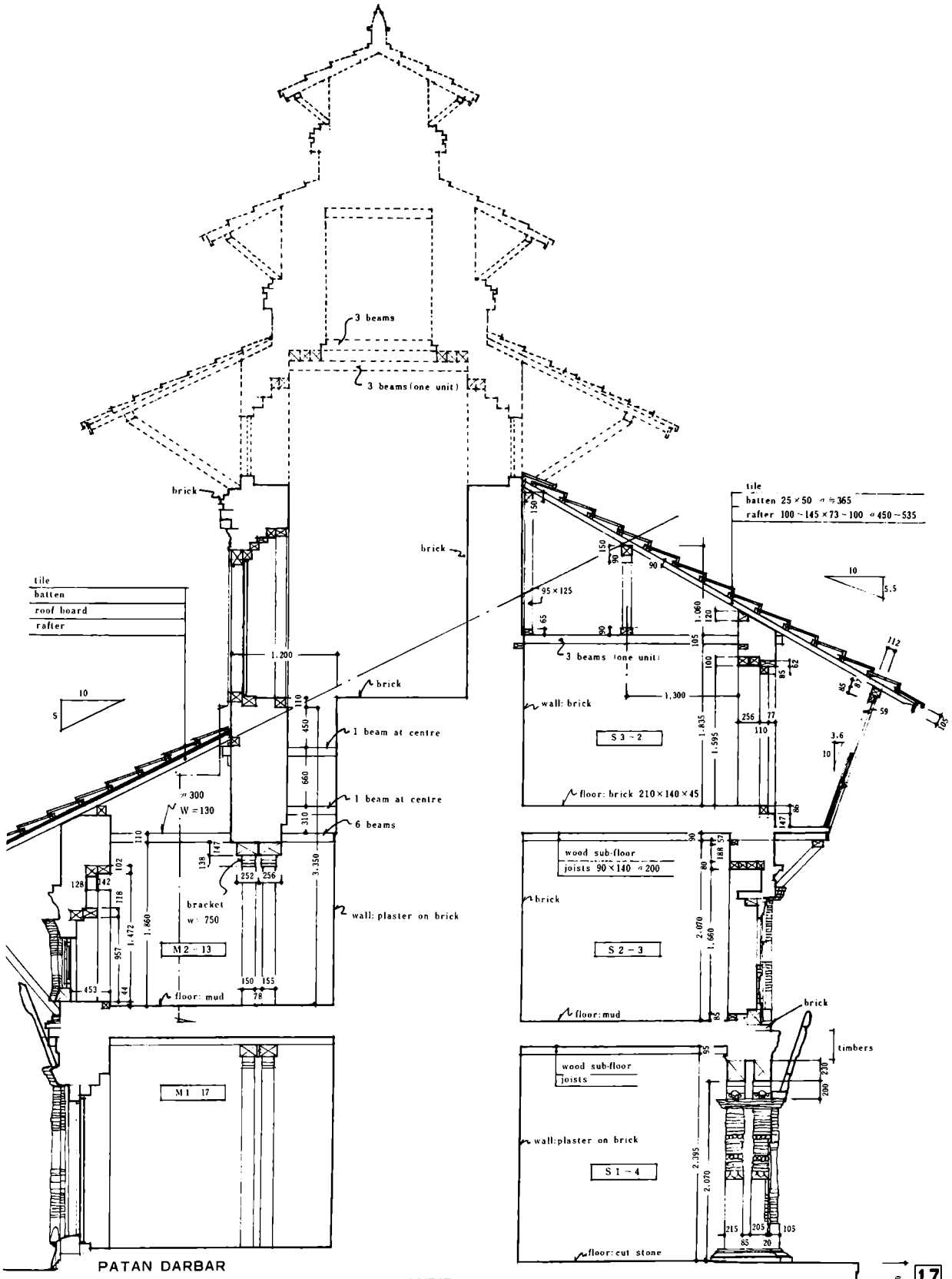
PATAN DARBAR
MUL CHOK
SECTION, FACING NORTH, SCALE 1 : 100



PATAN DARBAR
MUL CHOK
SECTION, FACING EAST. SCALE 1 : 100

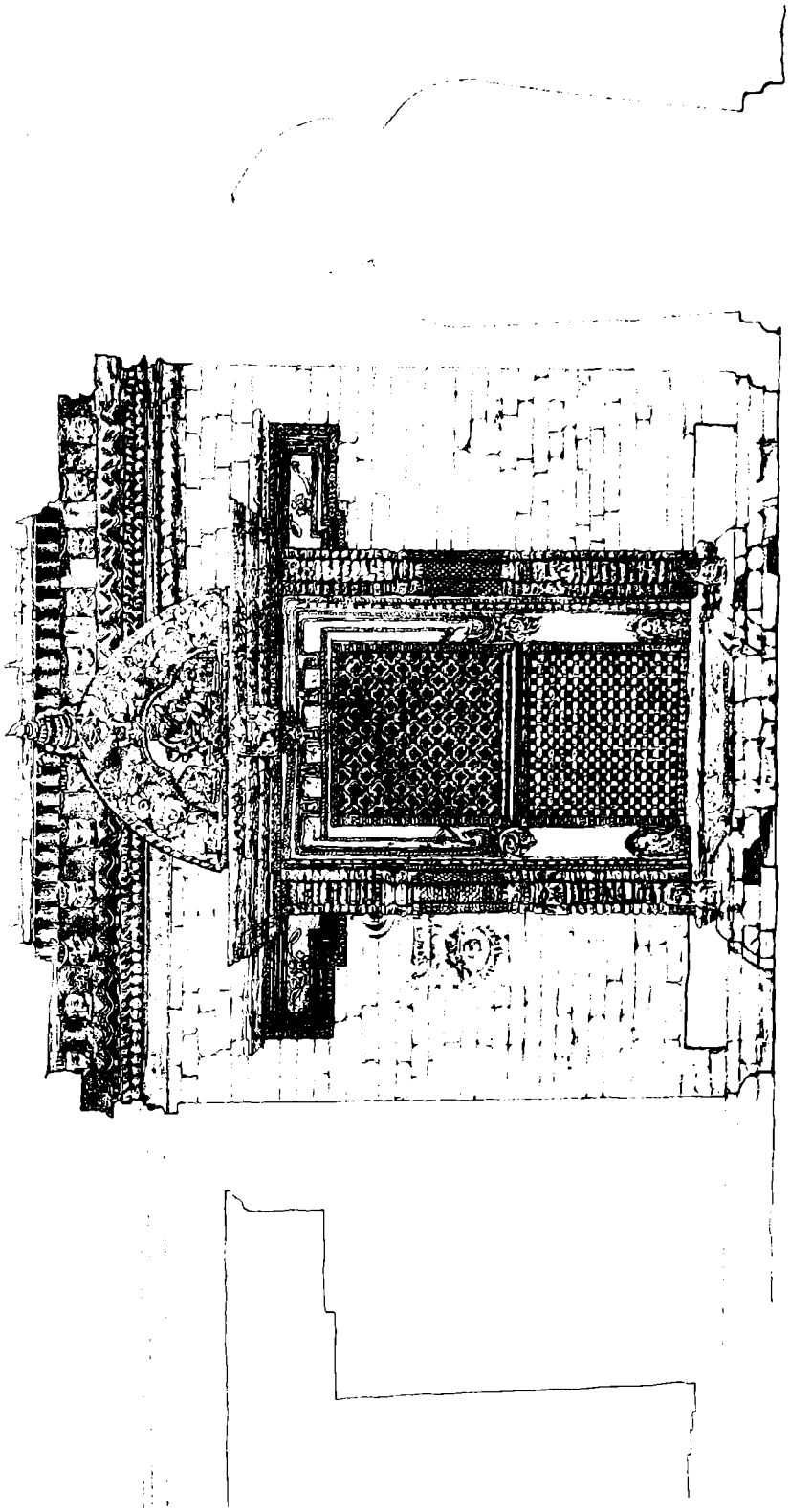


PATAN DARBAR
MUL CHOK
SECTION, FACING SOUTH. SCALE 1 : 100

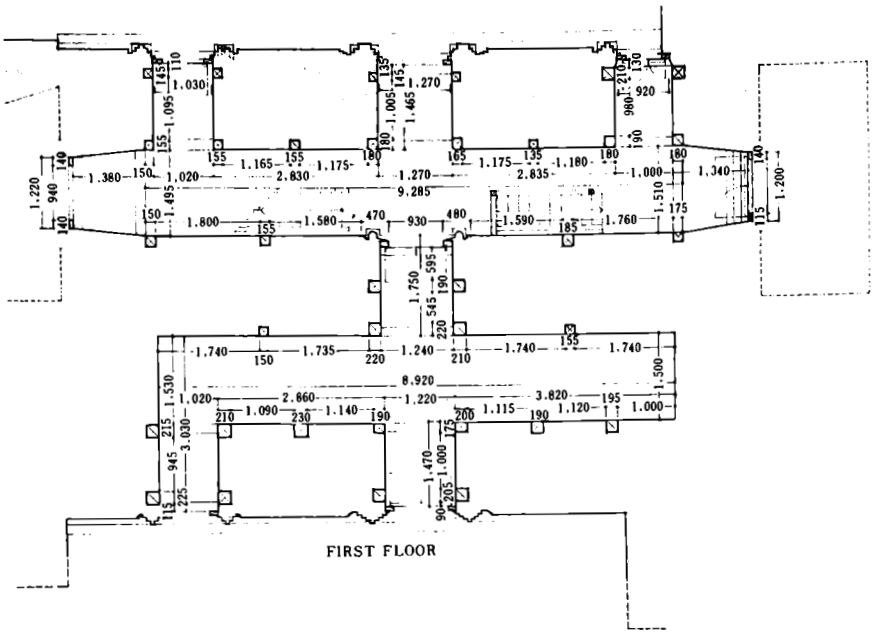


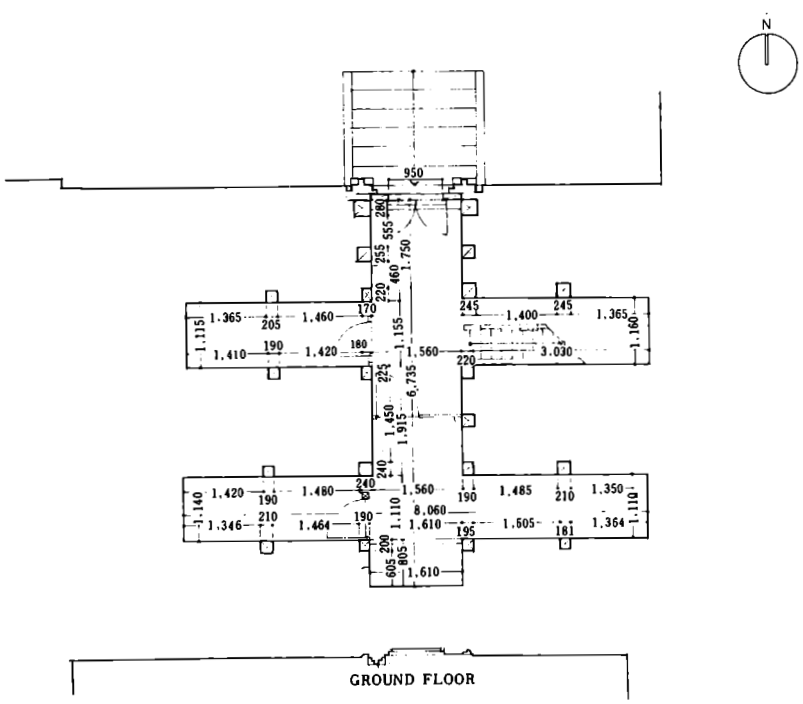
PATAN DARBAR
SUNDARI CHOK, MUL CHOK & AGAN MANDIR
SECTION, FACING EAST. SCALE 1 : 50

PATAN DARBAR
SUNDARI CHOK
MAIN ENTRANCE SCALE : 20

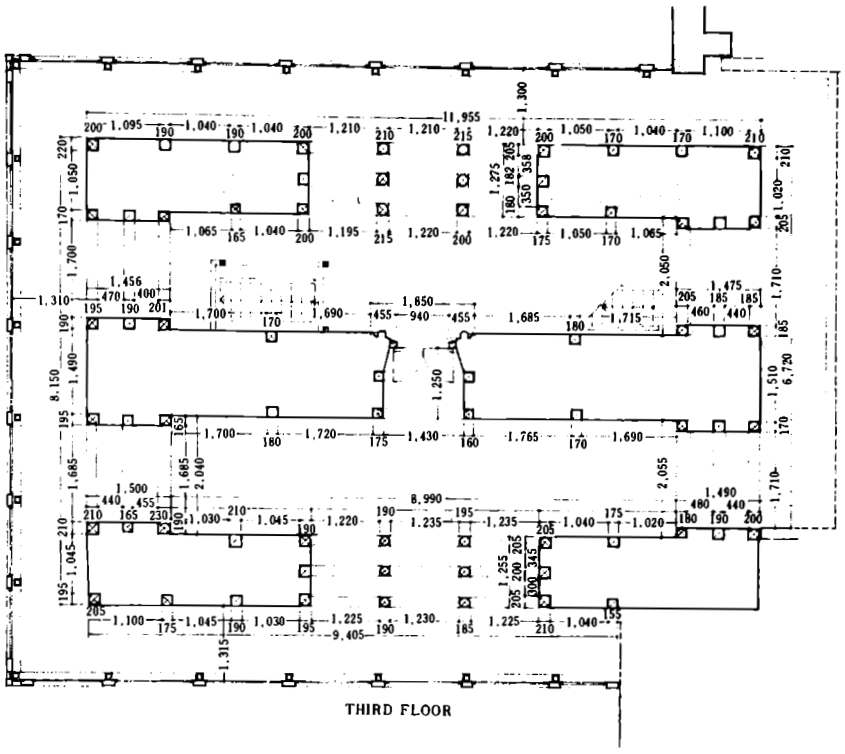


PATAN DARBAR
MUL CHOK
ENTRANCE(1 W – 13). SCALE 1 : 20

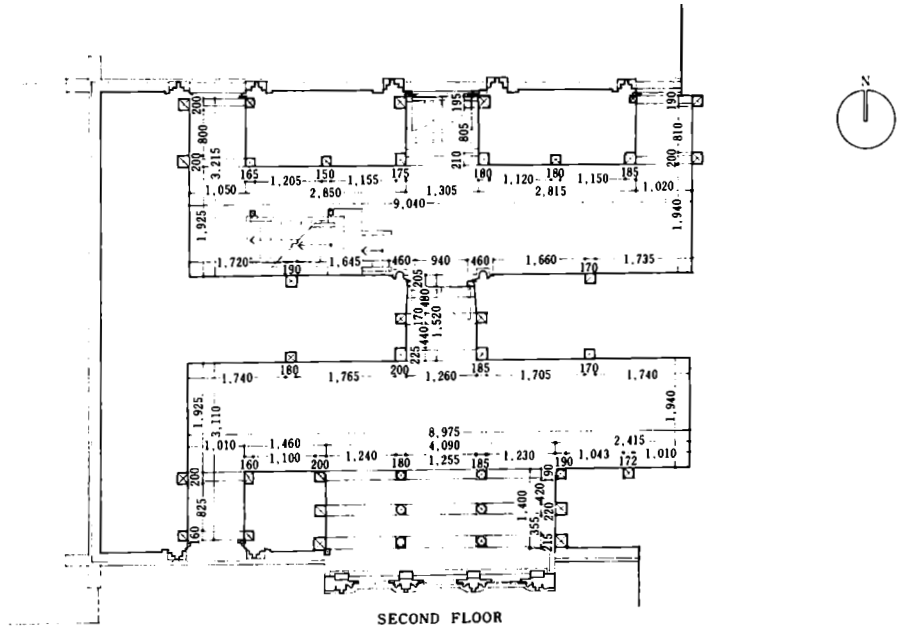




KATHMANDU DARBAR
BASANTAPUR BHAWAN
GROUND & FIRST FLOOR PLAN, SCALE 1 : 100

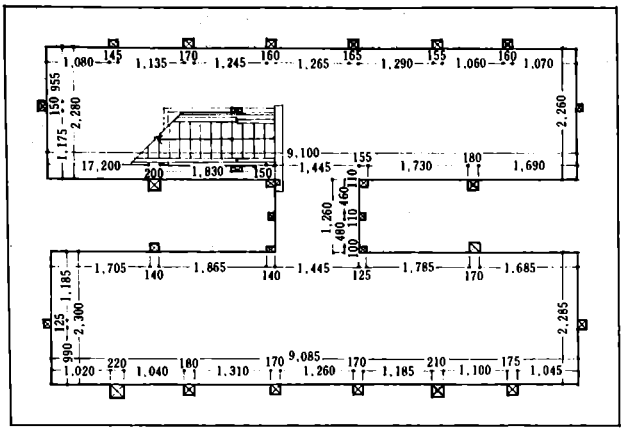


THIRD FLOOR

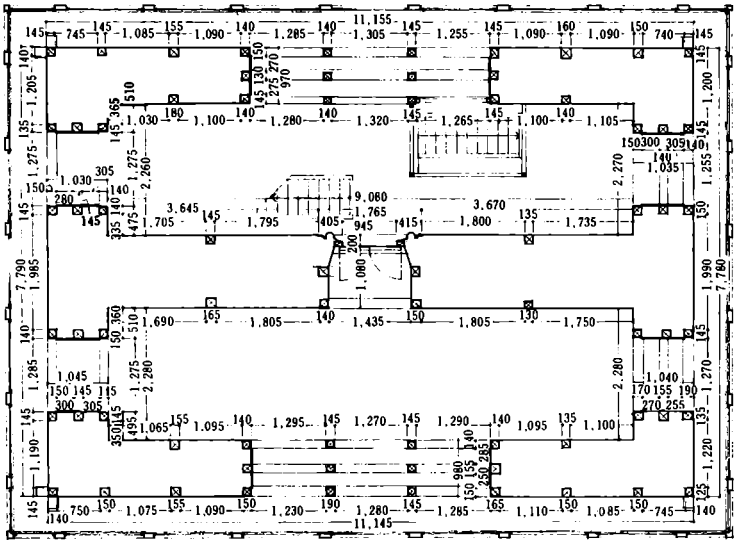


SECOND FLOOR

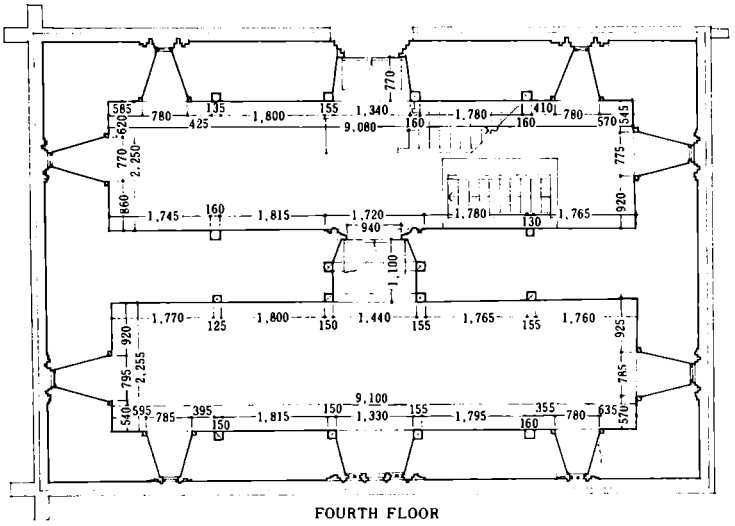
KATHMANDU DARBAR
BASANTAPUR BHAWAN
SECOND & THIRD FLOOR PLAN. SCALE 1 : 100



HALF-HEIGHT FLOOR

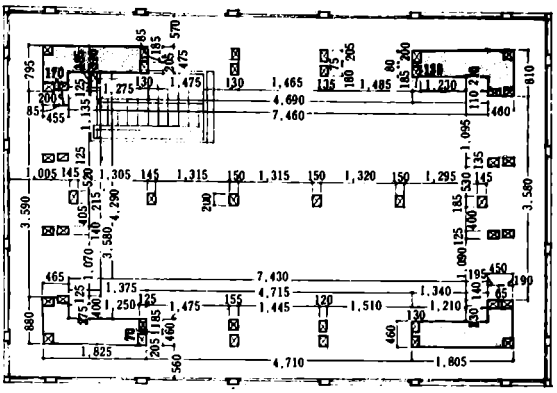


FIFTH FLOOR

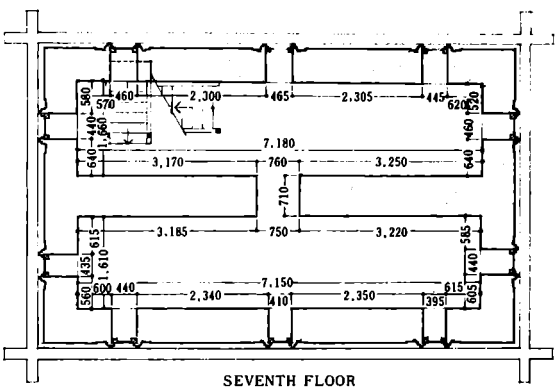


FOURTH FLOOR

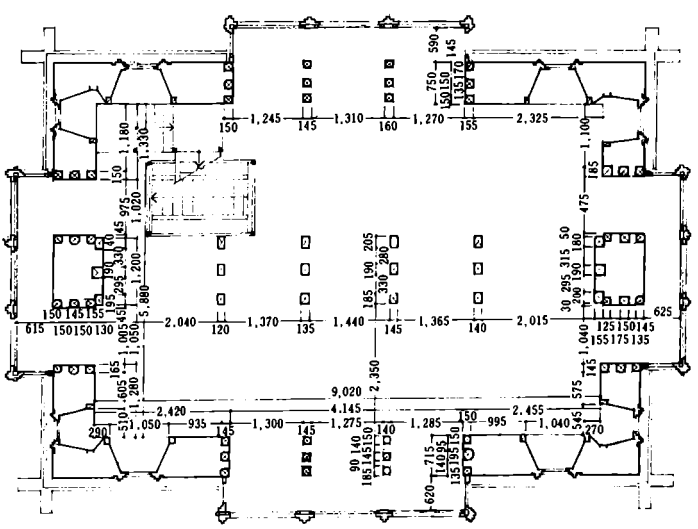
KATHMANDU DARBAR
BASANTAPUR BHAWAN
FOURTH, FIFTH & HALF-HEIGHT FLOOR PLAN. SCALE 1 : 100



EIGHTH FLOOR

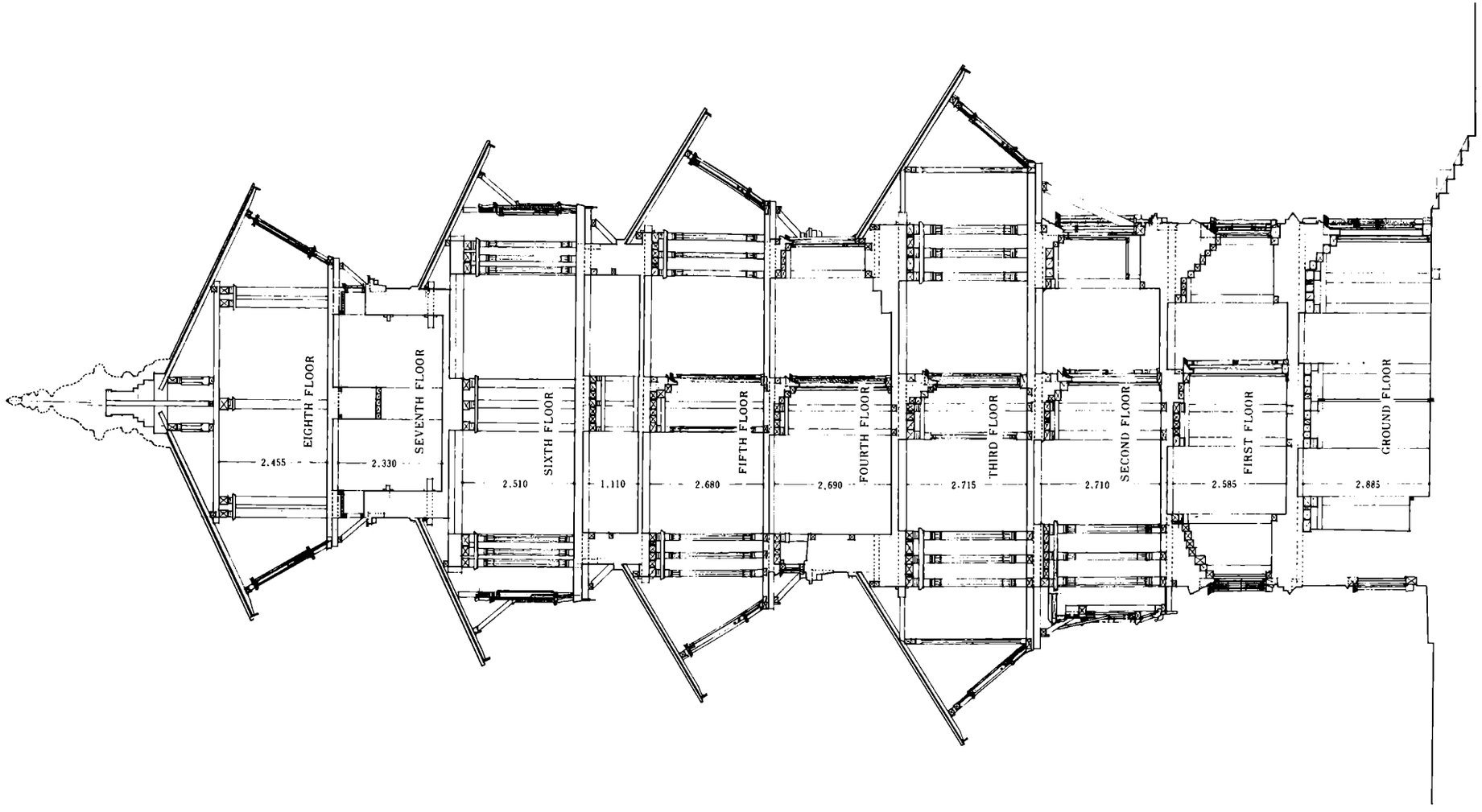


SEVENTH FLOOR



SIXTH FLOOR

KATHMANDU DARBAR
BASANTAPUR BHAWAN
SIXTH, SEVENTH & EIGHTH FLOOR PLAN. SCALE 1 : 100



KATHMANDU DARBAR
BASANTAPUR BHAWAN
SECTION, FACING WEST, SCALE 1 : 100