

**PRINCIPLES OF DESIGN AND CRAFTSMANSHIP IN THE TRADITIONAL  
ARCHITECTURE OF JAISALMER**

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Himanish Das  
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## PRINCIPLES OF DESIGN IN THE TRADITIONAL ARCHITECTURE OF JAISALMER

### Abstract

The study focuses on the sandstone *havelis* (urban courtyard houses) of the desert city of Jaisalmer, north-west Rajasthan, India. While the city has been much admired by contemporary Indian architects, their understanding has been a Modernist one, based largely on the idea of 'spatial organisation'. This is the first systematic study of the architectural tradition of Jaisalmer. The approach taken is one of detailed formal analysis, through which principles of design have been deduced. Two sources have provided the primary material: the buildings themselves, and the present-day practitioners of the craft tradition, who inherit their practices from the relatively recent, nineteenth-century heyday of *haveli* building in the city. Drawings by the author, both detailed measured drawings, and explanatory drawings, have been an essential analytical tool, and form an integral part of the thesis.

Setting the context of the tradition, the history of Jaisalmer is outlined, and the form of the city and its districts is described. Three distinct architectural schools, or *shaili*, are then identified. The *Sompuriya shaili* (the Sompuras are traditional temple builders) has its roots in the medieval architecture known from surviving temples, the *Mughlai shaili* is influenced by the imperial *Mughal* style, while the *Angrezi* (English) *shaili* brought an influx of western Classicism. Broadly speaking the schools and their respective styles correspond to three phases, but examples can be found combining these styles, for which a number of explanations are put forward.

The buildings are analysed at their various levels of organisation: formal and spatial planning, composition of elevations (interior and exterior), architectural components and details. It is argued that, as a concept in design, architectural 'form' has traditionally taken precedence over 'space', and that the basic notions of centre, symmetry, and the relation of the part to the whole, are fundamental. Aedicules, miniature representations of buildings, play an important role as compositional elements. Freedom and great inventiveness is demonstrated on the part of the designers, within the medium of the architectural language.

The building craftsmen in Jaisalmer work mainly for the local population, and can produce high quality craftsmanship comparable with the best workmanship of the past. Based on a period of six months (January – June, 2003) spent on site with a group of craftsmen, their tools and techniques are described, together with the principles that they use in making certain key components, particularly geometrical *jalis* (tracery screens). Although craftsmen have traditionally worked directly on stone, never recording designs on paper for fear of copying, the author's informants were willing to demonstrate their methods for the present study.

Case studies illustrate the varied application in practice of the design principles. Nine *havelis* are surveyed, classified typologically, and analysed in terms of their overall planning and composition. Two further, exceptional examples, from the *Patuon ki Haveli* group, are treated in greater detail.

## Chapter 1 INTRODUCTION

The study is the first systematic analysis of the architectural tradition of Jaisalmer in north-western India, focussing on the *havelis* (urban courtyard houses) of the region. The emphasis of architectural design characteristic of the tradition lies in the conception of form, as opposed to 'space' which is the main preoccupation of the Modernist approach to design. The buildings are analysed at various levels of organisation: formal and spatial organisation, composition of elevations, various architectural components and details. The two main sources for the present research are the *havelis* themselves and the present day building craftsmen who inherit their skills from nineteenth-century heyday of *haveli* building. The ideas of centre, symmetry and balance are discussed as the main design concepts on which the formal articulation of the parts of the *haveli* is based. Aedicules, miniature representations of buildings, are the key compositional elements, used with great inventiveness and creativity in the hands of craftsmen. The tools of present day craftsmen are discussed, and their methods of design and making, with particular reference to certain key architectural elements, including geometrical jails (tracery screens).

In seeking an indigenous artistic expression, contemporary Indian architects have from time to time closely examined India's traditional architecture, and have attempted to appropriate some of its tectonic qualities in their own work. Their points of reference have been specific cities and architectural complexes, dating from different periods of Indian history, with no particular stylistic uniformity and located in different climatic regions of the vast sub-continent. The chief paradigm in the evaluation of India's traditional architecture has been 'spatial organisation'. Ranging from the compact clustered arrangement of courtyard houses of Jaisalmer to the grand celebration of interconnected open spaces in Fatehpur Sikri and the structured layering of spaces in the great temple complexes of South India, these 'role models' have, in one great sweeping gesture, been put on the same level as emblematic of 'traditional Indian architecture'.<sup>1</sup> The complexity and layering in spatial organisation, compositions of solids and voids, light and shade, colour and texture, and picturesque arrangements of urban elements such as streets, courtyards and staircases, have been the chief paradigms for discussion and analysis. Discussions of this nature have been ongoing for more than the past two decades. The particular architectural traditions within which these edifices have been created have been completely ignored in this exercise. This is all the more alarming as there are vast numbers of traditional craftspersons in different parts of India, who continue to work today in the same idiom as traditional buildings.

Jaisalmer has been of great interest amongst contemporary architects in India and in art historical studies, providing a model for a tight-knit urban fabric appropriate to the hot and dry climate of much of northern India.<sup>2</sup> In the early nineteenth century, James Tod (1829/32) narrated its detailed history from antiquity upto his times, amongst other Rajput kingdoms.<sup>3</sup> Oscar Reuther (1925) published extensive high quality photographs and plans of major Rajput palaces including the palace at Jaisalmer. Art historical research was initiated (but left

<sup>1</sup> The selection of buildings representing India's traditional architecture for the Festivals of India in the 1980s is representative of this approach. Exhibition documents published as: *Architecture of India* (Festival of India in France, 1985) and *Vistara* (Festival of India in the USSR, 1986).

<sup>2</sup> Raj Rewal, 'The Relevance of tradition in Indian Architecture', in *Architecture of India*, (Paris: Electa Moniteur, Ministere des relations exterieures, 1985).

Raj Rewal and Architectural Research Cell, 'Jaisalmer', in *MIMAR* 20 (April-June, 1986), pp. 69-78.

Kulbhushan Jain, 'Jaisalmer', in *A+U* (February, 1977), pp. 13-24.

<sup>3</sup> James Tod, *Annals and Antiquities of Rajasthan*, 2 vols (New Delhi: Rupa & Co., 2002)

First published (London: Routledge & Kegan Paul Ltd., 1829).



incomplete) by Herman Goetz in the 1940s-50s, and more recently GHR Tillotson has treated the palace architecture of Jaisalmer art historically, along with other Rajput palaces of the desert states. Visual documentation through drawings and photographs has been carried out in recent years by INTACH (Indian National Trust for Art and Cultural Heritage), by the Architectural Research Cell headed by Raj Rewal, for the Festival of India in France, 1985, and by students of various schools of architecture in India (SPA, CEPT amongst others).

While the city is well known and reasonably well documented, no study has yet analysed its traditional buildings in terms of a consistent tradition, rooted in craft practice, and with its particular principles of design and vocabulary of forms. Jaisalmer has a thriving building-craft industry, kept alive primarily by the local population, a significant proportion of which prefers to build their houses in the traditional way. This enables an analysis of the historical tradition (represented by the buildings of the past) in relation to the live tradition (embodied in the living craftsmen).<sup>4</sup>

My observation and analysis of working methods of craftsmen in Jaisalmer has revealed that the prime concern of the building craft tradition is centred on architectural form. There is evidently a rigorous formal discipline within which the plans and sections of the building are worked out and the building massing organised. There is also a grammar of design involving various architectural elements, which are combined in an established syntax. In the resultant building, the 'spatial organisation' which has been the primary concern of contemporary architects and art historians, is the by-product of the formal design discipline, and is not intended as the prime objective of the traditional design process. Most of our contemporary architects received a Modernist education, and have retained their Modernist ideologies in the reading of traditional architecture. For most modernists, traditional form is taboo, and any attempt at analysis or experimentation with traditional form is immediately labelled as pastiche. Experimentation or innovation within the spirit of tradition is only possible through an understanding of the process of design, for which a thorough formal analysis of the architectural tradition is a prerequisite. The analogy is similar to traditional music. Once you know the rules, you can bend them and improvise. You cannot do so as an outsider.

Thorough formal analysis of an architectural tradition involves its language and syntax, principles of design, systems of measurement and proportion, aesthetics, and methods and techniques of production.

It would be useful here to explain briefly the use of the terms 'language' and 'syntax', in the current context. 'Language' refers to the architectural elements characteristic of the architectural tradition, which are combined in various ways to create the tangible building form. This is suggestive of the use of words in a particular language. The use of 'language' in this context is merely suggestive of the way the building communicates with a viewer or spectator, just as combinations of words is the medium of communication in language.

'Syntax' refers to the rules characteristic of the tradition for assembling together or composing various architectural elements, both at the micro and macro scale in the context of a building. The linguistic analogy thus provides useful terms, but no exact correspondence between architecture and language is implied.

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<sup>4</sup> Most craftsmen interviewed by myself trace their skills from their ancestors. Reputed master craftsman, Liyaqat Ali, and his brother Pir Mohammad learnt the craft from their father, whose exceptional handiwork may be seen in their own unfinished *haveli*, and some public buildings in Jaisalmer. Their sons are learning the skills of the trade working alongside them, on live projects, in their workshop.

Studies from a broad range of sources (art historians, architects, research/documentation projects) on the immediate subject of Jaisalmer, and on the broader subject of the use of the correct paradigm in the interpretation of traditional buildings in India, have broadly speaking, steered clear of systematic formal analysis of particular architectural traditions. This, in most cases involves substantial primary research of visual material (particularly through architectural drawings, both measured drawings and analytical studies) of the particular architectural tradition being studied, as a starting point.

### *Jaisalmer and its architectural tradition*

The desert city of Jaisalmer is located in the western extremity of present day Rajasthan, on the border with Pakistan. It is bound on the north by Bikaner, and Bahawalpur (Pakistan), on the west and southwest by Kherpur-Sindh (Pakistan), on the south by Barmer and Jodhpur, and on the east by Jodhpur and Bikaner (*fig. 1*). Originally a kingdom of the Rajput Bhattis, it was founded by Rawal Jaisal in 1156 AD, on Trikuta Hill, the site fabled to be the spot where Lord Krishna dug a well to quench Arjuna's thirst. It rose to power as an autonomous Rajput principality between the sixteenth and eighteenth century. In the beginning of the nineteenth century, it was the last Indian state to sign the treaty of 'perpetual friendship and alliance' with the East-India Company.<sup>5</sup> Jaisalmer is located between 26 degrees 4 minutes and 28 degrees 23 minutes north, and 69 degrees 20 minutes, and 72 degrees 42 minutes east. The ancient names of Jaisalmer are Mandadhara and Vallabhadesa. The languages spoken include Marwari, and Sindhi mixed with Marwari (*Dhat-ki boli*). The traditional festivals include *Sawan Teej*, *Gangaur*, *Akshya Tritiya* and *Mahavir Jayanti*. *Sawan Teej* commemorates the reunion of *Parvati* with *Shiva*. *Gangaur* is celebrated during the monsoon season, with the procession of the idol of goddess *Gouri*. It is attended by people from all castes, communities and religions. *Akshya Tritiya* is celebrated primarily by farmers in the anticipation of timely rainfall and good crops, and *Mahavir Jayanti* is the birthday of Mahavir. The inhabitants of Jaisalmer include Rajputs, Jains, Sindhis, Muslims, Oswal Jains and Brahmins, and various tribes such as *Bhils*, *Jogis*, *Jats*, *Sonis* and *Khetris*.<sup>6</sup>

Jaisalmer evokes images of tightly packed courtyard houses crafted in golden yellow sandstone, set at the base of the massive bastions of the citadel, captured so eloquently in Satyajit Ray's film *Sonar Kella* (*fig. 2*). The traditional architecture of the city is embodied in the *havelis*, which are introverted town houses, ranging in size from small two bay dwellings to large multiple-bay, multiple-courtyard buildings.

The formal qualities of the architectural tradition of Jaisalmer are the result of a synthesis between the medieval architectural tradition of Gujarat and that of the neighbouring Rajput kingdoms, chiefly Mewar and Marwar, and with Sind, and later, with the imperial Mughal tradition. In terms of architectural style, there are three different schools or *shailis* in the long course of development of the architectural tradition: *Sompuriya*, *Mughlai* and the *Angrezi* (English) *shaili*. In this study, the terms used to describe the different schools or *shailis* are based on the terminology used by present day craftsmen to distinguish between them. The differences between the different schools are visually distinct and fairly easy to discern. However no study on Jaisalmer to date has identified these three distinct *shailis*, with their particular repertoire of forms, principles of design and style of carving. The *Sompuriya shaili*

<sup>5</sup> Tod, 2002, Vol.2, pp. 216-222

<sup>6</sup> Hari Singh Bhati, *Annals of Jaisalmer* (Bikaner: Kavi Prakashan, 2002), pp. 436-438.

is the oldest school and originated in the Sompura temple builders of Gujarat. The *Mughlai shaili* borrowed its repertoire of architectural forms from the imperial *Mughal* tradition, and the *Angrezi shaili* was based on the Western Classical tradition. The increased affluence of the region in the eighteenth to mid-nineteenth centuries, caused the emergence of a new class of wealthy merchants, who in the building of their *havelis* sought the handiwork of the best craftsmen from neighbouring Sind, Jaipur, Bikaner, Dhayasar, Jajiyon and Kanoi.<sup>7</sup> This 'golden period' occurred rather late in the history of Jaisalmer, ironically during British rule (late eighteenth through nineteenth centuries), when indigenous craft traditions in other parts of India were on the decline. Some grand *havelis* built during this period, such as the five *Patwon ki Havelis* and *Nathmal ki Haveli*, may be rated as some of the most sophisticated examples of residential architecture ever produced in India.

### *Methodology*

For a systematic and thorough analysis of architectural language, grammar and syntax in the architectural tradition, this study draws on two sources: the existing *havelis* themselves, and observations of the design and working methods of contemporary building-craftsmen. Intuitive deduction of principles of design from the observation of repeated formal patterns in the existing buildings were confirmed and sometimes clarified in discussion with craftsmen. I received a Modernist architectural training. My bias, in primarily reading space structuring in the architecture, was gradually transformed to a form-based approach to understanding the architecture. The terminology in this craft tradition, which I am using in my thesis, is in the local dialect, as is in use amongst craftsmen, with its specific systems of measurement and tools of making. Although the terminology initially seemed like a potential barrier to fully appreciating the tradition, it was gradually transformed into a fresh new sensibility towards approaching architectural form. This was only possible due to the time spent with craftsmen, while they conducted informal tutorials on their methods of working.

Two options emerged initially, in the endeavor to document traditional buildings; to survey a large number of *havelis*, and from them to deduce the essential design principles, or to select a few representative examples and subject them to a rigorous formal analysis. The method adopted eventually combines aspects of both. The initial survey exhaustively looked at most of the *havelis* in the region, certainly not merely the grandest and most impressive ones. Out of these, nine *havelis* are documented, which may be dated between the sixteenth and nineteenth centuries. These display a range of stylistic affiliations, and also illustrate phases in the development of the different styles. These *havelis* illustrate the overall spatial and formal organisation, and the principles followed in designing the elevations. What surfaced quite early on, is that there is a set of simple rules of thumb for design and composition, and a set of architectural components.<sup>8</sup> These set of rules of composition and architectural components are combined to the effect of endless variety and innovation, with the result that no two *havelis* are alike. Even if two buildings are similar in their plan arrangement and general disposition of rooms, their architectural details might vary considerably, with the result that they might appear completely distinct.

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<sup>7</sup> Ibid., p. 416

<sup>8</sup> In the traditions of Indian temple architecture, Adam Hardy has demonstrated a similar use of architectural components in the overall composition of the temple. See Adam Hardy, *Indian Temple Architecture, Form and Transformation* (New Delhi: IGNCA, 1995).

Not guided by constraints of time or resources (both of which, though were, as always, at a premium), but by the apprehension of abortive documentation exercises of numerous buildings, each showing a variation, or 'another solution' so to say, of 'possibilities' which are in effect endless, it was a considered decision to focus the study on the detailed analysis of two *havelis*: *Bahadurmajli Haveli* and *Jorawarmalji Haveli*. Both form part of the *Patuon ki Haveli* group comprising five havelis, which were built by a *Patua Seth* for his five sons. In my understanding, these *havelis* are representative of the quintessential formal and spatial qualities achieved in *haveli* architecture in the 'golden period' during the nineteenth century. The study of the two *havelis* is aimed at detailed analysis of architectural form, in order to understand architectural vocabulary, grammar and syntax .

The survey of existing buildings and drawing them to scale was the most important tool in understanding the principles of design. All the architectural drawings featured in the study were surveyed on site, in Jaisalmer, and executed solely by myself between 2002 and 2004.

### *Traditional Architecture and its Critical Evaluation*

'Tradition and its relevance in contemporary practice'- the topic raised by Havell in 1913, in his *Indian Architecture*, has dogged generations of art historians, critics, and architects, ever since. Havell's concern in his pioneering effort was the modern architect, as he emphatically states in the Preface: 'Historical studies miss their aim unless they can make clear the bearing of the experience of the past, upon the actualities of the present day'.<sup>9</sup>

Havell wrote this in an atmosphere charged with concern for an appropriate architectural style in the building of New Delhi, when it was seen as the last and only eminent hope of preserving the indigenous skills of craft-guilds, their creative vigour denuded for decades by the hostile attitude towards it, of the Public Works Department.<sup>10</sup> The past six decades have witnessed more discussions, more debates, more articles, on the subject, especially so in the recent years, with the general disillusionment with the Modern Movement world wide.

Modernism arrived in India with a bang in the 1950's with the father of the Modern Movement Le Corbusier, commissioned to deliver a complex of government buildings in Chandigarh, as an appropriate symbol of independent India. Following the work of another modern master, Louis Kahn, on Indian soil in the 1960's and 70's, it did not take long for Indian architects to get converted to the ideals of Modernism. If New Delhi was not the final blow to the near-complete annihilation of the indigenous building craft skills, this certainly was. The purist clean-line language of Modernism, with rampant use of poured concrete and exposed brick, no matter how inappropriate these materials were to the climate of India, became the fashion of the day.

Over the past few decades, the question of an 'appropriate architecture' has become pertinent, suited to the cultural ethos of the people, adapting to the local vernacular tradition, employing indigenous craft skills, and materials. A number of architects have addressed this, through

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<sup>9</sup> EB Havell, 'Preface', in *Indian Architecture Its Psychology, Structure and History from the first Muhammadan Invasion to the Present Day*, 2<sup>nd</sup> edn. (London: John Murray, 1927).

<sup>10</sup> For a comprehensive history of the Public Works Department of the British Govt. and its antagonistic attitude towards indigenous craftspeople, see G.H.R Tillotson, *The Tradition of Indian Architecture: Continuity, Controversy and Change since 1850* (Yale, 1989).



their work, chief among them being Charles Correa, Raj Rewal and BV Doshi, all of India, and Geoffrey Bawa of Sri Lanka.

With this resurgent interest in indigenous architectural traditions, has emerged the concept of the 'correct paradigm' to be used in the critique of traditional architecture. The correct paradigm becomes all the more pertinent to the practising architect, who projects his interpretations, from the reading of traditional buildings directly onto his work. Most of the architects, who through disillusionment with the after-effects of Modernism have turned to indigenous artistic sources, ironically have retained their Modernist ideologies and aesthetics. Their critique or paradigms for aesthetic judgement are rooted in the Modernist school of thought. Architectural form is interpreted in terms of primary geometrical forms, compositions of light and shade, solids and voids, the aesthetics of colour, texture, and most importantly as compositions in space-making exercises, the chief preoccupation of architectural design in the Modernist idiom. Practiced and propagated simultaneously by art historians and architects, this approach to the analysis of traditional buildings is primarily fuelled by the question of re-interpretation of aspects of traditional built-form in contemporary architecture. Space-making for its own sake, as an aesthetic activity, is one of the main concerns of the Modernist school. The relationship of open space versus covered and semi-covered spaces, the physical and visual linkages between spaces, and through spaces, the impact of space on the observer passing through the building and so on, are design issues which have been discussed and written about inordinately, and form a very important part of the skills a student of architecture is supposed to acquire in his/her training at the school of architecture.

Traditional built form provides wondrous models of spatial relationships, and that itself becomes an issue of study, analysis and discussion. The intention of the *sthapati* (the traditional architect) and craftsmen in the design of these spaces, and the architectural process which led to these spatial effects in the built-form, is never questioned. The sheer physical beauty of the spaces, and the effect they have on the observer, becomes the main topic of discussion. Advocated by the most successful practitioners of the contemporary industry, this way of seeing gets sacrosanct validation, as the 'correct' and 'only way to see', in academic circles, and the media. The traditional architecture of Jaisalmer, Rajput palaces in various parts of Rajasthan, Mughal palace complexes, such as Fatehpur Sikri, amongst others, have been subjected to this kind of analysis, time and again. The visual images collected from a range of traditional architectural examples reappear in carefully orchestrated sequences of courtyards, terraces, *chowks*, streets, and vistas, in new architectural creations. Examples include the Asian Games Village (fig. 5) and the National Institute of Immunology, New Delhi (fig. 3, 4), both by Raj Rewal, and the Indian Institute of Management, Bangalore (fig. 6, 7) by BV Doshi. Comprising narrow shaded streets interspersed with open *chowks*, in complex networking of open and covered spaces, the buildings seek to evoke images of traditional building complexes, in a picturesque manner. The discipline in the organisation of the plan and the design of the elevations, however, is Modernist to the core.

None of the notable contemporary Indian architects have attempted to interpret aspects of traditional architectural language imagery. The only notable architect in the sub-continent who has attempted this is Geoffrey Bawa from Sri Lanka. With great skill and a unique personal vision, Bawa, through a bricolage of antique handcrafted building elements with contemporary building forms has created a model approach to a culturally rooted architectural expression (fig. 8, 9). It must however, be mentioned that Bawa's approach too is Modernist in spirit. His work cannot be categorized as belonging to any specific tradition.

The supremely sublime aesthetic of his buildings, perhaps unselfconsciously presents a potential model in the incorporation of handicraft in contemporary buildings.

Amongst many contemporary architects, a significant aspect in the reading of traditional architectural form is a singular loathing of traditional architectural language. Arches, brackets, architectural carvings, and decoration are almost completely ignored by architects, guided by the fear that if they re-surface in their own work, it will be denounced by the critics and their peers as pastiche. Perhaps indirectly originating in the reading of the primary geometrical solids (the cube, cone, cylinder, pyramid, and the sphere) in the ruins of the Greek temple, by Le Corbusier, while in their original form the ruins formed part of polychrome, gilded, gloriously decorated edifices, this approach has generated a reading of traditional built-form as compositions in straight clean lines and rectilinear geometry. Any exercise in the re-interpretation of traditional built-form starts with stripping off all florid and decorative detail-distasteful to the Modernist eye, and the invention of a form merely traditional 'in spirit'.

These attempts at re-interpretation have met with degrees of success, depending mainly on the skill and capability of the designer. The degree of success and failure of these creations has been debated by critics who, applying the same Modernist basis for aesthetic judgment, find them delightful, or disappointingly lacking in some architectural quality which is most important to them personally. These architectural and academic exercises are in no way exercises within the spirit of the architectural tradition they refer to. They can best be referred to as Modernist exercises, which aim at evoking, picturesquely, qualities of traditional architecture which appeals to the architect in a purely personal sort of way. The building-craft tradition which has generated these buildings is completely ignored in this debate, even though a number of highly skilled craftsmen are still available, and one can actually observe their methods of designing and executing a building.

In the realm of art historical writing, the overall approach during the twentieth century may be described as pluralistic. Critical writing and research on the traditional arts started with the pioneering efforts of Fergusson, Havell and others. More recently Tillotson has suggested that the spatial and formal complexity in Rajput architecture is a deliberate artistic attempt to elude an easy reading of the architectural form.<sup>11</sup> There have been some studies which look at individual architectural traditions, with their characteristic design tendencies. VS Pramar (*The havelis of Gujarat*)<sup>12</sup> has looked at the *haveli* tradition in Gujarat art historically, emphasizing the history of the timber craft tradition. He has illustrated *haveli* typologies, and analysed a few examples in detail. Sunand Prasad (*The havelis of North India*)<sup>13</sup> has compared the traditional form of the *haveli* with the bungalow, which developed as a house type during British rule in India, and gradually replaced traditional building typologies. The study also includes detailed studies of a small number of *havelis* in Shahjahanabad. Shikha Jain (*Haveli typologies in Rajasthan*)<sup>14</sup> has done a comprehensive typological study of *havelis* in Rajasthan, identifying regional variations. Plans, elevations and aedicular compositions form the basis of her study.

Fergusson's enthusiasm for traditional Indian architecture, concealed a deep-rooted conviction of the absolute correctness and superiority of the western classical models of

<sup>11</sup> G.H.R. Tillotson, *Rajput Palaces* (New Haven: Yale University Press, 1987)

<sup>12</sup> V.S. Pramar, *Haveli* (Ahmedabad: Mapin Publishing Pvt. Ltd., 1989).

<sup>13</sup> Sunand Prasad, *The Havelis of North India* (unpublished PhD thesis, Royal College of Art, London, 1988).

<sup>14</sup> Shikha Jain, *Havelis: A Living Tradition of Rajasthan* (Gurgaon: Shubhi Publications, 2005).

architecture, of the school he was trained in. His disappointment at any non-conformity of the Indian edifices, with his 'superior' Classical models presupposes an intellectual basis, that there can be no other paradigm of aesthetic judgment, even if works of art are products of another culture, age and time. The notion of picturesqueness in Rajput architecture may be traced back to Fergusson, who, while describing Rajput palaces suggested that 'these were seldom designed with much reference to architectural symmetry, but they are nevertheless always picturesque'.<sup>15</sup> This attitude of imposing a set of criterion for aesthetic judgment on works of art wrought by people of another culture, for purposes entirely different from their western counterparts, was questioned by another English art historian EB Havell, a younger contemporary of Fergusson.

Havell observed that the cultural milieu within which the Indian artisans worked was essentially religious in nature, and this quality determined the purpose of human artistic activity, and the means and methods of working, of the traditional artisans and craftsmen. A great defender and champion in the cause of traditional Indian arts and crafts, he, amongst other like minded contemporaries of his, campaigned vociferously against the decision to assign the design of the Viceroy's House in New Delhi to an English architect, rather than following the age-old tradition of guilds of craftsmen working under the guidance of the *sthapati*, the traditional architect.

The study of an architectural tradition demands a set of paradigms of judgment, an intellectual basis for reading architectural form. Much of recent art history theory, notably in the field of Indian art history, has been involved with the definition of the correct paradigm in the reading of traditional art.<sup>16</sup>

Interwoven in this debate on the identification of the correct paradigm, has been the relation between the architectural treatises, embodying the broad subject of 'the theory of Indian Architecture', and practice. Ananda Kentish Coomaraswamy, an art historian of mixed Sinhalese-English parentage was amongst the earliest writers to argue for the importance of theory and meaning in traditional art. In his interpretation, architecture, as the other arts, has a symbolic purpose, the overall building and its sub-parts expressing ideas rooted in metaphysics. Coomaraswamy based his arguments on the traditional architectural treatises, chiefly the *Shilpashastras*. The best known architectural treatises include *Mansara*, *Mayamatam*, *Aparajitapracchha*, and *Samranganasutradhara*. These treatises generally begin with the supra-human origin of the craft traditions, hence justifying their absoluteness and adequacy. In successive chapters they illustrate rules for site selection, orientation, plan layout, rituals associated with various stages of completion, and so on. The description is often in esoteric terms, and concern abstruse issues which one is not likely to encounter in real life situations.

Coomaraswamy argued that the intent of production of works of art and architecture was of paramount importance, in their interpretation and understanding. Artistic activity, he argued was another human activity and like all human activity in traditional society, its ultimate aim was self-realisation or *moksha*. Drawing extensively on scriptures and other sources of traditional knowledge, including the *shilpashastras* (traditional texts on the theory and

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<sup>15</sup> James Fergusson, *History of Indian and Eastern Architecture*, 2 Vols. (New Delhi: Vedams Books Pvt. Ltd., 1998) (First published, 1876), p. 90.

<sup>16</sup> An interesting work, which discusses this is: G.H.R. Tillotson (ed.), *Paradigms of Indian Architecture* (Richmond, Surrey: Curzon Press, 1998).

practice of the arts), he argued that traditional society was essentially theocentric, and the knowledge of traditional metaphysics and philosophy was an integral part of the intellectual climate of the times. Citing traditional architectural treatises, he asserted that the traditional body of knowledge of the building arts and crafts was supra-human in origin, revealed by Vishvakarma (the divine architect) himself, and transmitted in an unbroken lineage, from master to disciple down to the present times. Beauty is absolute and exists on an ideal plane, and aspects of this absolute beauty are revealed through the language of forms and symbols. Training in this discipline of traditional knowledge, both in theory and practice, is considered a pre-requisite in the training of any traditional craftsman, who sees himself merely as a device for execution of absolute knowledge. This negation of the self is probably best explained by the anonymity of most artisans and craftsmen in their artistic productions, conceived in the social milieu.

Coomaraswamy's dialogue traverses various disciplines of the traditional arts – painting, sculpture, architecture, music, literature, dance, theatre, as his main concern is the meaning and purpose of the traditional arts, no matter in what form. Though Coomaraswamy discusses convincingly the realm of theory and ideas, his work does not venture into practical aspects, as to how all this theory and ideation is actually expressed through the craftsman's or artisan's art.

Contemporary craftsmen, in my observations at Jaisalmer, do not discuss their art in these terms. Their discussion is totally empirical and practical. Armed with traditional theory, one cannot understand the buildings any better, or in an intellectually sounder way. It could, at the same time, be erroneous to say that theory and practice were independent disciplines, and each developed practically independently of the other. It is arguable that theory was an integral part of the traditional craft practice in traditional society, and it has been almost obliterated from contemporary craft practice, through lack of appropriate and adequate patronage. It is also possible that, due to the craft traditions having been through phases of dormancy followed by revivalism, the original relationship between theory and practice was gradually lost.

Innovation within the true spirit of tradition is only possible when the architect is fully conversant with the architectural tradition within which he chooses to work. Design principles, architectural language, syntax, characteristics, techniques, and processes of execution are all parts of the tradition. The repositories of knowledge of the tradition are twofold: the existing buildings crafted by master-craftsmen of the past, and the craftsmen themselves, who have learnt the skills of the trade from their ancestors. The question of whether these craftsmen belong to an unbroken or revived tradition is discussed in Chapter 4 (The Craft Practice). However, it would be useful to mention here that the craft tradition in its present form may logically be seen in continuum with the tradition having reached its flowering in recent history (nineteenth century).

In recent works of art history research, the pioneering attempt of Adam Hardy, in exploring the issue of architectural language and syntax, and the principles of formal composition in the Karnata-Dravida temple architecture tradition, perhaps comes closest to the approach in the present study.

## Structure of the Thesis

In Chapter 2 (The Context), we discuss the social and political history of Jaisalmer, and the morphology of the city. We also illustrate different architectural schools or *shailis*, which broadly relate to different phases in the development of the tradition.

Social and political history is discussed in the section on Social History. The history of Jaisalmer city and the fort is outlined and its lineage of Rawals. The 'golden period' marked by peace and prosperity, and rampant construction activities, occurred rather late and in the history of Jaisalmer (late eighteenth, through nineteenth century). Its indigenous craftsmen produced, in their native style, the celebrated *havelis*, some of the most splendid residential architecture ever produced in the country. The role of the wealthy Paliwal Brahmins and the Bafna Seths is discussed, and Jaisalmer's location on the trade route for trade between Central Asia, and India explained as the prime reason for its wealth. This is coupled with general information on the inhabitants of Jaisalmer – the various castes, and tribes, social customs, festivals.

This is followed by a general architectural introduction to city level organisation, down to street or *mohalla* level. The overall architectural character and morphology of the city is sketched, and the history of its evolution since its founding in 1198 to the present times.

The chapter includes a discussion on the formal characteristic of the different *shailis*. The development of the architectural tradition is traced from the early twelfth century to late nineteenth century. Architectural forms themselves are analysed from the point of view of their origins, that is, native sources, and their importation from other regions, chiefly Mewar and Gujarat, and later from Mughal architecture. The 'golden period' is characterised as a culmination based on a combination/synthesis between design principles of the native tradition and architectural forms and design principles from other sources.

In Chapter 3 (Principles of Design), the rules of design and composition characteristic to the tradition are discussed. The essential concept in form-making throughout the long course of this tradition is the concept of the centre. Embodied in symbols such as the *Vastu-Purusha-Mandala* and the *Yantras*, the concept is the life blood of cultural thought of the traditional society, not just in Jaisalmer, but throughout India. The *Vastu-Purusha-Mandala* is a symbol of the ordered cosmos, comprising the seat of the formless *Brahma* in the centre, with various deities or *padadevatas* arrayed around, the hierarchy in their relative positioning emphasizing the centre and the eight directions of space. The *Vastu-Purusha-Mandala* seen as a key principle in traditional Indian planning, has been an important strand in twentieth century thinking about Indian architecture.<sup>17</sup> While the esoteric content of the symbol is propounded in detail, its practical use is left ambiguous. Neither do contemporary building craftsmen use it at any stage, in the design or the execution of their buildings. Steering clear of the ongoing debate amongst scholars about the relevance and actual use of the *Vastu-Purusha-Mandala*, it is my inference that the *Vastu-Purusha-Mandala* helps to explain metaphysically the concept of the centre. It also attempts to symbolically relate the human act of building i.e. creating order, to reflect a higher archetype of order interpreted in the creation of the ordered cosmos from chaos through the will of the Supreme Intelligence. The concept of the centre takes on a

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<sup>17</sup> For a good summary of this line of thinking, see Stella Kramrish, *The Hindu Temple*, Vol.1 (Delhi: Motilal Banarsidass Publishers, 1976) and Titus Burckhardt, *Sacred Art in the East and West, Principles and Methods* (Middlesex: Perennial Books, 1967).

life of its own, in a conceptual design framework which influences every aspect of design. The craftsman uses it to create endless variety, at diverse scales: from the laying out of the plan to the design of a *jali* panel.

The nature of the tradition lies in the design of the form. Structural logic works hand in hand with the conceptual design framework. We illustrate the use of structural bays in the generation of the plan-form. The structural bays create a grid of load bearing columns, which effectively acts as a design grid. Characteristic design principles for the generation of various spaces, by positioning walls, screens and arcades within the structural grid framework, are illustrated. The design of elevations is also closely based on the structural grid. The overall form of the elevation is derived from the organisation of solids and voids in the facade achieved by projecting sections of the facade from the line of structure.

A palette of architectural elements are incorporated creatively in the detailed articulation of the building. A comprehensive glossary of architectural elements is provided in *Appendix 1*, which may be referred to while understanding the various ways in which these are incorporated in the fabric of the building. Aedicules, which will be illustrated as miniature representations of buildings, are one step above the architectural elements in the hierarchy of compositional elements. These are positioned in key areas of the elevation, adding considerable richness and variety to the scheme.

The final part of Chapter 3 'Architectural Components and their Details' identifies the basic building elements, both in their simplest forms, and more complex, composite forms, and varieties within each type. The 'architectural components' include columns (*khamba*), arches (*margol*), brackets (*todi*), balconies (*jharokha*), windows (*bari*), plinth (*dasa*), various mouldings, infill panels with geometrical and foliate and vegetal patterns, ceilings and door types, storage spaces (*ala*, *beel*), lamp niches (*diyaslai*), railings/balustrades (*balli*, *mundi*). The ornamental patterns are classified as being based on the *Mughlai*, or *Sompuriya shailis* – the two prime schools of design in Jaisalmer, with a brief note on their respective characteristics. My attempts to draw these architectural components to scale is probably unprecedented as the craftsmen themselves explained, that they draw directly on stone, and do not or have never kept records on paper or other media for fear of mass copying.

This apparent breach of copyright has been enthusiastically supported by all craftsmen, whom I encountered on site in Jaisalmer, as a serious endeavor to spread ideas, with enthusiasm about the traditional arts, all the more pertinent in an age in which the societies where they have continued to survive do not realize their value, and are all set to embrace the faster, cheaper and populist products of a global culture, no matter howsoever faceless they might be.

The building craft tradition as practiced by contemporary craftsmen is the focus of Chapter 4 (Craft Practice). In the course of numerous interactions with contemporary craftsmen and artisans, they made it clear that they have acquired their skills from their ancestors, and that they are proud of passing their knowledge and skill on to future generations. For the craftsman, the disciplines and rules of the architectural tradition are first to be learnt and internalized – knowledge, which may be obtained from a *guru* or *ustad*, or from supreme examples of handiwork of master-craftsmen, both past and present. Equally important is dexterity in practical work. Much of the labour intensive activities might be relinquished to juniors or apprentices, with the artisan being bestowed with *ustadhood* or *guruhood*. The concerns of the traditional craftsman-designer contrast heavily with those of a contemporary architect. On observation of the working methods of traditional craftsmen, this was immediately apparent to me. The contrast was perhaps more acute in my observations, as I

was trained in the modernist school, which since the sixties has been and continues to be the preferred intellectual orientation of most architectural schools in India.

The discussion also touches on the building craftsman, as he is allowed to practice in the contemporary building industry. Limited mainly to decorating the facades of buildings which in essence are modern utilitarian layouts, the master-craftsmen in some exceptional cases is allowed to design the entire *haveli*. But such instances are rare. The mindset of the contemporary user, used to the convenience of contemporary layouts coupled with a love and pride in the sheer beauty of traditional architectural form, fuelled also perhaps by a desire to display affluence, generates this hybrid. The passive acceptance of this dichotomy in the approach to architectural design on the part of the traditional craftsman is perhaps fuelled by the fact that, at least, they still have work available, and do not have to resort to driving rickshaws or running tea-stalls, as many of their peers in various other parts of India.

The main focus in the chapter is on the working methods, tools and techniques of contemporary building craftsmen, as recorded by myself through a series of interviews and discussions with craftsmen on site in Jaisalmer. The tools used in the design process depend on the nature of design – geometrical, or organic and vegetal. Various tools used in design and the carving process are discussed, with reference to the different stages of carving from layout to finishing. The systems of measurement and proportioning used by craftsmen are discussed next. This is demonstrated through various architectural elements such as the cusped arch (*margol*), fluted column (*surangdar khambha*), and the *kangra* – a popular frieze motif, used above projected eaves (*chajja*). With reference to geometrical *jali* designs, the concept of the grid or *chiraqya* as the basic generative diagram is explained. The grid is different for designs based on different geometrical shapes: square, hexagon, octagon. A number of designs based on each grid type are explained with their method of construction.

The unit for measurements used by contemporary craftsmen is feet and inches. Historical buildings are also described by them in these units. It is due to this reason that feet and inches are used while discussing measurements throughout the thesis.

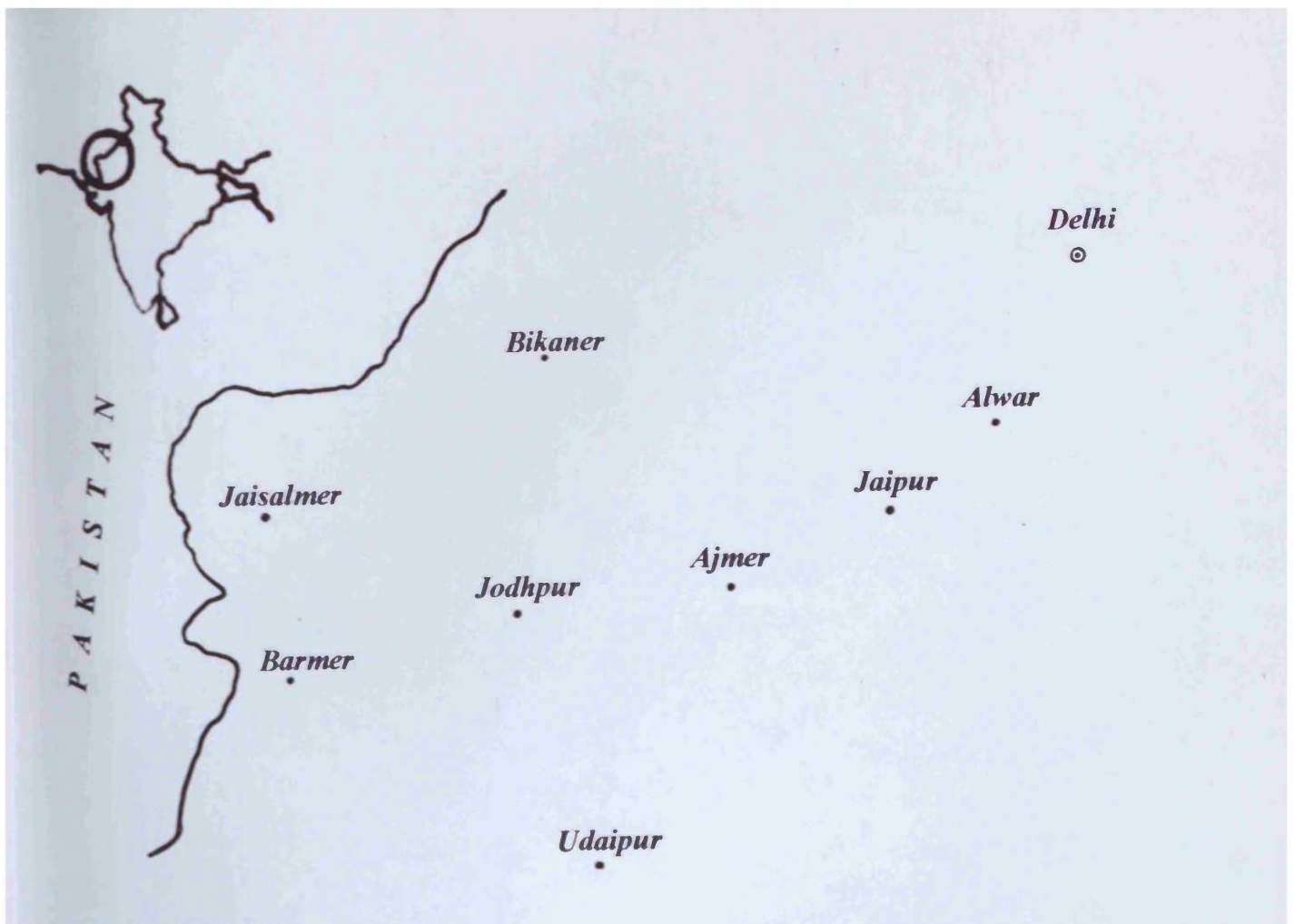
In Chapter 5 (Case Studies of Overall Planning and Composition), the principles of design are illustrated through their application in the design of nine *havelis* of diverse scales located in different parts of Jaisalmer. The *havelis* are classified typologically and their overall spatial and formal composition is discussed. Key stylistic characteristics and the aedicular composition in their elevations are also briefly discussed.

Chapter 6 presents two detailed case studies. The two *havelis* from the *Patuon ki Haveli* group, forms the topic of detailed analysis, as part of the detailed case study. The *havelis* are the first (*Bahadurmalji Haveli*) and last (*Jorawarmalji Haveli*) of the northern row of the *Patuon ki Haveli* group. While *Jorawarmalji Haveli* is bounded on its two longer sides with other *havelis*, with the two shorter sides (front and back) facing streets, *Bahadurmalji Haveli* is open on three sides, facing streets, and a *chowk*, and a part of the house is built over the street, forming a gateway. The discussion starts with the general spatial characteristics, and moves on to detailed architectural analysis of plans, sections, external elevations, internal room elevations, ceiling types and details, illustrated with measured drawings done by the author.

Apart from emphasizing the nature of design in the tradition, the Conclusion to the thesis also discusses the potential application in contemporary practice of the principles of design that



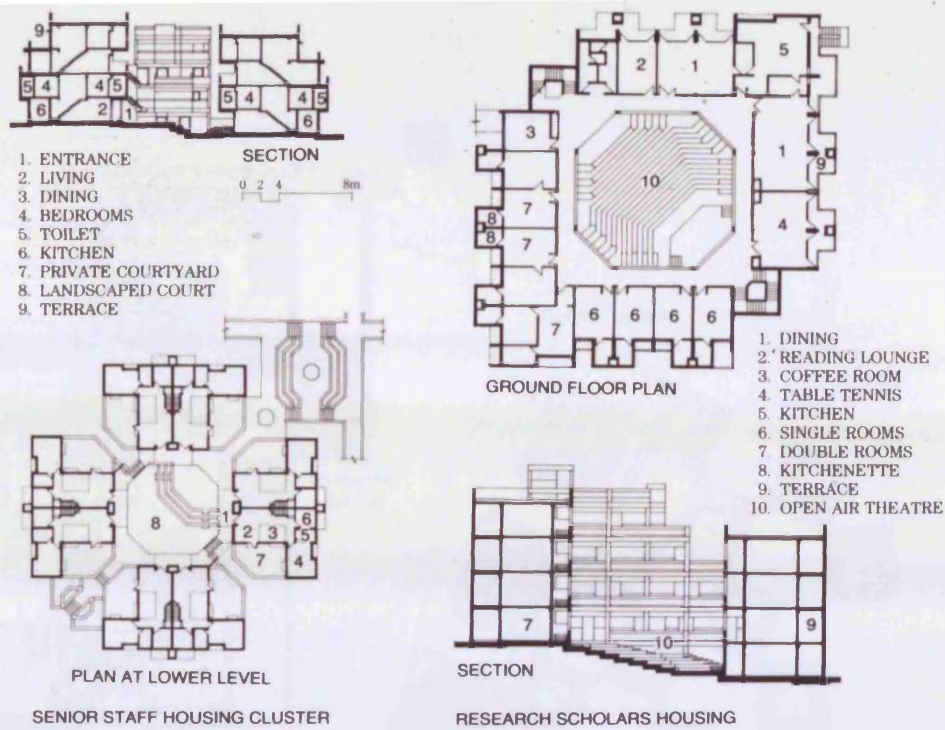
have been deduced. Given the constraints of time and resources in contemporary practice, the 'range of possibilities' of actually using hand-crafted building components is discussed. The issue of architectural language is discussed in the context of integrating traditional form in a contemporary design approach.



*Fig. 1 Location of Jaisalmer*



*Fig. 2 Aerial view of the city of Jaisalmer seen from the palace*



*Fig. 3 Plans of housing clusters, National Institute of Immunology, New Delhi. Architect: Raj Rewal*



*Fig. 4 Elevation of housing cluster, National Institute of Immunology, New Delhi*



*Fig.5 Housing cluster, Asian Games Village, New Delhi. Architect: Raj Rewal*



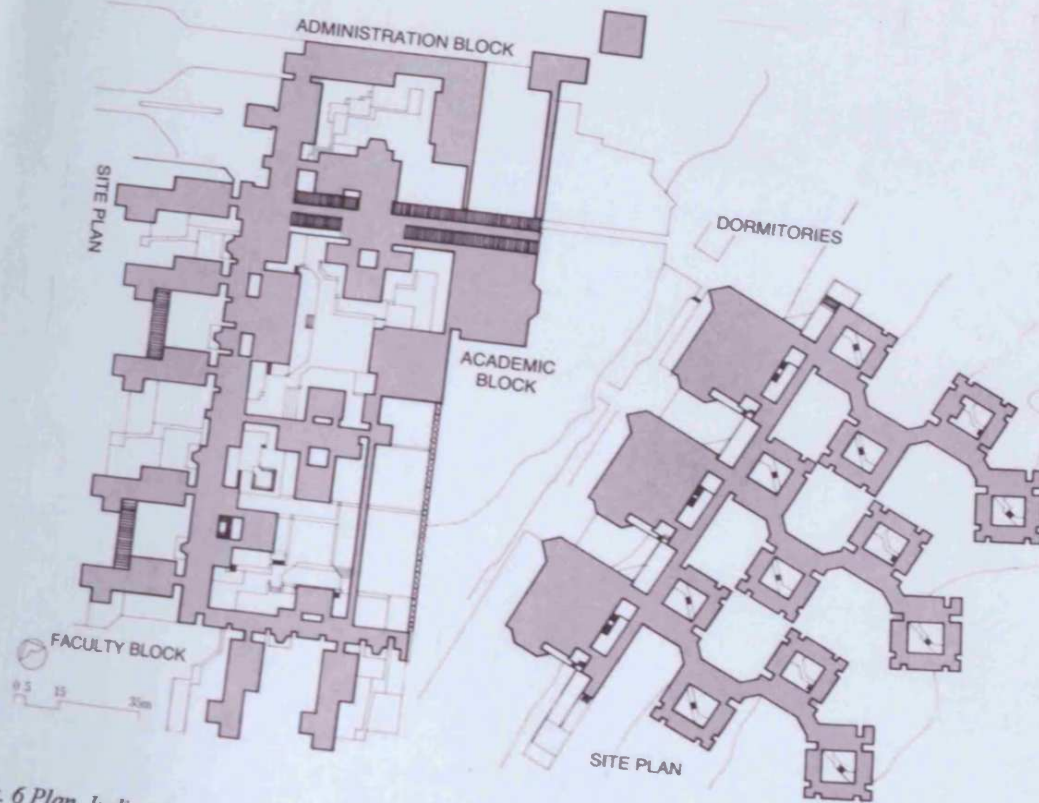


Fig. 6 Plan, Indian Institute of Management, Bangalore. Architect: B.V. Doshi

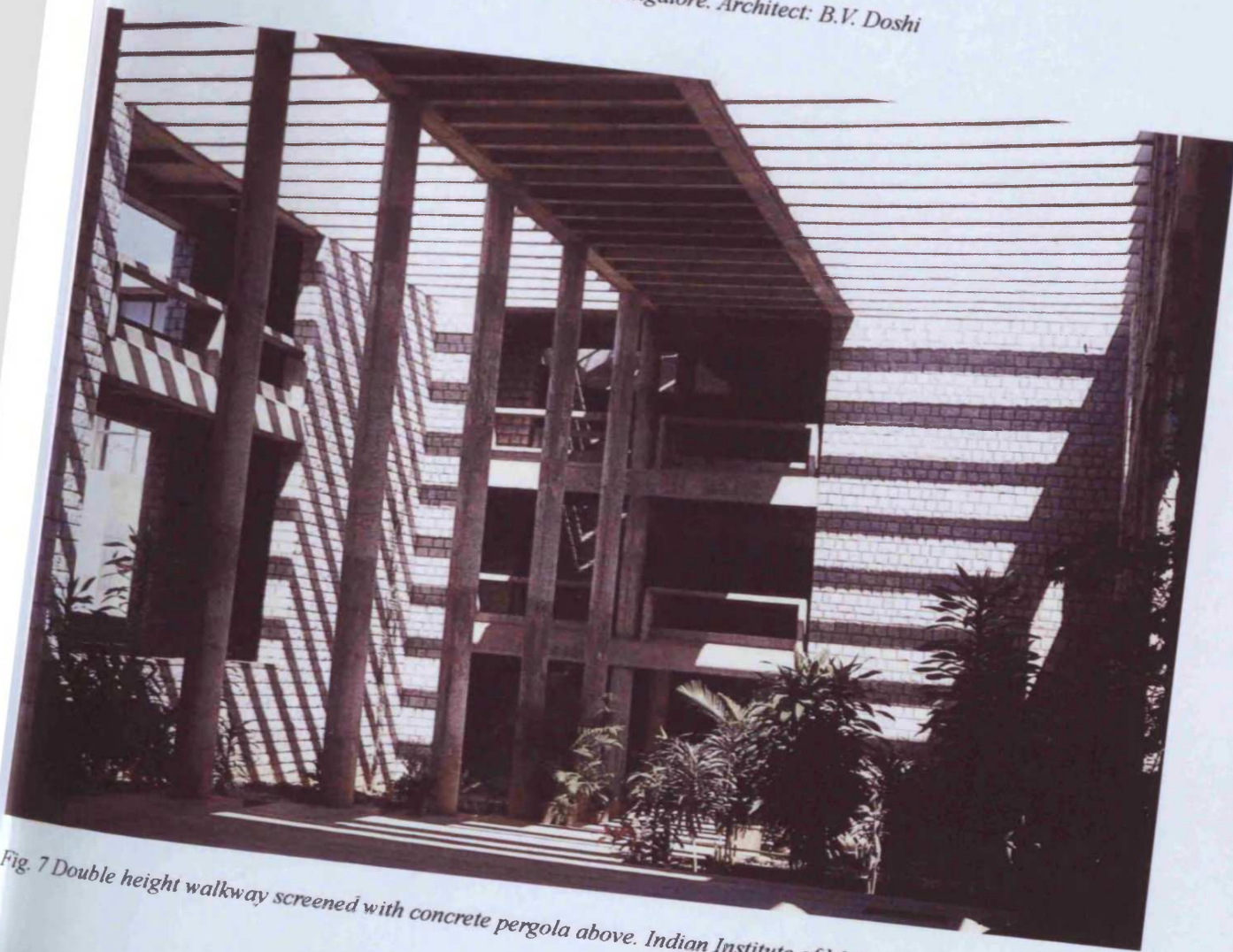
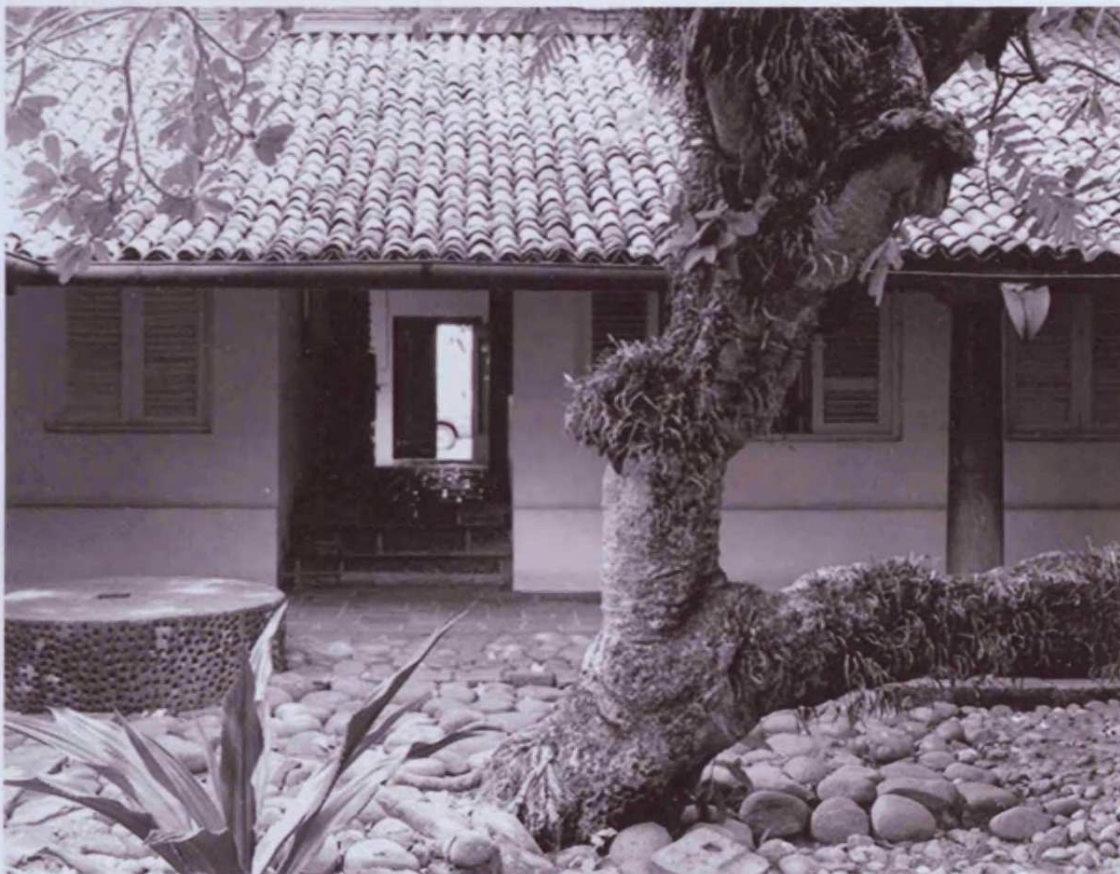


Fig. 7 Double height walkway screened with concrete pergola above. Indian Institute of Management, Bangalore.





*Fig. 8 View from garden terrace, Lunuganga, Sri Lanka. Geoffrey Bawa designed the estate for himself, on the site of an old rubber plantation. The design comprises a series of garden rooms with vistas into the adjacent landscape. A number of handcrafted building elements and antique furniture are used throughout, in a distinctively personal manner.*



*Fig. 9 Ena De Silva House, Colombo, Sri Lanka. Simple whitewashed walls and rough granite and brick paving create a series of spatial enclosures. Antique timber columns, doors and furniture are incorporated to create a unique contemporary aesthetic.*

## Chapter 2 THE CONTEXT

### 2.1 Social and Political History of Jaisalmer

The Rajput tribes inhabiting Rajasthan may broadly speaking be assigned to three different categories, depending on their genealogical history. The tribes termed Suryavanshi or race of the sun (Surya) claim descent from Lava and Kush, the two sons of Rama. The Rathores of Marwar, Guhilots of Mewar, Kachwahs and Sesodias of Amber and their various clans belong to this lineage. The Induvanshi tribes, or descendants of the moon (Indu) claim descent from Sri Krishna. The Yadava Bhattis of Jaisalmer and the Jarejas of Kutch and Bhuj are Induvanshis. In addition to these two primary genealogical streams, there are a number of races who are called Agniculas, who the Hindu genealogists ascribe as being born of the fire pit of Abu.<sup>18</sup> Chief among the Agnicula races are the Paramaras, Pratihars, Chalukyas, Solankis and Chauhans.

According to Tod, the original patriarch of the Yadavas or Yadus was Budha who came to India to perform penitential rites, fifty generations before Sri Krishna. Prayag (the confluence of the Ganga and Yamuna in present day Allahabad) is the cradle of the Yadus. The cities Mathura and Dwarka were founded by the Yadavas Prururwa and Sri Krishna respectively. Sri Krishna had eight wives of which Rookmani was the eldest. Her eldest son Pridema, married to a princess of Bidurba had two sons Anurad and Bujra. The Bhattis claim descent from Bujra. After the passing away of Sri Krishna, the supremacy of the Yadus, was contested by the Rajput tribes previously suppressed by them. They were eventually compelled to flee Dwarka and seek refuge in the desert on either side of the Indus. Various bardic chronicles have been recorded in detail by Tod, which enumerate the different settlements chosen by various successive Rawals, within this region.

The earliest known settlement of the Bhattis, Tunnote was founded in 731 by Rao Kehur. The establishment of present day Jaisalmer is historically linked with the site of another ancient city, known as Lodrava. This was the ancient capital of the Lodra Rajputs located sixteen kilometres to the west of modern day Jaisalmer. Lodrava was annexed by the Bhatti Deoraj on the request of an offended family priest of the Lodra Rajputs. In the following years, the Bhatti Rawal Jaisal conspired to usurp the throne of Lodrava from his nephew Bhojdeo, and for this, he sought the help of Muhammad Ghori by swearing allegiance to him. On accession to the throne, Rawal Jaisal realised the vulnerability of Lodrava to external attack. Jaisal sought a better location and found it in *trikuta* – a triple peaked mount, ten miles away. A Brahmin ascetic Eesul, stationed atop the *trikuta*,<sup>19</sup> revealed to Jaisal that it was prophesized by Sri Krishna that one of his descendants would raise a castle there. It is fabled that Jaisalmer is founded on the site of the well, dug by Krishna to quench Arjuna's thirst. In 1156, the fort of Jaisalmer was founded, and took seven years to build. Soon, the inhabitants of Lodrava migrated permanently to Jaisalmer.

Of the earliest known history of Jaisalmer, the most noteworthy events seems to have been two great *sakas*,<sup>20</sup> which took place between the twelfth and fourteenth centuries, during

<sup>18</sup> Tod suggests that Agnicula symbolically refers to the regeneration of the Rajput tribes on Mount Abu, when they adopted Brahmanical Principles. Tod, Vol 1, pp. 68-100.

<sup>19</sup> Tod, Vol 2, pp. 184-195.

<sup>20</sup> The practice of donning saffron robes and going to battle, when defeat was inevitable. While the men went to battle, and the women mounted the pyre.

which virtually the entire population voluntarily exterminated themselves. While the men died fighting the foes, the women mounted the pyre. The first such *saka* took place in 1295 during the reign of Moolraj III, as the inevitable culmination of a protracted eight year siege by the emperor of Delhi, Ala-du-din Khilji. The castle was abandoned and remained deserted for a long time, as the Bhattis had neither the resources nor men to defend it. The second *saka* took place soon after the first, in the year 1306, on the attack of Feroz Shah Tughlaq, provoked by the abduction of his stud by the Bhatti chiefs.

The influx of wealth in Jaisalmer may be ascribed to the reign of Rawal Chachig-Deo. Rawal Chachig-Deo came to power in 1449 and wrested the fortress of Satulmer, the abode of wealthy merchants, from the Rathores of Marwar. He made prisoners of the merchants and promised their release only on condition that they settle in the territory of Jaisalmer. Three hundred and sixty five families embraced the option, and it is from this period that the influx of wealth in Jaisalmer may be dated. During the late fifteenth and throughout the sixteenth centuries, construction activities in Jaisalmer occurred on an unprecedented scale.

The Mughal emperor Akbar came to the throne in 1554, and started his mission of slowly expanding his empire. In his attempts at consolidating his empire by including the individual principalities of the Rajputana, he resorted to means as diverse as war and matrimony. The *Mansabdari* system was introduced, and Jaisalmer became a fief of the Mughal Empire. Rawal Harraj who came to the throne in 1562, offered his daughter Nathibai in marriage to Akbar. Harraj's reign was peaceful and prosperous owing to the trade between the Doab valley and Sind as well as other western states passing through Jaisalmer. Tax was levied on all trade passing through the region of Jaisalmer. There were tax collection outposts located in different parts of the city, known as *dans*. Harraj's successor Bhim, following the precedent set by his father, married his daughter with the Mughal emperor Jehangir. Large scale construction activities took place during this extended period of peace and prosperity throughout the sixteenth century. The Parshwanath Jain Temple in Lodrava was renovated in 1615, with a peripheral screen-wall added along the entire perimeter of the temple.

Maharawal Amar Singh ascended the throne in 1681. During his rule, the state witnessed prosperity due to business activities with various towns in Sind, Marwar and Bikaner. Amar Singh extended the empire upto eastern Sind, and successfully resisted the Rathores from Bikaner. To foster construction activities, a tax called *Birad* was exacted from the wealthy sections of the society, which was greatly resented. The Maharawal constructed Amar Mahal and Amar Bagh in 1664. A large tank, Amar Sagar was excavated near the city in 1689 (*fig. 45*). After the death of Maharawal Amar Singh in 1702, the power of the Bhattis was challenged by the Rathores who wrested Poogul, Barmair, Filodi and various other towns from Jaisalmer. The territory bordering the Garah river was taken over by the Afghan chieftain Daod Khan, and named after him as Daodpotra.

During the reign of Maharawal Akhai Singh (1722-1762), the opium trade with China and Afghanistan greatly increased the prosperity of the state. Maharawal Mulraj II (1762-1820), after coming to power, was keen to have friendly relations with British India. The treaty of perpetual friendship and alliance with the East India Company was ratified during his reign, in January 1819. The treaty comprised five articles pertaining to issues such as maintaining perpetual friendship and unity of interest, ensuring for posterity of the Maharawal, the possession of Jaisalmer state and the provision of security of the state in case of outside invasions. Jaisalmer provided assistance to the British government during the first Afghan war between 1838 and 1839 and in the war against Sind between 1842 and 1843. The



minister of Maharawal Mulraj, Swaroop Singh, was ambitious and quickly consolidated his position. Swaroop Singh was succeeded by Salim Singh, a tyrant, whose atrocities drove the wealthy class of Paliwal Brahmins to voluntary exile after 1830. However Salim Singh was an able administrator and no part of the state was lost during his office as minister.

Maharawal Gaj Singh (1820-1846) constructed Gaj Vilas Palace, Moti Mahal and renovated Sarvottam Vilas, all comprising important palace buildings. It was during the reign of the Maharawal that most of the *havelis* in the city were built. After Maharawal Gaj Singh, Ranjeet Singh (1846-1864), son of Thakur Kesari Singh of Nachana was adopted as the Maharawal. Kesari Singh's atrocities and lawlessness in the state compelled several Maheshwaris, Jains, Pushkarana Brahmins and other business classes to emigrate from Jaisalmer. Nathmal, a member of Govindani (Mohata) race was inducted in 1860 as minister of the state. He retired voluntarily in 1889. The Extradition Treaty was signed by the Jaisalmer *Vakil* and the Political Agent of Marwar in 1870. Jaisalmer state merged in Rajasthan state on April 30, 1949.

## 2.2 Morphology of the City

The city of Jaisalmer was originally confined within the walls of the fortress. In the mid-eighteenth century, during the reign of Maharawal Akhai Singh, the populace who were resident within the fort till then, started coming out in large numbers and settling in the *talhati* (valley) around the fort. The people formed settlements in clusters on the basis of their clan or profession. The settlement in the valley below occurred largely to the north east of the fort. Geographically this area lies in the wind-shadow zone of *trikutachal* with the fort atop it, and is thus afforded natural protection from the sand laden winds from the desert. A thirty feet high boundary wall encircling the entire town, which had formed in the *talhati* was constructed between the latter half of the eighteenth century and early part of the nineteenth century. Four gateways were created on the boundary wall: Malka Pol to the north, Amar Sagar Pol to the west, Beron ki Pol to the south and Garisar Pol or Tilowali Pol to the east (fig. 10).

The population settled in homogeneous groups, based on caste and profession forming *mohallas*. The warrior classes settled on the periphery of the town, strategically located, to rise in defence, in case of external threats and attacks.<sup>21</sup> Professional artisans and craftsmen such as carpenters, blacksmiths, weavers, painters as well as tradesmen such as barbers and tailors were allowed to reside adjacent to the core of the town, mainly in the north-eastern sector. The business communities of Maheshari Jains, Pushkarana Brahmins and Khattris settled in the core areas of the town, in the north and north-eastern sectors. This was the heart of the commercial zone, and many large *havelis* such as *Patuon ki Haveli*, *Nathmal ki Haveli* and *Salim Singh ki Haveli* sprung up in this area, mainly in the nineteenth century.

The Hazuri Rajputs who were attendants to the royal family, had settled in a sector on the north, between the core business district and the palace. In the zone to the south east of *Badal Vilas*, the dancing girls settled, their *mohalla* referred to as *Patariyon ka Mohalla*. To the south of *Badal Vilas*, adjacent to the western boundary of the town, the Muslim architects, known as *silavats* formed their settlements. The tribals such as Bhils settled on the extreme peripheral areas of the city and beyond the city gates. Oswal Jains, afforded protection by the Bhattis, against Mohammedan invasions, settled in various parts of Jaisalmer. Besides the

<sup>21</sup> Ram Vallabh Somani, *History of Jaisalmer* (Jaipur: Panchsheel Prakashan, 1990), pp. 5-7.



well known Jain temples, this wealthy community built *panchayati* (community) temples, *dadawadis* (rest-houses) and *upashrayas* (monastic establishments) for *acharyas* (religious leaders) of various *gachachas* (sects).

*Mohallas* in Jaisalmer are also known as *paras*. The morphology of the overall city, both within the fort and outside it in the *talhati* comprises narrow streets with *havelis* built along their edges (fig. 15, 16). The nodes and junctions in the streets are defined by localised widening of space and occasionally by formal *chowks*. Temples and *dadawadis* are generally located in these areas. Unlike old cities in other parts of India, such as Shahjahanabad and Ahmedabad, where the *mohallas* are clustered around open community *chowks* and are provided with gated entries, the *mohalla/paras* in Jaisalmer are organised along stretches of streets. Raised platforms known as *otas* occur beyond the front door of each *haveli* adjacent to the street. These form the most public part of the *havelis* and are used to socialise with neighbours, wash clothes and dry condiments. The length of a street forming a *mohalla* is such that it is within easy visual range from one end to the other. The definition of the *mohalla* is more of a mental concept of the inhabitants residing in it, rather than the definition being provided purely by architectural means. Social life in a *mohalla* encourages the participation of all its inhabitants in a range of social activities. For example, festivities in one household automatically invites participation from the other households. Children may play safely within its confines, unattended by immediate family members. None of the individual *mohallas* in Jaisalmer are provided with gated entries. However, subtle spatial devices such as street nodes, public chowks and gentle turns in the orientation of streets provide them definition.

Development during British rule moved out of the limits of the city, occurring mainly along the road connecting Amar sagar Pol with Ludrava. Maharawal Jawahar Singh (1914-1949) built the Jawahar Niwas Palace in the style of a country house, outside the limits of the city. Public buildings such as Jawahar Hospital, Circuit House, and the Collectorate and District Magistrates Court were all built outside the city, enroute to Amar Sagar and Ludrava.

### *The Jaisalmer Fort*

The fort at Jaisalmer originally served as the habitation of the Maharawal, and the families of the royal office holders. It is a conservative Indian fort, similar to the fort at Chittorgarh. Devoid of well-laid out gardens, fountains, and orthogonally laid out streets and *mohallas*, the design of the fort does not have Mughal influences. *Havelis* are built along meandering alleyways forming *mohallas/paras*, such as Chauganpada, Vyaspada, Bulapada and Kundupada. The fort, which stands on the *trikuta* hillock, which is about 250 feet high, has three parallel walls around its periphery. The total length of the fort wall east to west is nearly 1500 feet, almost double the maximum width. Built over a period of seven years, the fort is provided with ninety nine bastions, each about thirty feet high. The walls of the fort are built in dry masonry, without any mortar.

The fort is entered through four gateways arranged in close succession along a steeply sloped meandering ramp (fig. 17). These gateways, along with additional boundary walls to the fort were built at different stages along its entrance on the north-east corner.

The first stage of renovations and additions were made between 1577 and 1623, during the reign of Bhim and Manohar Dass.<sup>22</sup> As part of the additions, the second wall running parallel to the main wall was constructed. This fifteen feet high wall is known as the *pada* or *peetha*, with the battlement finial known as the *kangra*. An important addition to the fort during this phase was the construction of three gateways: Suraj Pol, Ganesh Pol and Hawa Pol.

Suraj Pol (*fig. 18*), the second gate on entrance from the side of Gopa Chowk, was constructed by Maharawal Bhim in mid sixteenth century. It is embellished with a *torana vallari* with emphatic sun roundels (*fig. 20*). Adjacent to it, to its north is a bastion capped by a vaulted octagonal kiosk known as Rang Burj, whose foundation was laid earlier by Maharawal Jaetsi II, in 1508. The Rang Burj was constructed in the event of the state facing inroads from Multan and Sind and from various parts of Central India. Besides the Suraj Pol, the buttress wall to the fort was also built by Maharawal Bhim. He also conducted extensive repairs to the fort bastions. Ganesh Pol is the third gate after Akshay Pol, and occurs after a sharp bend along the ramped entry. Named after a figure of Ganesh the destroyer of obstacles, installed on the main lintel, it is also referred to as the Bhuta Pol. Hawa Pol (*fig. 21*) was constructed during the seventeenth century, and is appended to the fabric of the palace building, with the Gajvilas adjacent to it. Surmounted by the Rang Mahal, which is a hall decorated with murals, Hawa Pol is also referred to as Rang Parol.

The second stage of additions was made between 1633 and 1647. Additional security was provided by raising the height of the bastions from forty feet to sixty feet. Ninety two bastions were added to the fort wall, and platforms on top of the bastions known as *damdama* were provided to mount wheeled guns.

The third stage of growth occurred between 1722 and 1755, during the reign of Maharawal Akhai Singh. He constructed the Akshay Pol, the outermost gate, adjacent to Gopa Chowk, connecting it with the fort boundary, with additional battlement walls. In the extended period of relative peace and prosperity, during this time, the populace who were resident within the fort till then started coming out and settling in the *talhati* (valley) around the fort.

The fourth and final phase of growth occurred between 1750 and 1850. Maharawal Mulraj II (1764-1800) constructed a thirty feet high boundary wall encircling the entire city formed in the *talhati*. The boundary wall was provided with four main gateways: Malka Pol, Amar Sagar Pol, Beron ki Pol and Garisar Pol or Tilowali Pol (*fig. 19*). Most of the imposing *havelis* in the city were also constructed during this phase.

The Palace Building is located within the fort, adjacent to *Hawa Pol*. It is made of a number of different buildings, built at different periods. The oldest part of the palace is the Juna Mahal, which was built as a *zenana*. There is no record for a precise date for its construction. However, based on stylistic characteristics, it may be dated between the sixteenth and seventeenth centuries. The archaic character of the north facade of the Juna Mahal, with trabeate construction and crudely pierced stone screens, stands out in sharp contrast with the rest of the palace buildings (*fig. 22*). Stylistically it is representative of the *Sompuriya shaili*, or style, which will be discussed at length later. The Rang Mahal, constructed above the Hawa Pol (*fig. 21*) was built during the reign of Maharawal Mulraj II, between 1764 and 1800. It is similar in character to the Juna Mahal, though, stylistically more evolved. The

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<sup>22</sup> The dates referred to in this chapter are based on historical studies by other authors, mainly Tod, Bhati, Somani and Aggarwal.

interior is lavishly embellished with murals and arabesques. Rang means colour, which suggests that the name Rang Mahal is derived from the extensive interior decoration. Sarvottam Vilas was built, directly above Rang Mahal, in the reign of Maharawal Akhai Singh (1772-1762). The interior is decorated with mass produced blue and white glazed tiles. Sandwiched between Rang Mahal and the old *zenana*, is a fairly substantial rectilinear block, in the north-eastern sector of the palace, also ascribed to as the *zenana* (fig. 21, 22). Stylistically this block represents characteristics of the matured *Mughlai* phase, seen mainly in the diverse *jharokhas* and *baris*, provided with characteristic bent or *nokwala chajjas*. This block may be dated roughly between the late eighteenth and mid-nineteenth century.

Maharawal Gaj Singh (1820-1946) constructed Gaj Vilas in 1884, and renovated Sarvottam Vilas. Gaj Vilas has probably the most striking appearance of all the buildings comprising the palace, especially the facade adjacent to Dussehra Chowk (fig. 23). The building is perched on a high solid plinth, which reads from the outside as the ground floor. A continuous gallery projects out, along the entire length of the facade, on the first and second floors. The gallery on the first floor has cupolas surmounted by *ravatis* (miniature domes), positioned in a regular rhythm along the facade. The gallery on the second floor is more elaborate, with a proliferation of continuous cupolas with *nokwala chajjas*, each cupola surmounted with a *ravati*. The interior of Gaj Vilas is extensively decorated with mass produced ceramic tiles and inlaid stone floors (fig. 26).

Adjacent to Gaj Vilas, is another building, forming a part of the palace, known as the Moti Mahal (fig. 25). Stylistically, it is very similar to Gaj Vilas and was constructed earlier by Mulraj II, in 1813. The Sabha Bhawan is located on the first floor of the building. Both the buildings are capped by a fairly substantial *chattri*, positioned on the front facade. *Chattris* are generally absent in the *havelis* in Jaisalmer. It is more likely that its appearance in the Gajvilas, and earlier in Moti Mahal is a Mughal influence

Maharawal Bairisal (1865-1891) shifted the royal residence from Gajvilas in the fort to the newly built palace known as Badal Vilas (fig. 75) adjacent to Amar Sagar Pol.

## 2.3 Architectural Schools (*Shailis*) and Phases of Development

The city of Jaisalmer, by virtue of its remote location, from the rest of Rajasthan, has a unique position, in the historical development of its traditional architecture. The seven centuries from its foundation by Rawal Jaisal in 1196 to the peak of its architectural flowering in the late eighteenth to nineteenth century, has witnessed numerous dynastic upheavals, migrations of inhabitants and craftsmen to and from Jaisalmer. This chequered history has had its impact in shaping the cultural history of the desert city, embodied so vividly in its architecture.

In terms of architectural style, there are, broadly speaking three styles or *shailis*, in the course of development of the architectural tradition. Art historical studies on Jaisalmer till date have not acknowledged these *shailis* individually. These have been clubbed together and discussed as collectively representing one coherent style, representative of the architectural tradition of Jaisalmer.<sup>23</sup> These three styles or *shailis* are: *Sompuriya shaili*, *Mughlai shaili*, and the

<sup>23</sup> R.A Aggarwal, *History, Art and Architecture of Jaisalmer* (Delhi: Agam Kala Prakashan, 1979), pp.33-64.

*Angrezi shaili*. As suggested previously, the terms used to describe these schools are based on the terminology used by contemporary craftsmen to distinguish between them.

Originating in the *Sompura* temple builders of Gujarat, the *Sompuriya shaili* is characterised by the Central Indian temple architecture tradition. The *Mughlai shaili* is the result of influences from the imperial Mughal architectural tradition and neighbouring Rajput kingdoms. The *Angrezi Shaili*, started with attempts at grafting Western Classical elements to the traditional facade, and eventually succeeded in replacing traditional building typologies with imported western models. The three different *shailis* were in fashion at different periods in the history of development of the architectural tradition. *Sompuriya shaili* is the oldest, and was in vogue between the seventh and eleventh centuries, The *Mughlai shaili* developed gradually from the sixteenth century onwards, reaching maturity in the nineteenth century. The *Angrezi Shaili* enjoyed a brief spell of popularity, between the later part of the nineteenth century and early twentieth century. Though the *shailis* appear as stylistically discreet systems, there are examples of a deliberate mixture of architectural elements from different *shailis* in the same building. This is especially true of some buildings constructed between the seventeenth and nineteenth centuries, with elements from the *Sompuriya* and the *Mughlai shailis*.

In terms of development of the architectural tradition over time, there are broadly speaking three phases: the first phase between the seventh and the fifteenth centuries, the second phase between the sixteenth and eighteenth centuries, and the final phase of flowering of the architectural tradition, in the nineteenth century. These will be discussed at length in this chapter. Though the individual *shailis* appear stylistically discrete, especially in the repertoire of the architectural components, there was a degree of formal synthesis in the evolution of particular architectural forms characteristic to each *shaili*. This is particularly true of the *Mughlai shaili* in its glorious phase in the nineteenth century. Though not immediately apparent, a number of *Mughlai* forms in this phase of flowering, have evolved from *Sompuriya* forms. This will be explained in the course of the chapter. The *Sompuriya shaili* similarly adopted some architectural elements from the *Mughlai shaili*, as is seen from its application in the eighteenth and nineteenth centuries. The three phases correspond with various stages in the evolution of the three *shailis*, and are marked by periods of exclusive popularity of a particular *shaili*. The first phase corresponds exclusively with the period of popularity of the *Sompuriya shaili*. The second phase is the period of assimilation of architectural forms and design ideas from other architectural traditions, especially those of the neighbouring Rajput kingdoms and the imperial Mughal Court. This phase also corresponds with the gradual transition of a number of forms characteristic of the *Sompuriya shaili* to *Mughlai* forms. The third phase corresponds with the period of popularity of the *Mughlai shaili* and its flowering. It is also the phase when the *Angrezi shaili* made its presence felt briefly, in Jaisalmer. There are examples of the deliberate mixture of the *Sompuriya* and *Mughlai shailis* during this phase, which will be illustrated in the course of the chapter. We begin by briefly looking at the chief design characteristics of the three different *shailis*.

## *Sompuriya Shaili*

This early style is called the *Sompuriya shaili*, perhaps referring to the *Shaivite Sompuras*, who were craftsmen from Gujarat, and Jodhpur from whom the style originated.<sup>24</sup> This is essentially a Hindu *shaili*, patronised mainly by the wealthy Paliwal Brahmins. The earliest houses and the Jain and Hindu temples in the neighbourhood of Jaisalmer: Khabha, Lodurva, Kuldhara were built almost exclusively in the *Sompuriya shaili*. This style derives its architectural forms, and decorative scheme largely from the Western and Central Indian temple architecture tradition. The structural system is essentially trabeate with wide *jharokha* openings spanned by lintels supported on chunky *khambhas* or engaged pilasters. Decorative carving, though rich and sensuous, is limited in application to *jharokhas* and *baris* while the remaining part of the facade is left solid and unarticulated (fig. 27, 28).

The earliest buildings representative of this *shaili* are built with a rugged vigour, in an archaic, folk-art idiom. The appeal of this *shaili* lies in its simplicity and purity. The historian Herman Goetz likens its trabeate system of construction to modern day steel construction.

This early Rajput architecture, however, which outside Jaisalmer, we know best from the early palaces at Chitorgarh and Udaipur, Bikaner, Amber, Bundi, Datia and Orchha, today seems strangely modern to us. Its building technique looks almost like a precursor of our modern steel construction. Everywhere in Rajputana, sandstone has inspired a unique manner of construction, of vertical pilasters and horizontal beams, between which thinner slabs are dovetailed like cabinet maker's work.<sup>25</sup>

A noticeable feature in the external appearance of the buildings built in this *shaili* is the lack of an overall symmetry, wherein there is a clearly marked centre, with parallel sides balancing each other. This unique aesthetic of Rajput architecture has to be appreciated from the point of view of the internal layout of the building. The disposition of rooms generally comprises various arrangements of structural bays (fig. 35, 36). The centres of each of the bays is expressed on the elevation through *jharokhas*, *baris* or just pierced *jalis*. Sometimes the layout of a range may just comprise two bays, in which case the centres of the two bays are expressed in the elevation as a parallel row of *jharokhas* or *baris*. There is clearly no centre to the overall elevation, as an entity, in this case. In larger buildings, a number of such rooms may be arranged along the external periphery of a building, with the centre of each room or courtyard being expressed externally on the elevation. However, in a building comprising many stories, all these centres corresponding to various floors would line up, as demising walls of rooms would vertically align on various floors, or be co-ordinated, which is the most logical way the structural system may be designed. The external expression of the centres on various floors might vary completely from each other: one floor may have a *jharokha*, another may have a *bari*, while another may just have an opening or a *jali* screen.

The buildings to the north and east of the palace, especially the Juna Mahal (fig. 22), which comprise its oldest parts, and a number of old houses in the city are representative of this *shaili*. The facades of these buildings are picturesque and informal in design, without any discernable central focus, and a random assortment of *jharokha* types. This quality should not

<sup>24</sup> Goetz suggests: 'The art of Jaisalmer thus proves to have been either very archaic or imported, especially from Gujarat and Marwar- a situation which was to be expected in so lonely a place. Its interest is that of the art of a frontier area, a treasure well hidden in the desert, a folk tradition of a naive and simple purity.' Herman Goetz, 'Jaisalmer: Treasure of the Desert', in *Rajput Art & Architecture*, ed. By Jyotindra Jain & JJ Neubauer (Wiesbaden: Franz Steiner Verlag, 1978).

<sup>25</sup> Goetz, p. 159.

be taken on face value as representing the craftsman's fancy at adorning the facade with an assortment of forms, in the absence of any formal design discipline. On closer inspection of plans, it will be revealed that the centre of each bay is articulated on the facade as a *jharokha* or a *bari*. It is this unique aesthetic that has generated a way of looking at the architecture, that it is based on qualities of picturesqueness, and deliberate lack of symmetry in design and layout. Fergusson in his *History of Indian and Eastern Architecture*, referring to the palaces at *Rajputana* in general, says:

these are seldom designed with much reference to architectural symmetry or effect, but are nevertheless always picturesque, and generally most ornamental objects in the landscape, where they are found.<sup>26</sup>

This aesthetic theory is still prevalent, and has been, for example, the primary basis of architectural analysis of Rajput architecture in Tillotson's *Rajput Palaces*, where he further argues that this quality was a deliberate artistic attempt to elude the visitor, and to create formal ambiguity. The formal design principles, which have the potential to produce this effect of picturesqueness are discussed in detail in Chapter 3 (Principles of Design).

Generally, the appearance of the buildings built in this *shaili* is solid and forbidding, the solidity broken at places by projecting *jharokhas*, or *baris* clothed with a peripheral *jali* screen, or just with blind infill panels, with a central opening. The ground floor of houses have distinct wooden entrance doors, generally with double shutters, comprising planks of timber secured together with a grid of timber beams, fixed from the front with steel studs, with decorated ends (fig. 34). Most often, an image of *Ganesha*, the destroyer of obstacles, and the lord of beginnings is placed atop the door head, even though most of the house owners were primarily Jain. The *jharokhas* are *trabeate* (fig. 29, 30), supported on polygonal columns distinctly derived from Hindu temple architecture, with curved and corbelled brackets complete with pendants, supporting the lintel. The *chajja* is ribbed, similar to the ribbed eaves in Hindu temples. The *chajja* is surmounted typically by carving based on battlement finials, known in local terminology as the *kangra*. A typical facade is a bland mass of stone blocks, put together with no apparent visual relation with each other, or to the *jharokhas* and *baris*. The coursing of stone blocks do not line with key levels in the *jharokhas*, and two *jharokhas* next to each other do not match in their eave levels, or overall height. Most *jharokhas* have a characteristic slanting angle to their protective railings which enhances its presence in the elevation. This can directly be related to the inclined *kakshasanas* of temple architecture, and are most often decorated with rows of circular medallions. The floor slab of the *jharokha* is carved with different patterns, and often this slab is expressed continuously on the elevation as a horizontal band. The parapet may be solid, or punched with patterned holes, often projected out on brackets, above a *jharokha* or *bari*. The zone at the base of the *jharokha*, and the soffit of the floor of the *jharokha*, is a region of special interest, which being visually the most accessible part of the *jharokha* from the street, was lavished the greatest attention by the craftsmen. The portion of the wall between the two end brackets is carved elaborately, with staggered recesses and projections (fig. 29, 31). The soffit of the floor slab is decorated with circular medallions, and from the centre of each, is suspended a pendant, which serves no purpose other than imparting a decorative effect to the soffit. This feature revives images of ceilings of temples such as the Dilwara in Mt. Abu, where similar pendants are suspended from the centre of decorative ceilings.

<sup>26</sup>James Fergusson, *History of Indian and Eastern Architecture*, 2 Vols. (New Delhi: Vedams Books Pvt. Ltd., 1998) (First published, 1876), p. 169.

The decoration in the *jharokhas* and *baris* incorporate complex intertwining foliage patterns, densely woven, with very fine modelling, and stylised depictions of birds such as peacocks. These are combined with flat etched out patterns, executed almost as stencils. This *shaili* also incorporates very fine geometrical patterns as *jali* designs.

A characteristic architectural motif of a roundel, resembling simultaneously the sun and the lotus, is used recurrently, as a decorative element in the architectural scheme. The circular pattern sometimes comprises petal-like forms, resembling the lotus, and sometimes, with pointed ray-like forms radiating from a centre, it resembles the sun. This medallion is used extensively in the *takiya* panels of *jharokhas*, and most strikingly, these are arrayed around a *bari* or *jharokha*, on the solid wall (fig. 29). This form gets refined with deeper cuts and more precise modelling, and becomes larger in size, often incorporating rows of concentric arrangements of rays, in later examples. Rows of full or half roundels were used to decorate lintels, ceilings and soffits of various parts of the *jharokha*. Prominent examples of its application may be seen in the *jharokhas* of the earliest parts of the palace, on the northern and eastern facades, and in the *Suraj Pol* (fig. 20). This motif is cognate with the motif of the lotus medallion used ubiquitously in the railings of Buddhist stupas, and in early rock cut architecture. It is seen in the interior wall decoration, and coloured tile decoration on the ramparts in *Man Mandir*, Gwalior, built in the early sixteenth century. It also springs up in the decoration of mosques, as in the *Chota Sona Masjid* in Gaur in the sixteenth century, and in the architecture of Gujarat.

Incidentally, domestic architecture in the *Sompuriya shaili* in Jaisalmer, was admired by Goetz. He preferred it to the later much grander haveli tradition in the eighteenth and nineteenth centuries.

The same conservative note prevails in domestic architecture, but perhaps for this reason it has brought forth some of the most perfect house types to be found anywhere in India.<sup>27</sup>

In this section, we have discussed the chief architectural characteristics of the *Sompuriya shaili*. For a detailed discussion on the various architectural components and aedicules, which form part of the architectural vocabulary of this *shaili*, refer to section 3.3 (Architectural Components and their Details) of Chapter 3 (Principles of Design).

### *Mughlai Shaili*

Adapted from the imperial Mughal tradition, the *Mughlai Shaili*, is characterised by a carefully composed formal and spatial aesthetic, based on overall symmetry and balance (fig. 37). This quality immediately distinguishes a building built in the *Mughlai Shaili*, from the informal picturesqueness and asymmetric appearance of the *Sompuriya Shaili*. Most of the houses built between the eighteenth and nineteenth centuries and also later, in the twentieth century which includes most of the larger and grander *havelis*, were built primarily in this *shaili*.

The *Mughlai shaili* was popular in Jaisalmer for over two hundred years (end of seventeenth century to the end of nineteenth century). This was a period of relative peace and prosperity in the history of Jaisalmer. *Haveli* architecture in this *shaili* reached unprecedented levels of

<sup>27</sup> Goetz, p. 159.

grandeur in scale and formal sophistication. There are small two bay *havelis* built in this *shaili*, along with very large multiple bay *havelis*, over four storeys high. The formal and spatial sophistication achieved in *haveli* architecture, in this *shaili*, has no parallel in the earlier *Sompuriya* buildings, which seem spatially simplistic and crude in comparison. The most noteworthy aspect of the *Mughlai shaili* is its highly sophisticated design system based on structural bays. These bays created by the load bearing *khambhas* form the basis of spatial and formal organisation in the *haveli*, both in the plan and in the elevations. Principles of spatial organisation creating rooms, open to sky *chowks* (courtyards), *chandnis* (terraces) and verandah-like spaces are based on the system of the structural bay, as will be explained in detail in Chapter 3 (Principles of Design). The main principle of design which has a significant effect on the character and appearance of the elevation is the organisation of solids and voids in the elevation. Creative interpretations in the organisation of solids and voids, are realised through innovative structural means. The detailed architectural treatment of the elevation in this *shaili* involves a palette of architectural components, which are combined to create endless variety. Aedicules are positioned in key locations of the elevation further adding richness and variety. Though there are key aedicular types, particular formal treatments are full of innovation, as will be illustrated through the course of the thesis.

Characteristic architectural elements include *surangdar khambhas* used in conjunction with cusped *margol* and curved *bangaldar chajjas*, brackets clothed in vegetal ornament, known as *todi*, and a variety of *baris* and *jharokhas* (fig. 38). There is a tendency towards division of the building facade into thin long panels, framed by pilasters, imparting a vertical rhythm to the facade (fig. 39). This rhythm is picked up by the *todis*, which support the projecting bays. Horizontal members are picked up, on these panels at key levels such as the balustrade level, eave level of the *chajja*, or a projecting cornice. These horizontal members run continuously along the length of the elevation, breaking the vertical panels into smaller panels, each of which is then filled in with patterns, geometrical or vegetal. The decorative infill carvings comprise foliage and vegetal patterns, with delicate surface modelling, and characteristic linear flow (fig. 40). A variety of geometrical patterns, based on the square, hexagon and octagon, are used as infill *jali* patterns, occasionally with floral motifs inserted into the design. The visual striation of the facade in this *shaili* is the most striking departure from the earlier *Sompuriya shaili*, where the blank walls are nothing but solid masonry walls, with random stone courses, which not only do not co-ordinate with each other, but have no relation to the aedicules. The *jharokhas* in the *Sompuriya* buildings are very richly carved, and stand out in contrast against the bland background of the wall surfaces. While the *Sompuriya shaili* is about contrast, the *Mughlai shaili* is concerned with visual integration of the parts into a coherent whole.

The first floor of the *havelis*, in this *shaili*, is most densely carved, often a showpiece of craftsmanship. It is representative of the *haveli*, as it is visually the most accessible floor, from the street below. The upper floors are blander. This imparts a distinct visual quality to the different floors, which further adds to the visual richness of the building as a whole. A prominent architectural feature in the facade is the double *chajja*. Not strictly required functionally, the double *chajja*, is used creatively as a compositional element, appearing and disappearing as per the architectural design conceived by craftsmen. Architectural elements, and their inventive combinations in the hands of craftsmen produce incredible formal richness throughout the course of tradition, in this *shaili*. These are discussed in detail in section 3.2 (Composition of Elevations) of Chapter 3. As with the *Sompuriya shaili*, a detailed discussion on various architectural components and aedicules characteristic to the *shaili*, is included in Chapter 3.



## *Angrezi shaili*

This is distinctly different from both the *Sompuriya* and *Mughlai shailis*, primarily in the principles of planning, and in the basic building typologies employed. Based on the Western Classical tradition, this *shaili* merely tries to graft indigenous patterns and elements for decorative effects, while the overall architectural character and syntax remain completely alien. Forms derived from Western *Classical* architecture such crude representations of ionic columns, gothic arches, keystones and pediments are used in conjunction with indigenous architectural elements and decoration. The mixture is unresolved and uncomfortable. These buildings, as pointed out by a contemporary craftsman, were designed by English architects, who employed traditional craftsmen only in their execution and decoration.<sup>28</sup> The *Angrezi shaili* is limited in its application to a few buildings in Jaisalmer; parts of the Jawahar Vilas (fig. 42), the Magistrates court and the Jawahar Hospital (fig. 41). It did not become popular with the inhabitants of Jaisalmer, and its limited application to some parts of Jawahar Vilas, and a handful public buildings, constructed by the Public Works Department, suggests its alien status, and inappropriateness for the region.

## *Phases of Development*

We shall now look at the different phases which characterise the development of the architectural tradition of Jaisalmer from the seventh to the twentieth centuries. We also briefly look at the architectural tradition in its present condition, as represented by the designs of contemporary building craftsmen.

### *First Phase*

The earliest phase is marked by the period of prosperity of the Paliwal Brahmins, between the seventh and fifteenth centuries, who patronized the *Sompuriya Shaili*, practiced by Hindu *Sutradhars*, probably from Gujarat. We have no visible records of *havelis* constructed during this phase. Historians have suggested that most of the *havelis* constructed during this phase were located in Lodrava, and were destroyed in the siege of Muhammad Ghor in 1152.<sup>29</sup> We know this phase today primarily through a number of Jain temples located within the fort, such as the Parshvanath Jain Temple (early fifteenth century) (fig. 43),<sup>30</sup> Sambhavanatha Temple (early fifteenth century), Temple of Shitalnathji (mid fifteenth century), and the two storeyed temples of Shantinathji and Kunthunathji (late fifteenth century). The Jain temple at Lodrava is dedicated to Parshvanatha and was originally constructed before the twelfth century (precise date unknown) (fig. 44). It was extensively restored in the early seventeenth century.

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<sup>28</sup> Pir Mohammed, a contemporary craftsman, who reminiscences that his father Nazar Mohammad, who was a master craftsman in his time, was employed in the construction of the Jawahar Hospital in 1941. His suggestions to the English architect, in the design of the building, were scoffed at, and ignored. This attitude is representative of the attitude of the Public Works Department towards the indigenous craftsmen, who were seen as uneducated, ignorant and incapable, except under supervision of an engineer or architect trained in the superior western schools of design.

<sup>29</sup> Somani, pp. 23-37. Bhati, pp. 399-416.

<sup>30</sup> Aggarwal, pp. 39-44.

## Second Phase

The second phase of artistic rebirth took place during the sixteenth century. Probably influenced by contemporary work in Gujarat, there is stress given in this period to the extensive application of perforated screens, or *jalis*, both in temples and in *havelis*. These *jalis* have geometric, figural and floral motifs. The temple in Lodrava renovated in 1615, has a peripheral screen-wall carved with *jalis* in a grid of squares, no two *jali* patterns being alike (fig. 46). This stylistic trend is also witnessed in the *baris* in *havelis*, where a grid of squares, each with a different pattern, makes the body of the *bari*. Sometimes the central square is left open (fig. 47). This period is marked by prosperity achieved by the Paliwal Brahmins, and the Oswal Jains, mainly through duty levied on trade between the Doab valley and Sind and Afghanistan, which passed through Jaisalmer. Increased affluence, migrations of people from neighbouring regions, and increased awareness of neighbouring cultures wrought through travel and communication resulted in craftsmen from various neighbouring regions being invited to Jaisalmer to adorn buildings. Craftsmen and artisans from Udaipur, *silavats* from Sind, Paliwal *sutradhars/sutars* amongst others worked in Jaisalmer. A stone inscription from the period when Maharawal Jaetsi laid the foundation of Rang Burj in 1508, mentions that all the masons engaged were Hindu *Sutradhars*.<sup>31</sup>

Stylistic trends, such as the large scale adoption of the cusped *margol* in the architectural vocabulary, took place during this phase. One of the earliest examples of the use of the cusped *margol* is the Rang Burj constructed in the sixteenth century (fig. 33). There are coeval examples of similar use of the cusped *margol* in *havelis* located within the fort (fig. 32). The profile of the *margol* during this phase is crude and bulky with virtually no similarity with the sprightly appearance of the later forms, assimilated from Mughal architecture in the eighteenth and nineteenth centuries.

The use of the cusped *margol* generally in Rajput architecture has been denoted by historians, including Goetz, as Mughal (*Shah Jahani*) influence. Its proliferation and popular use in the eighteenth and nineteenth centuries may indeed be a more direct Mughal influence, but in the earlier instances, the sources are indigenous (fig. 48, 49, 50, 51).<sup>32</sup> The cusped *margol* had

<sup>31</sup> Bhati, p.415.

<sup>32</sup> The cusped arch as an architectural form, is Buddhist-Hindu in origin, its origin as suggested by Havell in 'transcendental ideas connected with the Indian conception of deity, and with anthropomorphic symbolism' (Havell, pp.82-86). Various forms of cusped arches appeared, framing the representations of the Buddha during the spread of Mahayana Buddhism, such as in niches framing images of the Buddha in Nalanda, and in the Sun temple in Martand, Kashmir, both in the eighth century. The open gables of early rock-cut Buddhist architecture, known as the *gavaksa*, described by Fergusson as the 'horseshoe arch', and by Havell as the 'lotus-leaf arch', was the key form from which the cusped arch form developed. The inner soffit of the *gavaksa* is equally divided into a number of parts with the ends of wooden purlins, used to span the roof. These divisions quite naturally led to their transformation into the cusps of the cusped arch form. Amongst its early uses are: the Sun Temple at Modhera (eleventh century), Arhai Din ka Jhonpra, Ajmer (thirteenth century), the *mihrah* in the Tomb of Iltutmish in the Qutb complex (1235), Lotus Mahal in Vijayanagar (fifteenth century), Man Mandir Gwalior (sixteenth century).

In secular architecture the practice of spanning in the trabeate system in timber and stone – both easily available materials in most parts of India became prevalent practice. In regions where neither stone nor timber was readily available as at Bengal, the arch made of bricks – which was the chief building material was much more extensively in use than in any other part of India. This happened as early as the fourteenth century e.g at Gaur and Pandua. It is from here that the cusped arch form travelled with migrating craftsmen in the seventeenth century to the imperial Mughal Court.

long been popular in Udaipur, whose construction between 1537 and 1572 predates *Shah Jahani* architecture by nearly a century. It even predates the building of Akbar's Fatehpur Sikri, which was built primarily in a trabeate style incorporating indigenous characteristics, when cusped arches were nowhere in fashion in Mughal architecture.

The second phase is a phase of transition from the heavy *Sompuriya* forms to the light and diaphanous *Mughlai* forms. The development of the architectural style during this phase, is marked by a visual lightening of building mass. Individual architectural elements display stages of transition, retaining aspects of the *Sompuriya shaili*, while assimilating fresh artistic influences. For example, the form of the inclined *takiya* in the *jharokha* from the earlier *Sompuriya shaili* remains, but it becomes visually lighter, with simple punched patterns (fig. 55) or infill with geometrical *jali* carving. The heavy polygonal *khambhas* used in *jharokhas* in the earlier *Sompuriya shaili* are usually engaged pilasters with large corbelled brackets supporting the span of the *chajja* above (fig. 29, 30, 31). As a result *Sompuriya jharokhas* appear more two dimensional as compared with *Mughlai jharokhas*, and resemble *baris*.

During this phase we see the *khambhas* in *Sompuriya jharokhas* detaching themselves from the wall and shifting to the front plane of the *jharokha* held at their upper ends with *margol* (fig. 54). A new columnar type makes an appearance during this phase, and replaces the heavy polygonal *khambhas* in *jharokhas*. This is the fluted column known in local terminology as the *surangdar khambha*. This columnar form gained popularity in Mughal architecture in the middle of the seventeenth century (fig. 52). Its introduction in Jaisalmer during this phase and its subsequent popularity in the 'third phase' in the eighteenth and nineteenth centuries, is perhaps the singular most important influence of the imperial Mughal tradition on the architectural tradition of Jaisalmer. We will briefly discuss the history of the evolution of the form of the *surangdar khambha* in section 3.3 (Architectural Components and their Details) of Chapter 3. We return to the discussion about the incorporation of the *surangdar khambha* in the architectural tradition of Jaisalmer. The delicate form of the *surangdar khambha* is gradually incorporated in range of forms, in this phase: as pilasters framing panels and in miniature forms in aedicules (fig. 53, 55).

The *chajja* shows stages of transition from the heavy ribbed appearance in the *Sompuriya shaili* to its streamlined, emphatic form characteristic of the mature *Mughlai shaili*. *Todi* show early stages of development to the matured form seen later in the *Mughlai shaili*; the pendants of the *Sompuriya todi* are fused with a vegetal bracket form, with acanthus leaf modeling. The synthesis of the pendant with the acanthus foliage in the overall form of the *todi* is still awkward and unresolved, and the *todi* is visually chunky and heavy, more in keeping with the character of the *Sompuriya todi*, than the evolved delicate *Mughlai* form. The *baris* show transition in their treatment using *Mughlai* elements such as cusped *margol* and *surangdar* pilasters (fig. 56). However the basic form of the *baris* are generally still squattish and heavy, like the older *Sompuriya* forms, with an emphatic *dasa*. The carvings are rich and heavy, and panellisation of the wall surface is absent. There are beginnings of the tendency to step out the building facade, in some cases, from the line of structure, as in the *Mughlai shaili* (fig. 55). The lotus medallion motif is used with less consistency on solid wall surfaces, and it seems to have lost its sharpness and vigour in some applications.

### Third Phase

The third phase may be described as the 'golden phase'. After Rawal Amar Singh (1681-1702), Mughal influence was evident, in the large scale adoption of architectural elements, such as *margol* (both cusped and tri-segmental) in their matured form (as seen in Mughal

architecture of the Shah Jahani period) (fig. 57, 58, 59, 60), fluted columns (*surangdar khambha*), Mughal *todis*, the curved *bangaldar chajja*, and decorative vegetal patterns used as friezes, as infill patterns, on arches and in railings. Besides this, a more profound transformation took place in the aesthetics of Jaisalmer. The early characteristic rugged vigour and archaic quality is transformed into a more elegant, carefully composed building aesthetic, where we suddenly witness overall symmetry and balance in the composition of elevations (fig. 61), which had never been the characteristic in the older phases. Asymmetric compositions of elevations are not unknown (fig. 62), but such examples are relatively lesser in number. The stylistic transformation, is more immature, and awkward in the earlier part of the phase, but in the nineteenth century, it achieves maturity. Apart from the elevation, the plan layouts are also more geometrical and symmetrical. Overall symmetry to the entire building as a whole is not a quality alien to Rajput architecture. The Bundela buildings in Datia, and Orchha, built between the fifteenth and sixteenth centuries are perfect examples of this. However, the late arrival of a discernable quality of overall symmetry, is more likely a Mughal influence.

An unlikely example of the application of Mughal planning principles is observed in the design of the overall complex of the Jain temple dedicated to Adishvara Bhagwan at Amar Sagar, built in 1871 (fig. 45). The temple is located adjacent to a char bagh, complete with water channels and planted beds. It is no mere co-incidence that like the Mughal citadels at Delhi, and Agra, the temples and other buildings of the complex are strung linearly along the edge of the Amar Sagar tank (as a metaphor of the Yamuna). Unlike Hindu temple cities located on rivers, such as Benares and Mathura, however, this complex does not open up to the water front in a cascade-like formation of steps (*ghats*), but is built along a high solid retaining wall facing the water, exactly like the Mughal citadels.

This period witnessed extensive patronage from the wealthy *seths* (businessmen) and *diwans* of the imperial office, due to the extended period of peace and the ensuing prosperity of the kingdom in general. This enabled the construction of grand *havelis*, which rivalled even the buildings of the royalty. Representative buildings of this period include the *havelis* built by the *Patua Seths*, *Diwan Nathmal's Haveli*, the minister *Salim Singh's Haveli*, and the additions to the palace facing Duss hera Chowk.

Mughal influence in the architectural language is seen in the profile of the cusped arches, in the *surangdar khambhas*, and their capital ornament comprising layers of curled petal-like forms which resembles a serpent's hood in profile, in the treatment of domes of *jharokhas* and *baris*, the *bangaldar chajjas*, in the *todis* decorated with foliage designs, and in the geometrical *jali* designs. These elements are, however, woven with features characteristic to the older *Sompuriya shaili*: the *loom*, or *sehra*, which is a row of hanging pendants along the length of a projecting floor slab (fig. 63), that characterises buildings from this phase is actually a form derived from medieval temple architecture. The prototypes are the ornamental pendants suspended from the centres of temple ceilings such as at Dilwara, Ranakpur, and the Jain temples in Lodrava and Jaisalmer. In the older *Sompuriya shaili*, this form is used sparingly, mainly in the soffits of *jharokhas* and *baris* (fig. 29). In this phase, it is used repetitively as a continuous run of bud-like forms, strung along the length of a projecting *dasa*. This happens in conjunction with the earlier practice of marking the centres of the soffits of projecting floor slabs with hanging pendants. The *jali* designs are primarily geometrical and derived from Mughal architecture. However, a distinctive local flavour is imparted by inserting four, six or eight petalled flowers into the compositions (fig. 65). This, in the views of the author comes from the indigenous folk-art tradition of the region, and may

be seen in a number of the *mandna* (handpainted floor and wall decoration) patterns of various tribals living in the vicinity of Jaisalmer. The inclined *takiyas* of *jharokhas* can be traced back to the *kakshasanas* in Hindu temple architecture, even though their decoration relies chiefly on Mughlai geometrical designs. In the decoration of the cusped *margol*, especially on the ground floor, one notes the appearance of an elaborate, dramatic flower pattern, which has a dynamic radial quality (fig. 66). This form is absent in Mughal cusped arches. It is my understanding that it is derived from the folk-art tradition of the region. Very similar patterns are noticed till date in the decorative designs used by the tribals living in the vicinity of Jaisalmer. Another important architectural element, not visible from the outside, however ubiquitous in the internal layout and design is a storage element, more like a small *almirah* (portable wall cupboard), supported on brackets, and anchored back to the wall. This element is known as the *ala*. Crude versions of the *ala* may still be seen in the dwellings of tribals, where they are used for storing grains, milk etc. It is very likely that these are the prototypes to the later developed form of the *ala*.

One encounters virtually no *chattris* (pavilions), in the *havelis*, or in the palace, except in the late additions to the palace overlooking the Dussehra Chowk, which is most likely a Mughal influence. *Chattris*, were popular in *Mewari* aesthetics, as is seen from their application in Udaipur, and Chittor. In the assimilation of architectural forms from Mewar in the architecture of Jaisalmer in the seventeenth century, this element was selectively left out.

The extensive use of the *surangdar khambha* in the mature *Mughlai shaili* as seen in this phase is perhaps the singular most important influence of the imperial Mughal tradition. Assimilation of the form of the Mughal *surangdar khambha* also involves the assimilation of another decorative motif; the acanthus leaf motif, which forms an important part of the vocabulary of the Mughla *khambha* (fig. 52). The acanthus leaf decoration assimilated from Mughal architecture takes on a new life in the hands of Jaisalmeri craftsmen, as a part of the architectural repertoire. In a decorative frieze pattern, the acanthus leaf motif is repeated in a row, joined edge to edge, with a second layer behind, seen between the outline of two adjacent leaf motifs. This pattern is executed in stone, with fine modelling, as horizontal friezes on the elevation, and on *takiyas* of *jharokhas* (fig. 64). It is also used extensively in a painted form, on *bilati* (cornices) (fig. 67), in the interiors of rooms.

This phase also saw the incorporation of another salient feature of *Shah Jahani* architecture: the curved *bangaldar chajja* (fig. 64), modelled on the curvilinear roof of the Bengali peasant hut. Towards the end of the sixteenth century, many craftsmen from Bengal migrated to the imperial Mughal court, and to the Rajput kingdoms beyond carrying with them the form of the *bangaldar chajja*. During the reign of Aurangzeb, when all but the orthodox Muslim craftsmen were driven from the imperial court, the craftsmen entered the service of Rajput kingdoms. From the beginning of the eighteenth century, *Mughlai* elements and stylistic features are especially widespread in Rajput architecture. Jaisalmer's glorious phase is co-eval with this period of artistic assimilation.

The popularity of the *Mughlai shaili* in the third phase did not spell the end of the earlier *Sompuriya shaili*. Occasionally we see the simultaneous use of the *Sompuriya* and *Mughlai Shailis* in a single building. Examples may be seen well into the middle of the nineteenth century, such as *Salim Singh ki Haveli*, and the *Patuon ki Haveli* (*Pratapchand Haveli*). In *Salim Singh ki Haveli*, one witnesses overtones of *Sompuriya* massing in some parts, and the exclusive style *Sompuriya* carving in some *jharokhas*, as will be illustrated in section 5.9 of Chapter 5 (Case Studies of Overall Planning and Composition).

In the *Patuon ki Haveli* group, in the third *haveli* in the northern row, built for Pratapchand (mid nineteenth century), the different floors of the front facade are carved in the two different *shailis* (fig. 68). The ground floor and first floor are *Sompuriya*, in massing and detail, while the third and fourth floors step out of the facade, are panellised and detailed in a typical *Mughlai* fashion. The crisp carving style of the *jharokhas* in the *haveli* of Pratapchand, is in no way inferior to the oldest *Sompuriya* carvings, which means that a high level of skill in stone carving survived well into the nineteenth century, in parallel with the *Mughlai shaili*.

Three plausible alternative explanations may be considered, in considering the co-existence of the *Mughlai* and *Sompuriya shailis* well into the middle of the nineteenth century, and their simultaneous use in the same buildings. The building may have been built in stages, with the parts built later having employed *Mughlai* craftsmen, due to non availability of *Sompuriya* craftsmen, or by choice of popular fashion of the times. Though this seems to be a logical explanation, it does not seem to be the case in the *haveli* of Pratapchand. We know that all the five *Patuon ki havelis* were built in one stretch, from the beginning to the middle of the nineteenth century. It is therefore very unlikely that construction of one of the *havelis* was interrupted mid-way and another guild of craftsmen from a separate *shaili* were brought in, due to the non availability of craftsmen working in the original *shaili* in which the construction had started. A more plausible explanation may be that different guilds of craftsmen belonging to the two different *shailis* were simultaneously available, well into the nineteenth century. Their employment by the owner to adorn different parts of the same building was a matter of his personal aesthetic choice. A third possibility is that the same guilds of craftsmen were trained in both the *shailis*, and the eclectic mix of *shailis* was a considered artistic decision on their part. Artistic expression in this phase did not merely involve working creatively with a palette of architectural forms characteristic to one specific *shaili*, but occasionally also incorporating forms and design idioms from another *shaili*.

Goetz has suggested that this phase is the period of decadence of the Jaisalmer tradition. Referring to the *Patuon ki Havelis* in 'Jaisalmer: Treasure of the Desert', he suggests:

Much richer even are the *Patwa Havelis* of the last century, which because of their astonishing profusion or ornament are regarded as masterpieces of art by many visitors, though they reveal nothing other than a pompous, vulgar taste.<sup>33</sup>

and:

The big mansions of the *Patwa* millionaires, the merchants who held some trade, customs of tax-gathering monopoly under a charter of the *Maharawal*, have become not less famous. Whoever believes that art consists in the mere exuberance of decoration regards these exquisitely carved mansions as wonders of beauty. But whoever believes beauty to be an expression of harmony, of rhythm, or restraint, and character, must find them a nightmare.<sup>34</sup>

Goetz does acknowledge that these *havelis* are exquisitely carved, but his main concern is the decoration, which he finds too exuberant to his personal taste. Surely the quantity of decoration is no basis for judging an entire group of buildings. Goetz's analysis does not discuss the plan layouts and spatial arrangements of these *havelis*, which, in my opinion, are amongst the most sophisticated examples of spatial organisation in all Rajput architecture.

<sup>33</sup> Goetz, p. 160.

<sup>34</sup> Ibid., p. 161.

Neither is the design of elevations discussed, which display ingenious creative solutions in the handling of projecting and recessed masses, to plans which are all quite generic and uniform, along the external edge of the building. Each solution displays, so to say, a variation on a theme. The massing is easy to miss in the richness of carving and decoration, but it is the prime aspect in the design of the elevation, in breaking the building mass visually. One must bear in mind that these buildings are fairly high (five to six storeys), as compared with the earlier town-houses, the supposed 'superior models', which Goetz so admired. Mere carving, no matter how rich and elaborate, would not be able to relieve a building mass that high from visual solidity and monotony. Goetz's basis for judgment comes from his personal taste and prejudices about architectural aesthetics, especially decoration.

The vigour in the architectural tradition, in my opinion, starts flagging in the mid-nineteenth century, soon after the construction of the *Patuon ki havelis*. *Diwan Nathmal's Haveli*, and *Salim Singh's Haveli*, both constructed in the same grand *haveli* tradition as the *Patua havelis*, show a visible decadence in the quality of carving. *Nathmal's Haveli*, was built in 1885, the carving on the facade, done symmetrically about the centre by two brothers, Laloo, and Hathi. In these carvings, one notices foreign elements creeping in: soldiers, trains, steamships, caprisoned elephants etc. The carving though elaborate lacks in depth, and sharpness. The vegetal patterns lack the fluidity that characterises decorative carving in the *Patua Havelis*. *Salim Singh ki Haveli*, is even more decadent stylistically. The central tower block, has a cluster of connected balconies, with *bangaldar* roofs, and domes, arranged in a way similar to the Gaj Vilas, however, here the carvings are big and bulky (fig. 69). The string of loomb is heavy and oversized, so are the infill panels in the railings. The architectural style here is very visibly on the downslide.<sup>35</sup> The later additions to the fort palace, especially the *Moti Mahal*, are weak compositionally. They have lost all plasticity and vigour, and are devoid of the richness of earlier buildings. In *Moti Mahal*, one notices a representation of the Italian balustrade, which has probably crept in from the *Angrezi shaili* (fig. 70). Foreign influences are most overtly seen in the design of Jawahar Vilas, the Maharawal's abode, constructed outside the fort, in the early twentieth century (fig. 72, 73). The ground floor is constructed in a hybrid style, combining fluted ionic columns, with crude ionic capitas. Weak copies of pediments crop up, especially in the inner courtyards. The main palace facade has a conspicuous pediment, external porch, with symmetrical flights of stairs flanking it, with the dado of the front wall decorated with mass produced glazed tiles. The upper floors, however, are carved in the *Mughlai* idiom. The quality of carving throughout the palace, however is of exceptional quality, which shows that craftsmen were still capable of high quality work (fig. 74, 76). *Badal Vilas*, built at the end of the nineteenth century by Muslim *silavats* is modelled on the Tazia tower (fig. 75). This unique mutistoreyed pavilion-like building was a parting gift to Maharawal Bairi Sal by the Muslim *silavats*, before they left the region, and migrated westwards.

The twentieth century buildings include a large number of public buildings designed by English architects, in the PWD style. The typology of these buildings was based on Western Classical models, and their architects intended to use traditional craftsmen merely to build and decorate them. The High Court, Jawahar Hospital, and the Jawahar Vilas built outside the city as a country house, are all examples of the *Angrezi shaili* built in the twentieth century.

<sup>35</sup> Goetz, praises the haveli, in comparison with the Patua Havelis: 'An earlier, much better example is the Haveli of Dewan Salim Singh'. He however adds: 'Though the rooms are elegant and impressive, the whole looks petty and uncanny, like the character of the tracherous and bloody tyrant who had built it'. Goetz, p.162.

### *The Contemporary Context*

We conclude the brief survey of the history of the tradition by briefly looking at the work of contemporary building craftsmen in Jaisalmer. A substantial proportion of the local population in Jaisalmer, employ traditional craftsmen to design and build their houses, structurally in stone, in a fairly traditional way. Reinforced concrete is used minimally, its use restricted to very large and high buildings. The repertoire of architectural forms of the building craftsmen include *baris*, *jharokhas* and decorative panels, based fairly closely on the traditional models. We will observe in detail, the design methods and techniques of making, as is in use amongst contemporary craftsmen in Chapter 4 (Craft Practice). The level of skill of some craftsmen is very high, their workmanship comparable with the best handiwork of the past. However, craftsmen today have to contend with stiff market competition, and lack of discerning patronage. They work for square foot rates, or on the basis of daily wages. It is fairly easy to decipher that a mechanical repetitiveness marks their work. Forms are chunky and crude and the carvings generally lack delicacy and finesse.

Used to the conveniences of modern living, the plans of contemporary buildings are modern utilitarian layouts, designed in most cases, by a civil engineer. The traditional craftsman is called in to design and construct the facade. He has no say whatsoever in the design of the plan. Unlike the traditional design process, the building is not the result of an integral process of design, where the plan and elevation, are designed as one cohesive unit. Spatially, the building speaks one language, while the facade speaks another language. Whatever redeeming possibilities, the facade design may potentially offer, is ruined by the obsession of the modern client in shutting off the building from external noise, heat and dust. All the *jharokhas* and *baris*, are sealed to their edge with wooden shutters, which remain perpetually shut. The playful inter-relationship between the semi-enclosed, pavilion-like *jharokhas* and *baris*, with the facade behind, partially obscuring while framing views of the facade, and creating subtle nuances of reflected light, and deep shadows is completely lost in the modern hybrid (*fig. 77*). In spite of employing traditional forms and details, these modern buildings are far removed from the spirit of traditional design, embodied in the older buildings.



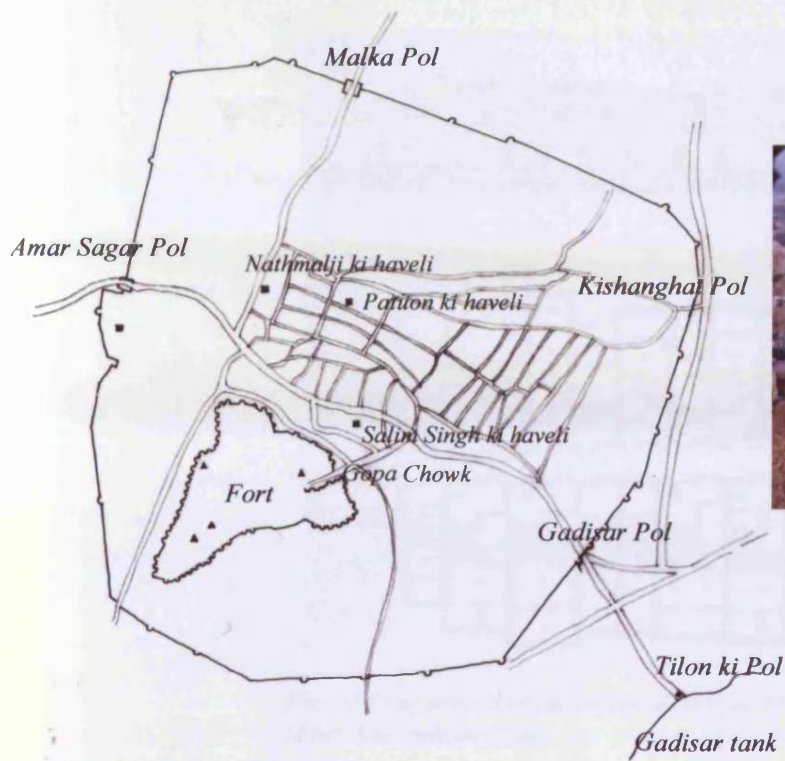
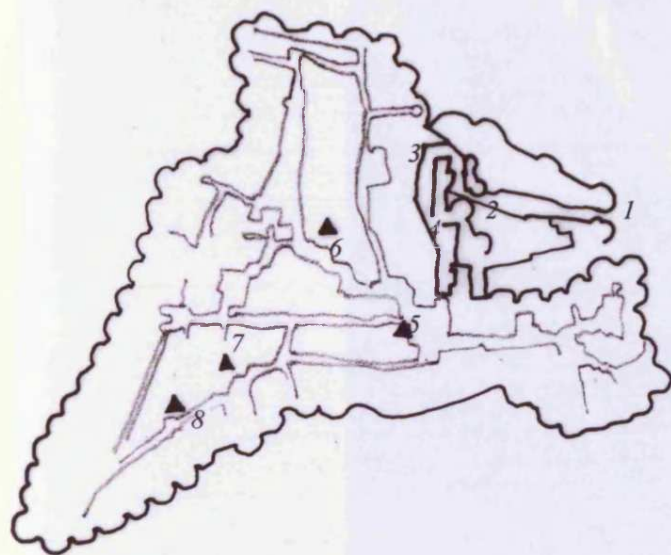


Fig. 10 The city of Jaisalmer



Fig. 12 The serpentine peripheral wall of the fort. The lower wall is known as the pitha or pada



- Key
- 1 Akshay Pol
  - 2 Surya Pol
  - 3 Ganesh Pol
  - 4 Hawa Pol
  - 5 Tikam Deora Temple
  - 6 Laxminath Temple
  - 7 Jain Temple
  - 8 Sitla Temple

Fig. 11 The fort of Jaisalmer

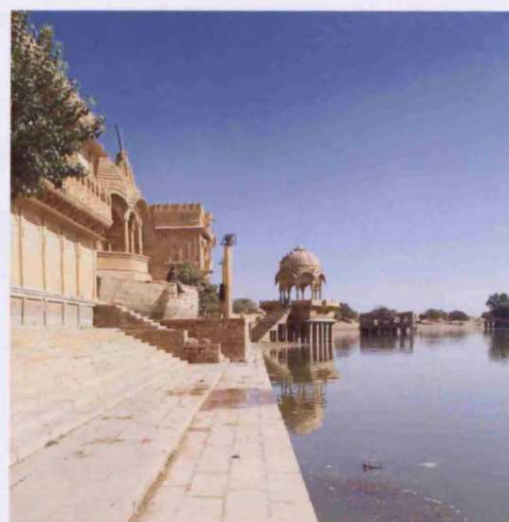


Fig. 13 Gadisar tank

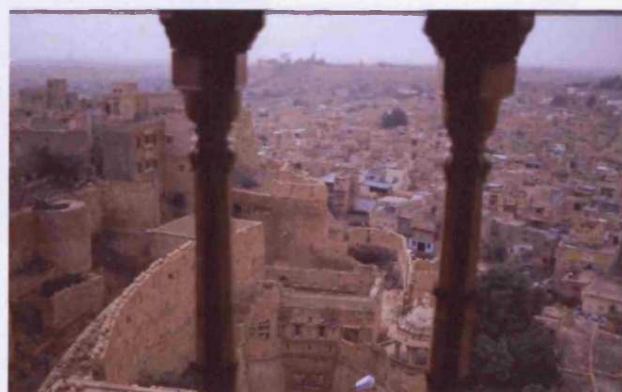
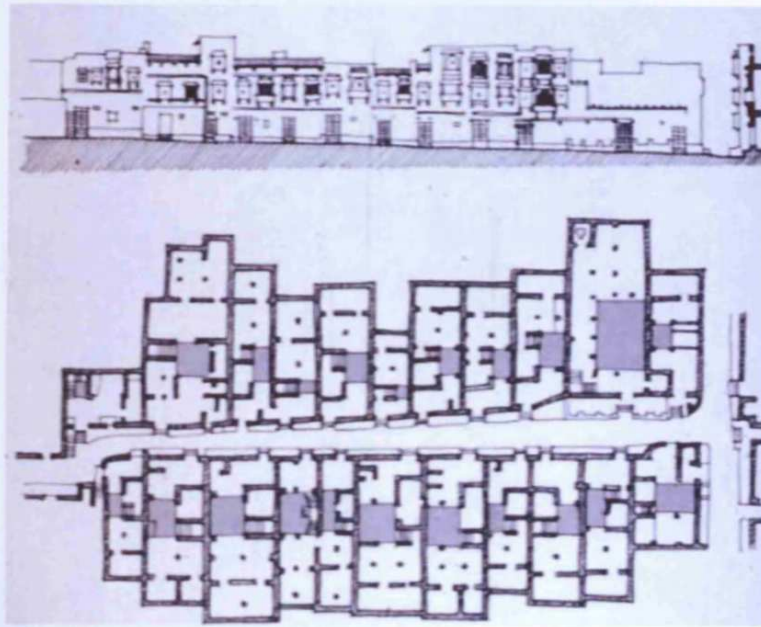


Fig. 14 The city in the talhati or valley



*Fig. 15 Plan and street elevation of typical mohalla/para in Jaisalmer.  
(After Kulbhushan Jain)*

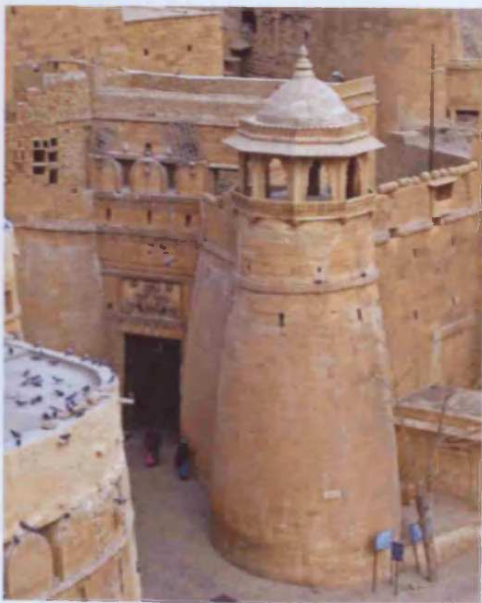


*Fig. 16 Relationship of havelis with the street in a typical mohalla/para. This street adjacent to the Patuon ki Haveli has a row of raised otas connected with each haveli, strung linearly along the street. These are used as out-door social spaces, throughout the year.*





*Fig. 17 The circuitous entrance ramp interspersed with different gateways or Pols. Akshay Pole is to the extreme right adjacent to Gopa Chowk, Suraj Pole in middle ground*



*Fig. 18 The Rang Burj with Suraj Pol in the left*



*Fig. 19 Tilon ki Pol seen from the side of Gadisar*



*Fig. 20 Torana Vallari above Sural Pol*





*Fig. 21 North facade of palace depicting the mardana built over Hawa Pol (seventeenth century), and the zenana (eighteenth –nineteenth centuries) on the left.*



*Fig. 22 North facade of Juna Mahal (between sixteenth and seventeenth centuries) on extreme left. The zenana block on its right was built at different stages in the late eighteenth and nineteenth centuries.*



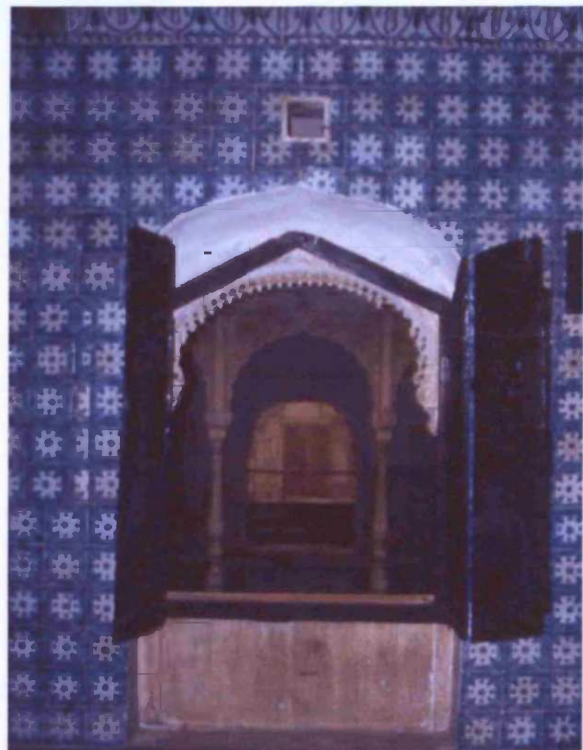
*Fig. 23 South facade of Galvilas (mid-nineteenth century) overlooking Dussehra Chowk*



*Fig. 24 Zenana facade (most likely late eighteenth century) overlooking Dussehra Chowk*



*Fig. 25 Steps with marble throne of the Maharawal on top, adjacent to Dessehra Chow. Moti Mahal at rear*



*Fig. 26 Interior of Gajvilas depicting coloured ceramic tilework*





Fig. 27 Typical example of Sompuriya facade, depicting playful assortment of forms

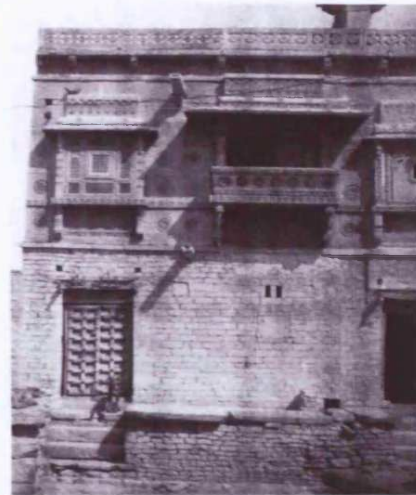


Fig. 28 Solid ground floor pierced by doorway. Upper floor embellished with jharokhas and baris



Fig. 29 Example of Sompuriya jharokha with trabeate construction, ribbed chajja, engaged pilasters, curved todi with pendant heads. Note the suspended ceiling pendants, and the sun roundels splattered on the wall



Fig. 30 Piling of layers of horizontal mouldings above jharokha, reminiscent of Hindu temple architecture

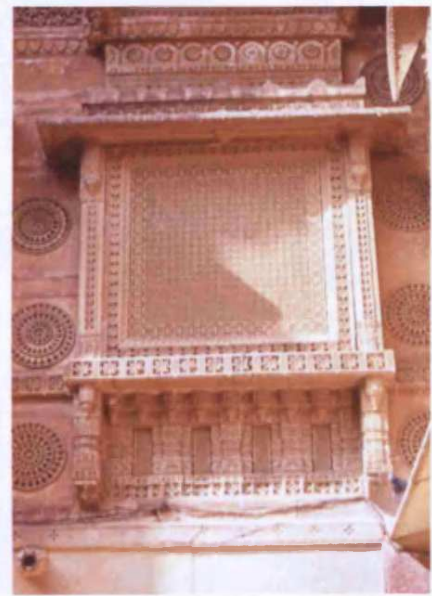


Fig. 31 Sompuriya bari



Fig. 32 Example of early cusped margol in a Jaisalmer house

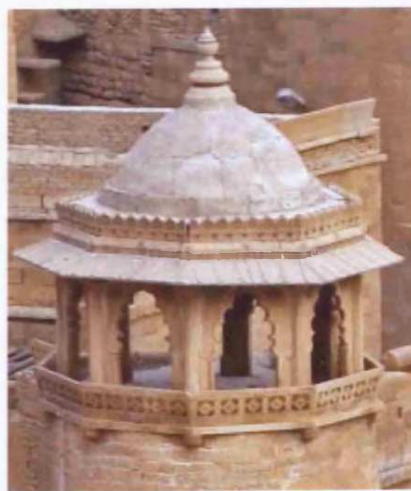


Fig. 33 Rang Burj constructed in 1508, illustrating an early use of the cusped margol



Fig. 34 Sompuriya door with quadratic panels secured with steel rivets



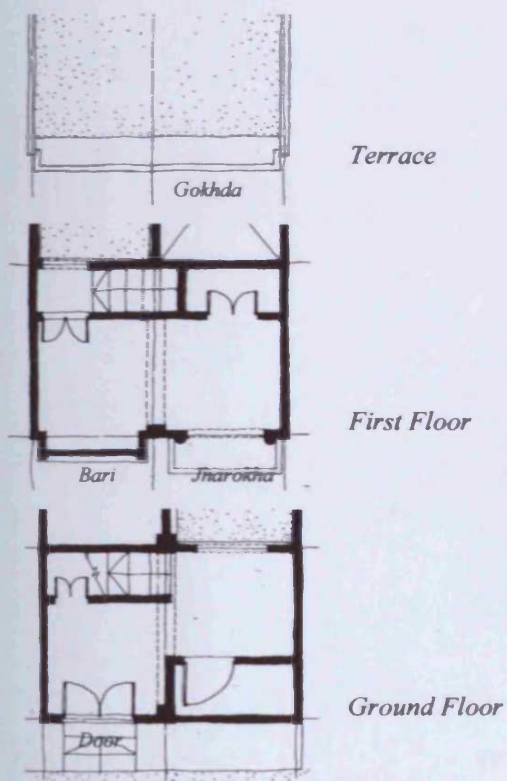


Fig. 35 Stacking of bays vertically, so their respective centres on various floors are aligned



Fig. 36 Informal arrangement of architectural elements in a typical Sompuriya facade, suggesting asymmetry



Fig. 37 Mughlai elevation designed with overall symmetry and balance



Fig. 38 Jharokha made of architectural components distinctive of the Mughlai Shaili: surangdar khambha, cusped margol, and streamlined curved chajja





Fig. 39 Panellisation of the external facade



Fig. 40 Arabesque vegetal designs typical to the Mughlai Shaili

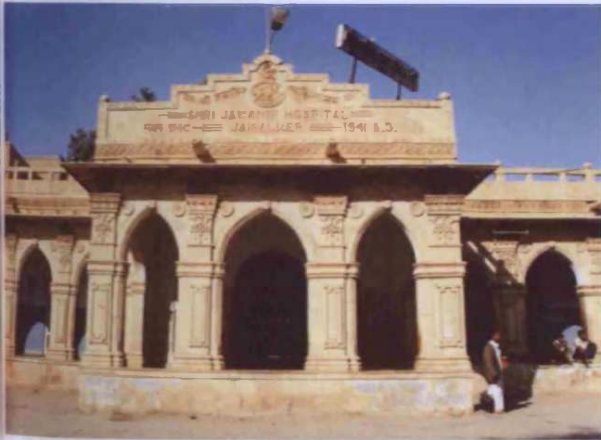


Fig. 41 The Jawahar Hospital built in 1941 represents attempts at synthesising indigenous and foreign forms



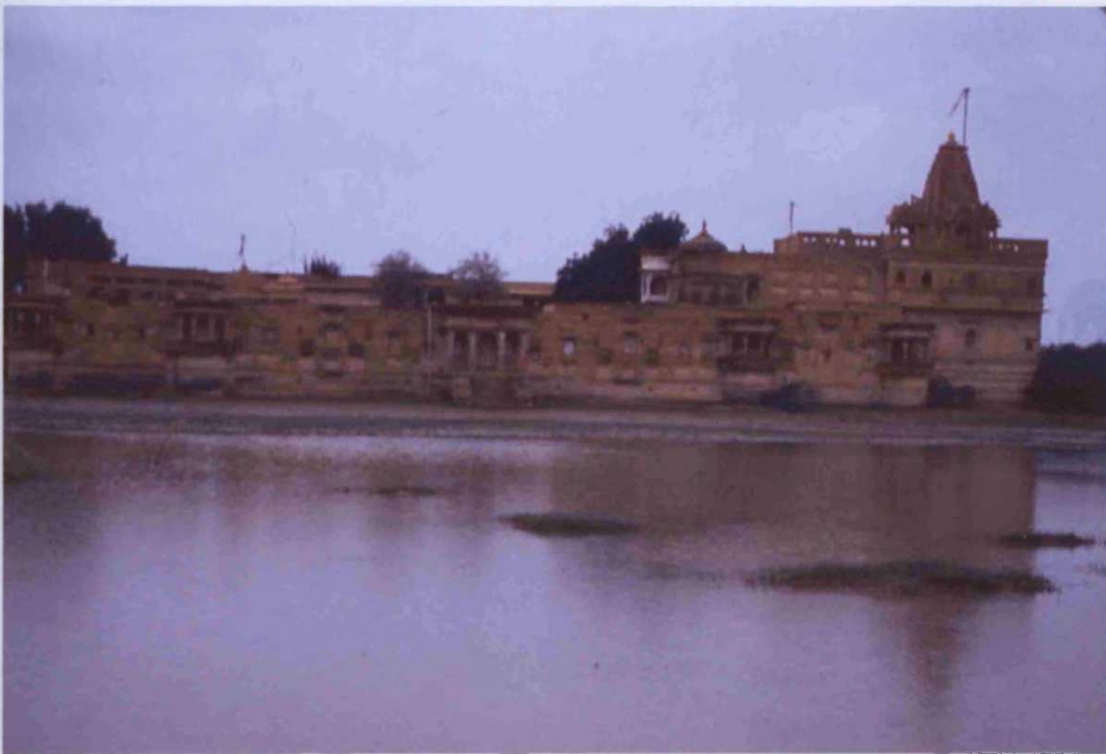
Fig. 42 Jawahar Vilas built in the early twentieth century. Western influence is seen in the crude ionic pilasters and pointed arches on the ground floor, and the suggested pediment above





*Fig. 43 Parshvanatha Temple, Jaisalmer. Early 15<sup>th</sup> century.*

*Fig. 44 Entrance Torana to the Parshvanatha Jain Temple, Lodrava. Originally constructed by Lodra Rajputs before 12<sup>th</sup> century (precise date not known). Renovated in early 17<sup>th</sup> century.*



*Fig. 45 Jain temple at Amar Sagar built in 1871. Note the similarity in the treatment of the facade of the temple complex overlooking the tank, with Mughal palace complexes built along rivers. Traditionally temples built adjacent to a water body opened up to it in a cascade like formation of steps, known as ghats (as at Varanasi, Mathura). The solid parapet wall with projecting jharokhas overlooking the tank, here, is most definitively a Mughal influence.*





*Fig. 46 Parshwanath Jain Temple, Lodrava. Peripheral screen wall added in 1615*



*Fig. 47 Sompuriya bari with jalis inset in grid of squares*



*Fig. 48 Open gable of early rock-cut Buddhist architecture at Ajanta, fifth century*



*Fig. 50 Niches framing images of Buddha, Nalanda, eighth century*



*Fig. 49 Niches framing images of Buddha in the Ali Masjid Stupa, second century*



*Fig. 51 Cusped arch in Sun Temple at Modhera, eleventh century*

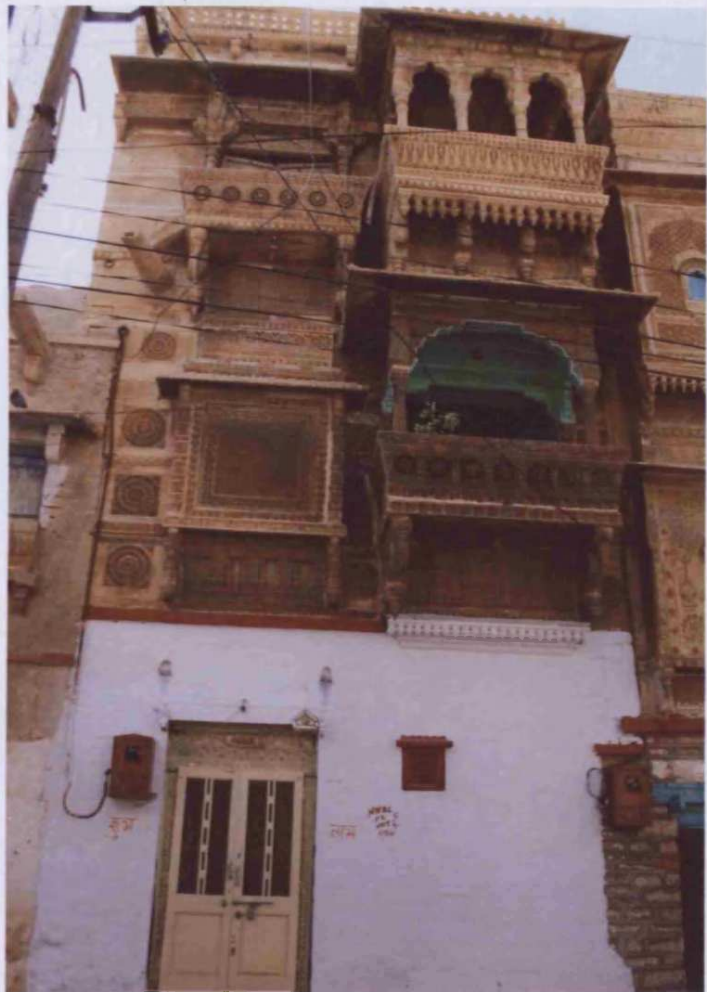


*Fig. 52 Fluted column in the Baldachin, Machchhi Bhawan, Agra fort, 1637. Note the extensive use of acanthus leaf decoration in the capital and in the constriction in the base*





*Kanhaiyalal Vyas Haveli. The massing illustrates Sompuriya characteristics. Architectural elements display early Mughlai influence*



*Fig. 54 Haveli facade using Sompuriya elements. Massing tendency on the first floor illustrating stepping out of facade reflects Mughlai influence*



*Fig. 55 Kanhaiyalal Vyas Haveli. The visual lightness, and the co-ordinated composition of the facade on the second floor displays Mughlai characteristics*





Fig. 56 Stages in the transformation of the Sompuriya bari, to the Mughlai bari. The bari on the extreme right retains the squattish proportions of the Sompuriya Shaili, however incorporating Mughlai features, such as surangdar khambha, streamlined chajja and the Mughlai todi



Fig. 57 Cusped arch in Mughal architecture, Agra fort



Fig. 59 Cusped margol in Jorawaralji haveli, Jaisalmer



Fig. 58 Tri-segmental arch in Mughal architecture, Agra fort

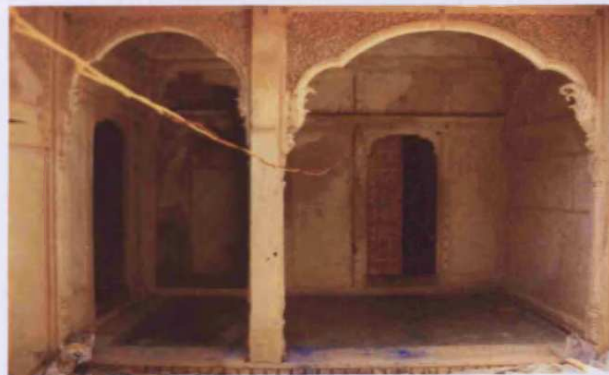


Fig. 60 Tri-segmental margol in Jorawaralji haveli, Jaisalmer



Fig. 61 Haveli of Hari Vallabh Gopa, illustrating overall symmetry



Fig. 62 Sri Nath Haveli, illustrating asymmetry in overall elevation





Fig. 63 Sehrabandhi running along the edge of projected dasa



Fig. 66 Cusped Margol

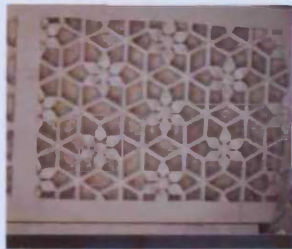


Fig. 65 Jalis

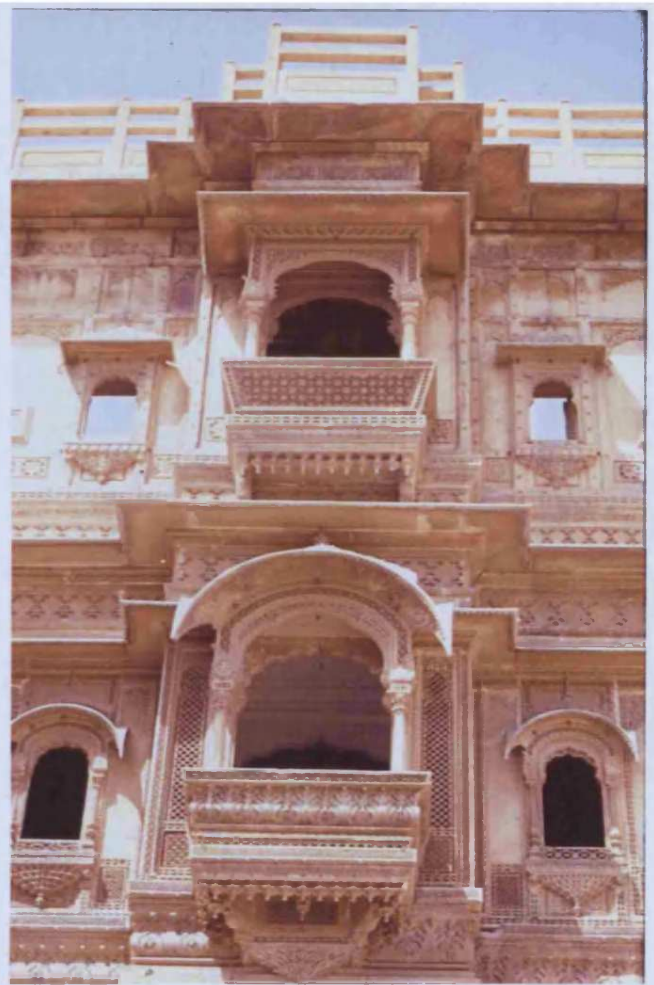


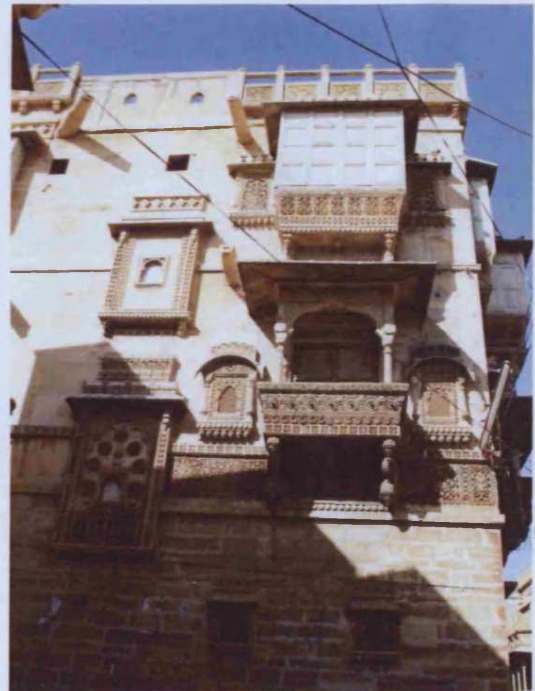
Fig. 64 Acanthus frieze used on takiya, Jorawarmalji Haveli



Fig. 67 Painted acanthus motif on bilati, Jorawarmalji Haveli



Fig. 68 Mixture of Mughlai and Sompuriya Shailis, middle-late nineteenth century. Pratapchand Haveli (above), haveli in Malpani Para (right)







*Fig. 69 Bagaliyas in the central tower, Salim Singh ki Haveli*



*Fig. 70 Carving on second floor of Moti Mahal*



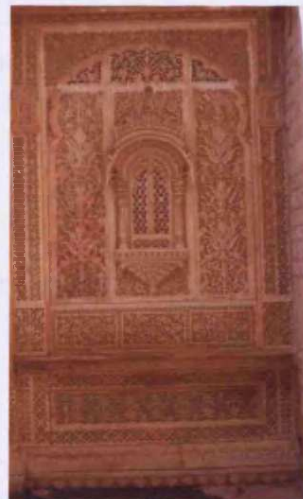
*Fig. 71 Carvings on first floor of Moti Mahal illustrating the use of oversized vegetal ornament in the tracery*



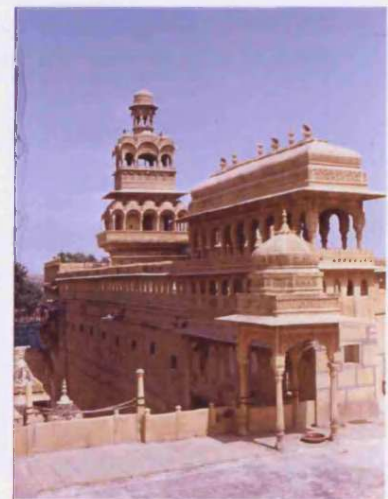
*Fig. 72 Facade overlooking chowk, Jawahar Vilas*



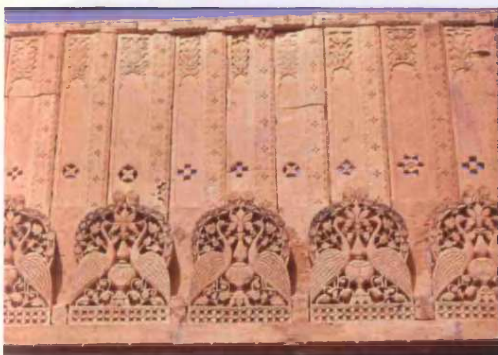
*Fig. 73 Jawahar Vilas. The ground floor had crude version of ionic pilasters and pointed arches*



*Fig. 74 High quality carving in Jawahar Vilas*



*Fig. 75 Badal Vilas modelled on the Tazia tower*



*Fig. 76 High quality carving in Jawahar Vilas*



*Fig. 77 Design and workmanship of contemporary building craftsmen in Jaisalmer*

## Chapter 3 PRINCIPLES OF DESIGN

The principles of design include the overall formal and spatial composition of the *haveli*, including the design of elevations (including external facades and internal rooms). Detailed architectural expression using a range of architectural elements and aedicules illustrates form making at the micro scale. The overall formal and spatial organisation from a planning point of view is based primarily on the structural layout of the *haveli*. Design decisions governing the creation of spaces using a variety of architectural elements are based directly on it. The structure has an equally important role in the design of the elevations. A range of design principles based on these ideas form the main body of discussion in this chapter.

The discussion often refers to architectural elements characteristic to the traditional architecture of Jaisalmer in the local dialect, as is in use amongst craftsmen. For the convenience of the reader, an illustrated glossary of the most important architectural elements has been provided at the end of the thesis in *Appendix 1*. This will be especially useful while attempting to understand the composition of elevations, especially at the micro scale.

The two *shailis*: *Sompuriya* and *Mughlai* have a distinctly different set of architectural components, but they generally share the same nomenclature, in the terminology of present day craftsmen. The principles of design and composition in the two *shailis*, are basically common. However, as we have seen, the *havelis* built in the *Sompuriya shaili* are fairly elementary and simplistic in comparison with the *havelis* built in a mature *Mughlai* idiom, wherein *haveli* architecture reaches unprecedented levels of scale, and formal and spatial complexity. The discussion on the principles of design is therefore based primarily on the *Mughlai shaili* (with references to the *Sompuriya shaili* wherever relevant). Detailed illustration of the architectural components and aedicules particular to the two *shailis* is done separately, in the concluding section of the chapter.

### 3.1 Formal and Spatial Organisation

It is important that we look at the basic form of the *haveli*, before we discuss the principles of design in detail.

#### *The basic form of a Haveli*

The individual house is inherently an introverted design, centering on a courtyard that is open to sky known as *chowk* (fig. 78). A raised platform, a few feet wide, with steps leading up to it, from the street, is the part of the house which is most public. This platform known as *ota*, is used for informal social interactions, and for certain types of domestic chores, like washing clothes, bathing children, and drying home-made condiments. The steps leading up to the entrance door from the street are known as *pidhakiyas*, with broad slabs of stone at intervals known as *hathini*. The *pidhakiyas* are always designed on a unit of three steps referred to as *indra*, *yama* and *raj* respectively, by local craftsmen.<sup>36</sup> The convention is never to stop at *yama* (god of death), so the number of steps could be one, three, four, six, seven, nine and so forth. The entrance door to the house is never in direct visual axis with the *chowk*. The eccentric location prevents a direct view of the *chowk* from the street, and protects the privacy of the inhabitants. On entrance through the door, one steps into the reception room of the house, known as the *moda*. Guests are received in this space and unless related or very

<sup>36</sup> As described to me by craftsman Pir Mohammad on site, in Jaisalmer, 2003

familiar with the inhabitants, are rarely allowed access, into the house beyond this point. Next in the spatial sequence comes the *chowk*. The *chowk* is the visual and physical hub of the house. In size, it varies from a few feet across, in small houses to very large open spaces in the larger *havelis*. There might even be more than one *chowk* in larger *havelis*. Most of the kitchen activities are conducted in this space, as are also the drying of clothes, and large formal social gatherings. The *chowk* provides for all the uses of an open to sky space in the house, with the added benefit of it being introverted, hence completely private and secure.

Staircases are located adjacent to the *chowk*. In small houses, there is normally only one staircase, and it is located on the left side of the *chowk*, with the visitor oriented towards the *chowk*, from the *moda*. This is considered auspicious. As pointed by a traditional craftsman Pir Mohammad, the left side is also more convenient practically, while climbing up, when carrying heavy items in the right hand, so the left hand may be used to grip the railing, or wall, for easy manoeuvre.

Next in the spatial hierarchy comes a verandah-like space, open on one side to the *chowk*. This space is called the *pathiyal*. The *pathiyal* may be one or two bays deep. This space, used for informal family gatherings, is provided with ample built-in storage space in the walls. Often, they contain stairs leading to the basement, to which the inhabitants retired during the unbearable summer months.

The farthest space in the sequence, is the *kotha* – a room bounded by walls on all sides, with doors leading from the *pathiyal* to it. The *kotha* is provided with windows, in case the rear of the house abutts a street or a *chowk*, otherwise the only source of light, is the indirect light from the inner *chowk* of the house.

On the upper floors, terraces, open to the sky, known as *chandnis*, are created by eliminating the roof over selected bays.

The materials used in the construction of the *havelis* are all locally available. The yellow sandstone is locally quarried. Powdered gypsum is mixed with water and used as a binding agent. Traditionally, the floors are mud-plastered and help in keeping the interiors cool. The floor construction uses a combination of timber and compacted soil (fig. 79). Deep timber beams supported on stone brackets anchored to the walls, form the main structural elements of the floor construction. Short planks of timber locally known as *chinyar* are laid cross-wise to the main beams. Densely woven jute matting is laid over the layer of *chinyar*, over which a layer of dried grass (known as *san* or *khemb*) is laid, forming a good insulating layer. Soil is then compacted over this to a depth of about one foot. This layer contributes most significantly to the insulating properties of the floor construction. The flooring is plastered mud. A locally available reddish clay known as *morut* is mixed with cowdung (*gobur*) and used for plastering (*lipai*) the floor. Traditionally floors are re-plastered once a year.

Having discussed the basic form of the *haveli*, we look at *haveli* typologies in Jaisalmer based on scale, number and disposition of *chowks* and the *diwankhana*.

### *Haveli Typologies*

The *havelis* in Jaisalmer vary vastly in scale. To give an idea, the smaller town house may be fifteen feet, in frontage, and twenty five to thirty feet in depth, while the larger *havelis* may have a frontage of thirty to forty feet, with depths ranging from fifty to sixty feet. *Havelis*



such as *Nathmal's Haveli*, and *Salim Singh ki Haveli* are even bigger. The basic system of architectural design and arrangement is based on the structural bay, as will be discussed in detail in the section 'Plan and Structure', in this chapter. A structural bay may be four to five feet in span. It is from the multiplication of such individual bays, in both directions, around the *chowk*, that the layout of the *haveli* is generated. A *haveli* may be as small as two bays wide, while larger *havelis* may be seven, eight or even nine bays wide. Symmetry in the overall design is evident, especially in the design of the later *havelis* built in the third phase of artistic growth in the nineteenth century. However, within the course of the tradition, there is consistency in the use of symmetry in the design and architectural treatment of each bay, but not necessarily in the overall design. This will be illustrated through the case studies of nine different *havelis* located in Jaisalmer, in Chapter 5 (Case Studies of Overall Planning and Composition).

The elevations, in general are solid on the ground floor, and more porous and open in the upper floors. This is also true of the plans. Open to sky terraces and balconies are created in the upper floors with the elimination of roofs over a number of structural bays. Occasionally, structural elements are also eliminated to create large unobstructed spans.

The front elevation of *havelis* belonging to *diwans*, who were ministers in the service of the royalty, are distinguished by an open verandah abutting the street called the *diwankhana*. This space was used to receive guests by the *diwan*. The *ota* of the *haveli* occurred beyond the *diwankhana*, adjacent to the street. The *diwankhana* clearly identifies the house of a *diwan* from other *havelis*, which are characterised by a solid wall facing the street punctuated by the entrance door. The *otas* in the houses belonging to the *diwans* are invariably higher than other houses, and are occasionally marked by statues of horses and elephants, flanking the main entrance. Often miniature representations of horses known as *todiyas* appear on the lintel of the entrance doorway. Most of the large *havelis* of Jaisalmer, including the five *Patuon ki Haveli*, and *Nathmal ki Haveli* belong to this category.

A summary of the typology of *havelis* in Jaisalmer is suggested below, highlighting briefly the characteristics of each type. Examples of each type are illustrated in detail in Chapter 5. Below, each typology is provided with reference numbers of the relevant *havelis* in Chapter 5, which illustrate its type.

*A. Small two/three bay, single chowk haveli: (5.1, 5.2, 5.7, 5.8)* These generally have the *chowk* positioned eccentrically to one side abutting a party wall. The *chowk* itself is small, usually one bay along both the width and depth. The ground floor facade facing the street is solid, with a prominent door opening to one side or the centre of the facade. *Chandnis*, some of which are tiny in size, occur on upper floors, sometimes associated with *pathiyal*-like spaces. The positioning of key architectural elements and aedicules throughout the *haveli* is based fairly consistently on the structural bays.

*B. Large multi-bay single chowk haveli: (5.5)* The total number of bays along the width and depth of the *haveli* may be odd or even numbered. The *chowk* itself generally has an odd number of bays, though there are examples with even numbered bays. The *chowk* is positioned in a centralised location in relation to the overall plan.

*C. Large multi-bay multi-chowk haveli: (5.9)* Multi-*chowk havelis* are unusual and are relatively larger than most ordinary *havelis*. In some instances, the two *chowks* might possibly have been designed as distinct *mardana* (male) and *zenana* (female) zones. In very

large *havelis*, the *chowks* are vital in maximising the light and ventilation to the surrounding ranges. The *chowks* themselves may comprise an odd or even number of bays.

**D. Large multi-bay single chowk haveli with diwankhana:** (5.4, 5.6) The disposition of spaces and formal arrangement is similar to B, with an added *diwankhana* gallery adjacent to the street on the ground floor. It is not necessary that the *diwankhana* gallery is continuous across the length of the facade. It might be restricted to a certain number of bays over a specific stretch of the facade. Sometimes, its continuous porosity is interrupted by solid blocks built over a certain number of bays.

**E. Large multi-bay multi-chowk haveli with diwankhana:** (5.3) The disposition of spaces and formal arrangement is similar to C, with an added *diwankhana* gallery adjacent to the street on the ground floor.

### *Plan and Structure*

The essential concept in form-making throughout the long course of this tradition is the concept of 'the centre' (fig. 80). Embodied in symbols such as the *Vastu-Purusha-Mandala* and the *Yantras*, the concept is the life blood of cultural thought of the traditional society, not just in Jaisalmer, but throughout India. The *Vastu-Purusha-Mandala*, expresses in geometrical terms the ideas of centre, symmetry and balance. Like all traditional symbols, the *Vastu-Purusha-Mandala* expresses an idea: the idea of creation of the cosmos by the supreme being (Brahman) from himself – an act of Divine Will imparting through *Viraj* – the supreme intelligence, 'order', on creation. The *asura* pinned down by the *devatas* represents matter in its undifferentiated form, while Brahma in the center and *devatas* around represent the stamp of Divine Intelligence, which imparts order to created matter. Various deities or *padadevatas* are arrayed around, the hierarchy in their relative positioning emphasizing the centre and the eight directions of space. The central part of the *Mandala* called the *Brahmasthan* radiates power in the four cardinal directions and the four intermediary directions of space.

The open central courtyard, very often with *jharokhas* in the four cardinal directions overlooking it, the expression of the centre of the house on the external elevations through *jharokhas*, are more obvious expressions of the concept. The same concept leads to complex, often intriguing architectural compositions, when taken through to the conception of the smallest sub-parts of the building. These architectural compositions, when seen in isolation, seem deliberately asymmetric and ambiguous, but when appreciated from the logic of the overall structure and the relation of the sub-parts to this overall logic, one understands the coherence of the architectural concept. This will be demonstrated through examples in the course of the discussion.

The concept of 'the centre' has two possibilities in its application (fig. 81). One possibility is that the overall building is designed in perfect symmetry about a centre line, such that its two sides align in perfect symmetry. The building conceived in this manner would most possibly have a strong focal element, hierarchically expressed in relation to other elements, used to create the tangible building form. The other possibility is that the building is conceived as being made of unitary parts, such that there is perfect symmetry in each unitary part but not necessarily in the overall form of the building. When designed in this way, the formal concerns are focussed on the unitary part, which takes precedence over the overall form of the building. The latter design possibility also includes the former, that is, to be able to design a perfectly symmetrical building, using a number of individually symmetrical unitary parts.

The former approach may generally be attributed to Mughal architecture, where overall symmetry in architectural forms is the singular most important formal quality. The latter approach has characterised the work of building craftsmen for centuries in Jaisalmer, and more generally, in Rajasthan. It is not difficult to appreciate the potential of the latter design approach in being able to create architectural compositions of a far greater range of spatial and formal complexity than using the former approach. This is one of the prime reasons as to why Rajput architecture has been more complex to comprehend formally and spatially, as compared with Mughal architecture, and has generated a wide range of interpretations amongst architects and art historians, as has been discussed previously.

The unitary part is the structural bay (*fig. 82*). It is the cellular unit of composition. The centre of the structural bay is marked consistently in all the floors, on the inside and on the facades outside. It is treated visually as a symmetrical entity, through its entire height, from the lowest floor to the parapet. Its architectural expression changes from floor to floor, but every element on each respective floor is positioned symmetrically with respect to the centre line of the bay. For example, the ground floor expression may involve a cusped *margol* on plain *khambhas*, the first floor may have a *tibari*, and the second floor might have a *jharokha*, with a parapet above of interlocking *vallis* and *mundis*. All these elements would be stacked above each other about the centre line of the structural bay.

In the generation of a plan, structural bays are laid out around a *chowk*. The number of these bays ultimately generates the form of the building. An odd number of bays laid out across both the length and depth of the chowk define a clearly marked centre along both its edges respectively (*fig. 83*). These central bays are generally a trifle wider than the remaining bays, for example, a courtyard square in plan with five bays around it, would have the central bay at five feet wide and the four flanking bays, four feet wide. An even number of bays, however, means that there is no clear centre to any edge. Nevertheless symmetry is observed in the formal articulation of each bay. It must be said the overall symmetry in the building is popular, more so in the matured *Mughlai* phase. However, when confronted with a non-symmetrical elevation, such as a two-bay *chowk*, it would be incorrect to assume it as an anomaly. Careful observation of the architectural treatment of each bay would reveal that it is designed as a unit, with perfect symmetry in itself (*fig. 84, 85*). Sometimes, elevations with a symmetrical layout of forms do not visually appear to be symmetrical, because there is no dominant focal element in the centre. There is, however, perfect symmetry in every bay. This aesthetic often produces a visual complexity, in the overall form, so the order is not immediately visible to the spectator. As seen previously, this has generated a theory of a deliberate formal ambiguity and complexity intended by the craftsmen to elude an easy reading of the form.<sup>37</sup> The playful massing of the *Sompuriya* buildings, where the solid external walls do not reveal the lines of structure and provide a perfect foil for the rich array of *jharokhas* and *baris*, especially convey an impression of picturesqueness. A closer look will reveal that these elements are arrayed in vertical rows, above each other. This is a visual clue, which when seen in relation to the plan reveals that each vertical row relates to a structural bay.

It is important to note that the sanctity of the centre of a bay is never compromised. In its formal treatment, which varies from floor to floor, a characteristic device involves subdividing the bay. The bay is further subdivided into smaller bays for visual reasons, such as the delineation of smaller, more intimately scaled bays. This is especially done in ranges

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<sup>37</sup> Tillotson, *Rajput Palaces*.

adjacent to terraces and *chandni* on upper floors. This division is always into an odd number of bays, mostly three, so the centre is a bay and not a *khambha* (fig. 86, 87). This is an additive approach to form-making. The formal concerns are centred on the part, which take precedence over the whole.

The design of the plan form starts from the *chowk* or courtyard. Structural bays, not necessarily of consistent width are laid out on either side of the *chowk*, as layers, both along the length and width (fig. 88). The points where the bays laid along the length, intersect those laid along the width determine the location of *khambhas*. Limited primarily by the structural possibilities of sandstone, each bay spans a length of four to five feet. If one seeks a consistency of pattern between the *Vastu-Purusha-Mandala*, and a *haveli* plan-form, one is likely to be dissatisfied. Unlike the *brahmasthana*, which is always located in the geometrical centre of the *Mandala*, the *chowk* may be located eccentrically within the plan, or to one side (as in a typical two-bay *haveli*). There may even be more than one *chowk* within a *haveli*. Nevertheless the *chowk* remains the hub; all spaces are oriented towards it, and derive light and ventilation from it.

The positioning of the *khambhas* within the footprint of the plan creates a structural grid, which from an architectural point of view also acts as a design grid. The positioning of the internal walls is co-ordinated within the grid layout (fig. 89). As explained in the plan-form of the typical *haveli*, the nature of spaces arranged around the *chowk* (courtyard) range from the verandah-like *pathiyal* adjacent to the *chowk* to the more private *kotha* beyond. The shape and size of a *pathiyal* or *kotha* depends on the number of bays that have been combined in it. The physical openings connecting the spaces, such as doorways or archways, are positioned with respect to this grid.

From the logic of the distribution of structural loads, the structure becomes lighter as one moves from the lower floors to the floors above. On lower floors, the layered spaces in the *haveli*, are segregated by walls, with doorways punched through them. These walls also act structurally in cross-bracing the grid of load bearing *khambhas*. On the upper floors, these cross-walls start to disappear. A number of layers that formed separate spaces on floors below are combined to form large pavilion-like rooms. The *khambhas* maintain their position in the structural grid, but change their form. From chunky rectangular forms, they transform into delicate *surangdar khambhas* playfully festooned at their upper ends in a plethora of *margol* types: cusped, *halali*, and tri-segmental (fig. 90). This creates a range of shapes in the outline in each bay, which introduces further variety and playfulness. Intermediate *khambhas* might even be completely removed on the uppermost floors, where the load of the super-imposed roof to be carried is not too much, and intermediary structural members are not required. This results in the creation of large pavilion-like rooms on the upper floors (fig. 91), which stand in contrast with the dark and formal rooms below (fig. 92).

There is a tendency for the eliminating of the roof over a number of bays or over certain ranges, to create open to sky terraces known as *chandnis*. *Chandnis* can be tiny, and created by eliminating the roof over a few bays along the length or breadth of the *haveli*, while the external walls are high and treated exactly as if they were part of a covered room (fig. 93). The *chandni* may be large and formal, or small and intimate like a room open to the sky. Occasionally it is intimately linked with rooms, and is then used for sleeping outside at night, or by women to bathe in the rain. These *chandnis* help in emphasizing the sense of openness on the upper floors of the *haveli*.

A number of these open terraces and *chandnis* of different sizes occurring at higher levels, are often screened from each other, with access from one to the other provided through defined doorways with restricted views of each space framed through *baris*, *jharokhas* and peepholes, from other spaces. Even though the physical area of such spaces may be very small, devices such as this create an impression of unlimited space (fig. 94). The *chandni*, for example is always enclosed by a wall, so it is not visible from everywhere as an open space. It is, however, visually and physically linked to other spaces through a *bari*, *jharokha* or a doorway. Spatially this has two effects: first, it always comes as a surprise when it is discovered. Second, the observer within it is always able to see other spaces, either contiguous with it or beyond. This creates a sense of simultaneity, for the observer, of being within the space of the *chandni* and also being able to enjoy the space beyond. The effect is most dramatic when a *chandni* perched on an upper floor has a framed view of the main *chowk* below, through a *jharokha*.

### Interior Spaces

It will be explained in the section 'Composition of Elevations', that the external facade of the *haveli* is typically like a curtain wall projecting out from the line of the structural *khambhas*. The pattern of projections corresponds with a certain number of bays at a time. Sometimes the projection is organised along the entire length of the facade. There is effectively, a gallery-like space along the external edges of the rooms, corresponding to the projection in the facade, ranging in depth between one foot and two feet, formed between the line of the *khambhas* and the external facade (fig. 95). The creativity of the craftsman is at work here, in carving out a range of spaces from this gallery – small intimate seating spaces, viewing galleries and storage niches – and arranging them in various combinations. The floor and ceiling of the main room and the associated gallery space are not at the same level. The *dasa*, at the line of structure is raised up from the floor level of the room by a few inches. The ceiling over the gallery space is lowered considerably from the room ceiling, with the result that the scale of the space is considerably more intimate than the main room (fig. 96). The spaces thus created, are small and intimately delineated from the main room, with a *margol*, or with its own arcade, almost complete in themselves, but connected with the larger space of the room. These spaces may be a *bari*, or open out into *jharokha*, or just be a gallery along the external wall, with tiny peepholes, close to the floor level, so as to enable informal seating spaces on cushions and bolsters spread on the floor. When storage spaces are built in into this thickness, they generally flank a central *bari* or *jharokha* opening, with access to it from the room, or even from the tiny space adjacent to the *bari* or *jharokha*. In long elevations, various rhythms of *jharokhas*, *baris* and such storage elements are devised. Examples will be illustrated in the case studies of two havelis from the *Patuon ki Haveli* group (Chapter 6). The provision of storage space within the thickness of the external walls, serves the two-fold function of providing storage without sacrificing usable area within the room, and the increased depth of the wall providing added insulation to the room within.

Internal walls are very rarely left bare. Built-in storage spaces and niches in inventive combinations relieve the walls from blandness and monotony, in addition to providing ample storage space associated with the usable living space. A frequently used storage element is the *ala* (fig. 97). The form of the *ala* is explained in section 3.3 (Architectural Components and their Details) of this chapter. The *ala* is generally used in a regular rhythm, positioned between *khambhas*, across the length of a room (fig. 98). They are also used in combination with other elements such as doorways or built-in niches, arranged in varying rhythms in relation to the position of the *khambhas* (fig. 99). The positioning of the storage elements

comprising shelves, niches and *alas* is never arbitrary. It is always built into the framework established by the structural elements (*fig. 100*).

### 3.2 Composition of Elevations

As has been briefly suggested before, the most important compositional elements in the design of the elevation is a palette of primary architectural elements and aedicules ('architectural components' illustrated in *Appendix 1*). There is variation in the scale and function of these 'architectural components' oscillating between function and imagery. We begin the discussion on the composition of elevations by looking at the most elementary syntax of the primary architectural elements, and the incorporation of aedicules.

#### *Primary Syntax of Architectural Components*

The most rudimentary construction comprises a base or plinth known as '*dasa*', on which are placed the load bearing columns, or *khambhas* (*fig. 101*). *Khambhas* are braced at their upper ends with brackets known as *margol*. These brackets fixed in place look like arches, but in fact do not act structurally, as arches. Their shape has an aesthetic purpose, and is a part of the architectural language. A deep horizontal beam known as *chabna*, sits immediately above the *margol* supporting the load above, and transmitting it to the load-bearing columns. Depending on the orientation of this structural member, it is termed *chabna*, or *bharwar*. A horizontal fin of stone cantilevered from the wall, and used to shade the wall surface from mainly the vertical sun, is called a *chajja*. A horizontal moulding with a curved profile, supports the *chajja*, from underneath, and is fixed above the *chabna*. This moulding is termed the *galat*. The wall surface above the *chajja* has a continuous cornice like projection in stone called the *kane*. The *kane* is surmounted by a flat horizontal band of stone often decorated with relief patterns known as *kangra*, and the ensemble terminates with a projecting course of stone called the *chaap*.

This syntax of elements is repeated on every floor in multi-storey buildings. Formal variations are sought through mixing and matching from the palette of forms, and seeking new combinations (*fig. 102*). Aedicules are positioned in key locations, mostly in the centres of structural bays.

#### *Aedicular Composition*

In the architectural expression of *havelis*, structural logic is woven with the concept of imagery. They are woven into each other to the extent that it is impossible to separate the two. It is important at this point to clarify the concept of imagery. Imagery is the visual representation of a form, where there might be no requirement of that form for pragmatic reasons. The representation may involve structural members, such as *khambhas*, *todis*, *margol* or aedicules such as *jharokhas* and *baris*. Imagery often involves the concept of playing with scale. The aedicules are miniature representations of the larger building, and often create an ambiguity in the impression of scale, especially when seen in relation to real life objects. A palette of key aedicular types (including variations within each type) used throughout the course of tradition is illustrated in *fig. 103, 104*. As will be demonstrated in the case studies, there is considerable variety and innovation in the design of particular aedicular forms.



## *Solids and Voids in the Elevation*

The organisation of solids and voids are probably the most critical element in the design of an elevation. The external facade of the *haveli* is not a load-bearing wall. It is similar to a curtain wall, being detached from the line of the load-bearing *khambhas*, and projected forward, supported on rows of *todis* (fig. 105). The entire facade is not projected out in a single step or on a single floor. A certain number of bays are projected out at the same time, creating a rhythm of projected and recessed planes (fig. 106, 107, 108). The projections may be organised, one step at a time, over a number of floors, so, the building has a stepped profile, with the floor area increasing from the lower to the upper floors. Alternatively the projections may be organised in one bold sweep on a lower floor, with the location of the external wall remaining unchanged on the upper floors. The pattern of projections may change from floor to floor. There is no pre-established order; the ever-changing array of projections and recesses is the craftsman's creative domain. He devises ingenious ways to transfer the load to the load-bearing *khambhas*: single and double rows of *todis* and cantilevers, and their combinations. The projections of the facade are, however, co-ordinated with the structural bays. There is no practical reason for it to be so, as the facade is detached from the line of structure. Like the plan, here too, the structural grid acts as the design grid.

The solidity of the ground floor in general houses contrasted with the porosity of the *diwankhana* in a *diwans's haveli*, imparts a distinctness to the elevation, even though the treatment of the upper floor might be identical. In a symmetrical design, the centre usually has a projected bay, which is flanked by projected bays either across the entire height of the elevation, or limited to certain floors. In some cases, the lower floor has an arrangement of symmetrical projections about the centre, with the upper floor along the entire length of the facade projected out. In non symmetrical elevations the composition is based on visual rhythms of recesses and projections, corresponding with structural bays, across the length of the elevation. Most often, the full visual effect of the massing is the combination of the projections with the *bari* or *jharokha* (fig. 109). A *bari* may be flush with, or may project out from the line of the facade. The most dramatic visual effects are achieved by the use of *jharokhas*. *Jharokhas* are hollow from the sides, so the wall behind, the ceiling of the *jharokha* and the soffit of the floor slab are visible. Their porosity, shape and the shadow patterns they generate contribute greatly to the character of the massing. Differently profiled *jharokhas*, such as octagonal *jharokhas*, staggered *jharokhas*, introduce visual variety as do the *nokwala* bent *chajja*, inclined *takiyas*, and the diverse devices employed to project the floor slab, such as *todis*, *todis* used in conjunction with *khursi*, and successively receding rows of *sehrabandhi*.

Many *chowks*, especially those in larger *havelis*, are provided with a continuous gallery along its internal periphery, on floors above the ground floor. This provides access to the ranges around the *chowk* (fig. 110, 111). The floor of the gallery is supported on ingenious combinations of *todis*, which transmit the load to the structural *khambhas*. The sides facing the *chowk* might be provided with a screen wall or be left open. Examples of both types may be seen in the *Bahadurmalji* and *Jorawarmalji Havelis* (Chapter 6).

One of the most attractive features of the *haveli* facade are the patches of sky that appear framed within *bari* and *jharokha* openings in the facade (fig. 112). To the spectator in the street below, this is a potentially curious phenomenon, which remains unexplained till he actually goes inside the *haveli*, and understands the relation of the facade with the internally open space of the *chandni*. The *chandnis* on upper floors permit views of the open sky

framed through openings on the building facade. From outside, the building appears to have woven patches of the blue sky into its fabric.

### *Form and Imagery*

As we have noted previously, imagery plays an important role in the formal language. This concept is not unique to Jaisalmer, but is a characteristic feature of the Indian tradition, both in religious and secular art and architecture. It is noticed, for example in the earliest temples, conceived as conglomerations of images of the prototypical shrine-hut.<sup>38</sup>

There being no hierarchy in the visual representation of architectural elements, which are real, and those which are used for imagery, for overall composition and design, it makes it very difficult, for the observer to differentiate between the two. This is a characteristic trait of architectural design, which we witness throughout the buildings, in the exterior and the interior forms. To make the point clear, some examples may be discussed. As we have noted, that the facade of the *haveli*, typically detaches itself from the structure at strategic points to create projected bays, punctuated with *jharokhas*. These bays are divided into panels, with vertical pilaster like elements, which appear as columns (*fig. 122, 123*). These pilasters have no real structural purpose, but are merely images of columns. However, these are architecturally expressed in a manner similar to the actual load-bearing columns.

A *surangdar khambha* might be used as a functional structural member, of full floor height, or it might be used in a miniature form, as representation of an actual *khambha*. Examples may be seen in its use as a pilaster in a *bari*, framing its opening, or in a composite *khambha* (*fig. 114*). In its formal articulation, there is no difference between a functional *surangdar khambha* and its representation for purposes of imagery. The syntax with which it is related to other elements such as the *margol*, *paan*, and *dasa* are retained in both the forms. Merely the scale of the elements changes. This principle has another dimension in the representation of an architectural form, in a miniature scale set as an aedicule within the original larger form, for example a miniature *bari*, complete with a *ravati* and *khursi* set within a functional larger *bari* (*fig. 115*). This playing with scales of architectural forms creates an ambiguity in the scale of forms, especially when seen in relation to real life objects, such as the human faces, which is about all that may be seen of people seated within the *haveli* adjacent to the *baris* (*fig. 113*). Depictions of palaces in ancient and medieval rock-cut architecture such as at Sanchi and Bharhut show similar examples, where the openings in the windows and pavilions (*kutagara*, *harmya*) are filled with human faces.

### *Termination of Planes*

An opening in the plane of a structural bay is defined in a particular manner, using a particular type of *margol*. In a structural scheme, where *khambhas* are aligned, it is inevitable that, along the depth of a room or a range, a number of such openings are arranged in succession, aligned along their centres. This may happen for example in looking at a range adjacent to a *chowk* from a range across it (*fig. 118*). The arcade of the gallery provides framed views of ranges behind, with its access doorways. From the gallery across, a spectator sees both the planes simultaneously, the view of the plane behind the first plane, however, framed between the openings in the first plane. The openings in the two planes might be delineated in differently shaped *margol*, with no relation to each other in terms of height.

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<sup>38</sup> A Hardy.

This design characteristic often leads to complex formal compositions when planes occur in succession at close intervals. This is particularly true of the treatment of openings along the external edges of the facade (fig. 116). There are generally three planes at play here; the plane of the structural *khambhas*, the plane of the stepped out facade, and the plane of the projected *jharokha* or *bari* beyond. The openings in each plane might be framed differently using *margol* with different profiles. The bay on the line of structure may even be divided further into three bays. The openings in the external facade and the *jharokha* would inevitably be lower than the opening in the plane of the structure, due to the low ceiling heights in these areas. These planes when seen in succession, from within the room or from the outside, present an array of shapes and forms (fig. 117). This is another effort by the craftsmen to create formal variety and playfulness.

### *Detailed Architectural Expression*

The location and orientation of a building determined a front, rear, and side. The front elevation facing a public street or *chowk* was lavished with greatest attention in terms of design and craftsmanship. The rear elevations are generally blander and plainer (fig. 119, 120). The big *havelis* in Jaisalmer; the five *Patuon ki Haveli*, *Nathmal* and *Salim Singh ki Haveli*, have a visibly distinct front and rear. The aim quite apparently was to impress the spectator from where the building was seen most. A characteristic feature amongst the grander *havelis* is a porous *diwankhana* abutting the public street on the ground floor. The *diwankhana* is generally raised, with a prominent set of steps connecting the street with the main entrance door. At the level of the street, are a series of storage rooms, accessed from under a raised platform, attached with a *verandah* (fig. 122). The grander *havelis* vary in height from ground plus three to ground plus four storeys. Punctuated with arrays of recesses and projections, and articulated with *jharokhas* of diverse types, the facades have been written and discussed about for their apparent complex and ambiguous massing. The dynamic volumes cascading in and out from the general surface of the facade, coupled with layers of *chajjas*, running along the length of the facade or stopping short half way, variety of shapes and forms of *jharokhas* and the rich surface decoration seen in the bright desert sun, does indeed create a highly articulated, complex visual language. Moreover these *havelis* are generally viewable only from very narrow streets (some as little as three metres at their widest), with buildings built to the very edge of the street. The buildings can also be viewed from across the street, from other *havelis*, but only through small apertures, such as windows, balconies, or at the most terraces. These views, generally frame the view of a detail or a part of the building. Whatever the location of the spectator, the view of the building is partial. It is never panoramic, never complete. These factors generally convey an image of great visual complexity and ambiguity. Seeing the extent of the entire building and appreciating its overall composition, will reveal a reality quite the opposite of the impression of formal ambiguity.

To understand the principles of composition of an elevation, it is not adequate just to look at the elevation, or its parts in detail. The structural layout in the plan-form has to be appreciated in relation to the facade. As explained previously, aedicules are always positioned on the facade, symmetrically about the centre-line of the structural bay. This system of design is common to both the *Sompuriya* and *Mughlai shailis*, despite their apparent differences in architectural style and formal vocabulary. The variety of aedicules that are selected, on different floors, and in different structural bays, displays a degree of playfulness. This quality runs through both the *shailis*. The different architectural elements in the *Sompuriya* facade are not visually integrated with each other, or the overall elevation. Individual *jharokhas* and

*baris* are richly carved, but the background is plain and solid. All ornamentation is limited on or immediately around the *jharokha* or *bari*, such as the rear wall below the *dasa*, and the sun roundel motif splattered on the walls. The *Sompuriya* carving style relies on strong geometrical forms, such as circles, triangles. A large proportion of the carving is planar, without much modeling, like stencils. Shadows are precise and crisp. Linear designs are punched out in the stone. There are also very complex organic compositions, involving peacocks, foliage and flowers. There is great linear flow in these designs, with complex relief modelling.

Visual integration is the key quality in the *Mughlai* elevation. Forms are delicate and attenuated, often fully clothed in the delicate texture of geometric carving, which impart to them a porous quality. The most characteristic tendency of the mature *Mughlai* phase is a panellisation of external wall surfaces. The ground floor is generally solid and devoid of panellisation. Where the ground floor comprises a *diwankhana*, a porous facade is obtained with an arcade of *khambhas* braced at their upper ends with *margol*. The panellisation occurs on the upper floors and follows a very simple pattern. Each bay is divided into three vertical panels, with the central bay wider than the two side bays (*fig. 121*). The width of the structural *khambha* is expressed as another vertical panel. This generates a rhythm of panels along the length of the facade. It is important to mention here that the rhythm of panellisation is integrated with the structural layout. There is no need for this to be, from a structural point of view, as the external facade is totally detached from the structural *khambhas*. Here too, as in the organisation of projections and recesses in the facade, the structural grid acts as the design grid. The rhythm and density of panels does not remain consistent on all the floors. On upper floors, panels are sometimes combined to create a sparser and bolder appearance.

In the centres of all the bays, which comprise the wider bay, is placed an aedicule. There is great variety in the selection of these aedicules, which are often exploited for their potential in accentuating the full visual effect of the design of the elevation.

The lines in the elevation are continuous; the horizontals running with the regular rhythm of verticals, creating a mesh-like pattern of lines (*fig. 122*). Within this network of lines, panels are formed which are then filled in with patterns, set within a border frame. The line of the balustrade (the top edge of the *takiya* panel in a *jharokha* or *bari* positioned on the elevation) usually runs continuously along the length of the elevation, dividing each panel into smaller panels. The panels thus formed are sheathed in decorative carving: geometrical *jali*-work or vegetal designs. The density and delicacy of carving is highest on the first floor, the floor visually most accessible from the street below. The carving becomes sparser and bolder on floors above.

The vertical rhythm of panels and pilasters is broken at floor and lintel levels by the continuous *dasa* and the *chajja* respectively. The zone immediately below the projected *dasa* corresponding to the thickness of the floor slab is usually treated as a horizontal element, covered in a continuous frieze of *kangra*, or other designs (geometrical or organic) (*fig. 123*). In case of the facade or parts of it stepping out, this is the region where rows of *todis* are located. The rear wall surfaces between *todis* are carved with geometrical or vegetal designs. The *chajja* is emphatic and streamlined, and is used more as a compositional element than as a mere sun shading device. It creates rich masses of horizontal shadow providing a perfect foil to the dense vertical striation of the facade. The double *chajja* is sometimes used, either across the entire length of elevation or restricted to a specific stretch, or over *jharokhas* and *baris*. When a *chajja* stops short of the edge of the elevation, a horizontal line is picked up,

marking the line of the *chajja* and carried across the vertical panels, dividing it further. The appearance of the mature *Mughlai* elevation is one of various architectural elements and aedicules held together in a mesh of lines which relates and skilfully ties them into a coherent whole. Occasional positioned elements such as drooping *chajjas* of *nokwala jharokhas* and their *ravati*, slanting *takiyas* and projecting *khursis* provide points of contrast, introducing visual breaks and variety relieving the scheme from possible monotony.

In the *Mughlai* tradition, the carved infill patterns are of two types: vegetal and geometrical (*fig. 124*). The vegetal patterns incorporate flowers, foliage, tendrils in complex intertwining and overlapping patterns, with a degree of three dimensional modelling. The geometrical patterns are based on *jali*-designs of *Mughal* architecture. Most of the *jalīs* are not perforated like their *Mughal* counterparts, but are merely surface carved using techniques of deep carving. In the strong desert sun, the technique is fairly successful in imitating the visual effect of true *jalīs*. An interesting fact about the vegetal patterns is that they lend themselves with equal ease to stone carving, as to painting. Numerous carved patterns, appear as painted designs in the interior of the *haveli*, in walls, in the cornice, the ceiling and other places.

In internal spaces, the wall typically sits on a *dasa*. The wall is generally divided into two parts, with an approximately mid level string course defining a *dado* area below (*fig. 125*). When a niche or *ala* is integrated with the wall, the string course doubles as its projected *dasa*. The wall above the *dado* is rarely left blank. Pilasters in low relief sub-divide the wall surface creating smaller framed panels. Internal doorways are usually framed with pilasters, and capped by a run of *galat* moulding. Occasionally the *galat* moulding stretches along the entire length of the wall. Aedicules such as *baris* and *diyaslais* are positioned in the framework of panels thus created.

### 3.3 Architectural Components and their Details

We conclude this chapter by looking at the finer architectural and decorative details of architectural components used in the tradition. As has been suggested previously, there are two *shailis* or schools: *Mughlai* and *Sompuriya*, each with a distinct set of architectural components, decorative designs and style of carving. We look at the two *shailis* individually.

#### *Sompuriya Shaili*

##### *Primary Elements*

**Khambha:** These are generally circular or polygonal in profile, derived from Central Indian temple architecture (*fig. 126*). There are also *khambhas* whose profiles are staggered. The shaft of the *khambha* is covered with different geometrical patterns arranged in bands along its length. The decorative patterns used to cover the shaft are generally devoid of three dimensional modelling. They are deep-cut into the surface of the stone, two dimensionally, almost as stencils.

**Todi:** They are of two types: ribbed and staggered, and serpentine with emphatic pendants (*fig. 127*). The ribbed and staggered *todis* are used to support short spans, for example under *baris*. The body of the *todi* is provided with constrictions toward the top, base and the middle. Small pendants mark the upper ends of the *todi*. The serpentine *todis* are generally used to

support *jharokhas*. The form of the *todi* is voluptuous, with large emphatic pendants at the top and base and a sinuously profiled body. The sides are sharply etched with linear designs.

*Dasa*: This is the projected floor slab. The most popular decorative motif used in this element comprises squares inset with eight petalled flowers, alternating with vertical panels infill with chequers (fig. 127). The rear wall panel below the *dasa*, between the supporting *todis*, is lavished with rich, sensual carving (fig. 128). The most popular design in this area comprises a row of staggered pilasters covered in flat, etched decoration. The soffit of the *dasa* is not left plain. Circular designs are set within panels, and decorative pendants are suspended from the middle of each design (fig. 127, 129).

*Chajja*: The *Sompuriya chajja* is heavy and ribbed, similar to those used in temple architecture (fig. 130). It is localised over *baris* and *jharokhas*, and is never used purely for compositional purposes (unlike its use in the *Mughlai shaili*).

*Decorative Mouldings*: *Sompuriya* decoration is rich and sensual. Flat etched designs are combined with those with rich three dimensional modelling (fig. 131). Complex overlapping organic designs incorporating foliage and birds (expecially the peacock) are exquisitely carved on the *takiya* panels of *jharokhas*. As has been illustrated previously, the singular most characteristic motif of the *Sompuriya shaili* is the sun medallion motif. This motif is applied at diverse scales, and in different parts of the *haveli*. In its most spectacular application, it is splattered around an opening: *bari* or *jharokha*, on the solid wall.

### *Aedicules*

*Jharokhas*: These are visually heavy and chunky. Structurally, they are generally trabeate (fig. 132). Through the influence of the *Mughlai shaili*, the later examples incorporate *halali* brackets and *surangdar khambhas* (fig. 133). In their original form, *Sompuriya jharokhas* do not have free standing *khambhas*. The load of the *chajja* is transmitted through *todis* to pilasters engaged to the wall. In later examples (*Mughlai influence*), free-standing (*surangdar*) *khambhas* are used. The lintel, known as *chabna* is heavy and carved with sun medallions set in square frames. The section above the *chajja* comprises a broad *kangra* with rows of elongated bell-like forms, inset with small lotus medallions on top. The *takiya* panels are mostly inclined, like the *kakshasana* in temples. The body of the *takiya* is divided into horizontal frieze panels richly carved with vegetal and bird motifs. Sun medallions alternating with stubby pilasters is the most favourite motif in the broad central part of the *takiya*. The section of wall below the *dasa*, at the rear is richly carved, as illustrated above.

*Baris*: *Sompuriya baris* have squattish proportions and are set within pilasters. The body of the *bari* is either clothed in a sheet of fine geometrical carving, or divided into panels with pilasters (fig. 134). Each panel is then infill with geometrical and vegetal designs, with the central square mostly left open (fig. 135).

*Doors*: These are panelled, with a quadratic network of struts secured with the panels using decorative steel rivets (fig. 132, 136). The panels are generally inset with carved flowers. The central door post is carved with v-shaped ribs alternating with flowers and is used to cover the joint between the shutters.

### *Mughlai Shaili*



## Primary Elements

**Dasa:** Literally the plinth, it may be plain or decorated with carvings (*fig. 137*). The *dasa* marks the floor-line of a storey. There might be one *dasa*, in case of a single storey building, while each floor has its respective *dasa*, in the case of a multi-storey building. The most common pattern carved on the *dasa* consists of a row of downturned petals. Various other carvings of geometrical and floral nature may also be found. The most prominent ones comprise rows of four petalled flowers called *chaufulia*, rows of squares turned diagonally, on their vertices, a dense mesh of alternate punched squares known as *chadabandhi*, or the *chagola* – a row of punched crosses. A *dasa* design with complex interlocking foliage designs, is known as *munariya dasa*. It is limited in application to the more showy parts of the *haveli*.

**Khambha:** The *khambha*, or column is the primary load-bearing member. The primary load-bearing columns that usually occur in the ground floor are carved out of blocks of stone twelve inches by twelve inches. Rectilinear in profile, each *khambha*, has a base (*paggi*), body (*sakh*) and a head (*sira*). The *sira* of the *khambhas* usually support *todis* (brackets), which support the *chabna* above. *Khambhas* vary in shape, size and purpose. When circular in plan, they are referred to as *surangdar khambha*.

**Plain khambha:** The plain *khambha* is the most widely used type. Rectangular in profile, it is placed with its broad face facing the room, or adjacent space. It has three parts – base (*paggi*), body (*sakh*) and head (*sira*). The *paggi* may be plain, when it is slightly wider than the *sakh*. A thin groove is marked along length of *sakh* along the edges. The *sira* comprises the *galat* moulding. The plain *sakh* is used extensively as a framing element in the panellisation of elevations. When used for panellisation, the *sakh* is generally sheathed in decorative carving. *Chauras*, *bajrangi*, and row of *chaufulias* are the most extensively used motifs in decorative carving. The *diyaslai* is generally placed at middle height on the *khambha*.

**Surangdar Khambha:** As has been suggested in Chapter 2 (The Context), the form of the *surangdar khambha*, as used in the *Mughlai shaili*, and its popularity in the eighteenth and nineteenth centuries, is perhaps the most important influence of Mughal architecture on the traditional architecture of Jaisalmer.<sup>39</sup>

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<sup>39</sup> The *surangdar khambha* appeared in the palace architecture of Shah Jahan in the second quarter of the seventeenth century. Its use became extensive in north and central India in the eighteenth and nineteenth centuries. Early uses of the columnar form include: the baldachin of *Macchhi Bhawan*, in the loggia of the *Zenana Mina Bazar*, Agra Fort (both 1637), and in the throne *jharokha* in the *Diwan-i-Am*, the hall of Shah Burj, the Sawan and Bhadon Pavilions in the Hayat Baksh garden, in the Red Fort, Delhi. As has been illustrated by Koch, close prototypes of the *surangdar khambha* are also found in eastern India, in Buddhist and Hindu architecture and sculpture. In an eleventh-twelfth century architectural fragment, the baluster column emerges from a 'purna ghata' with overflowing foliage, which makes direct reference to its archaic use in early Buddhist-Hindu architecture.

The specific form of the Shah Jahani *surangdar khambha*, however, resembles more closely European versions of this columnar type, especially in the acanthus mouldings at the capital and base. This columnar type was in widespread use as architecture decoration in sixteenth-century Europe, especially in the work of Durer. The Durer baluster column has the bulbous base of the shaft clothed in acanthus leaves, similar to the Mughal *khambha*. Durer's prints were most likely introduced by Jesuit missions in the Mughal court towards the end of the sixteenth century, and it is a known fact that Jahangir supervised the copying of prints of Durer, and included them in royal albums. It is from the graphic depictions of this columnar form that it was appropriated in Mughal architecture. (Ebba Koch, 'The Baluster Column: A European motif in Mughal Architecture and Its Meaning', in *Mughal Art and Imperial Ideology*, pp. 38-60).

The *surangdar khambha* (fig. 138) is essentially circular in cross-section, comprising eight fluted segments along the circumference. It has three distinct parts: base (*paggi*), shaft (*shakh*), and capital (*sira*). The capital, shaft and base are visually separated from each other with ribbed mouldings. The capital is carved with petal forms upturned at their tip. A second wreath of upturned petals occurs immediately above and below the ribbed moulding, which separates the capital from the shaft. The row of petals below the rib, however, has a distinct bulge at the upper end. The shaft is fluted, generally with eight fluted segments, alternating with eight v-shaped ribs. The shaft is spindle shaped with a bulging base and a narrow top. A row of elongated petal mouldings with plain or serrated edges wraps around the base of the shaft. The base comprises a bulging pot-like element with a constricted top and bottom, which accentuates its shape. The ribs of the shaft continues to the pot-like element, unifying it visually with it. Rows of upturned petals occur above and below the ribbed moulding. However, the row of petals below the upper rib follows the contours of the pot-like base element. All this is placed atop a flaring base moulding carved with petals or acanthus leaves. The ribs separating the capital, shaft and base may be circular or polygonal in profile, while in some cases, they continue the flutings in the shaft. Below the flaring acanthus base element, the mouldings are variable. While some columns have a plain base, square in profile, variable in height, others have pairs of alternating convex and concave mouldings, plain or carved with petals. Sometimes these are stacked above each other in tiers, increasing the length of the base element considerably. The shaft of the *surangdar khambha* is not left plain in the more decorative examples. A row of four petalled flowers (*chaufulia*) is carved along the length of each of the convex fluting in decreasing size, from base to the top, along the length of the shaft. In most examples, a distinct element, occurs at the top end of the capital, where it joins with the *sakh*, above. Above the upturned petal mouldings of the capital and separated from it by a flat plain moulding, square in profile, occurs a characteristic moulding comprising planes of receding acanthus leaves in increasing size, each with a characteristic twirl at the tip, referred to as *paan*, in the terminology of craftsmen. Though not an integral component of the capital, wherever it is used, it nevertheless appears as the crowning element of the capital, from which the *sakh* of the *margol* above appears to have grown. The distinct twirl at the tip of the acanthus leaves makes it resemble the erect hood of a serpent, and is often thus described by craftsmen. The fluted body of the *khambha* normally left plain, is sometimes carved in a pattern of a row of flowers, through the length of each fluting. The *surangdar* column may occur by itself or in pairs. It might be load bearing or just decorative. The twin columns are complete forms individually, with their own respective *paggi*, body and *sira*, however, they are placed on a common sub-base. In its decorative form, it is often used as pilasters in *jharokhas*.

**Composite Khambhas:** These *khambhas* combine the plain *khambha* with the *surangdar khambha*, and are amongst the most elaborate types of *khambhas* at Jaisalmer (fig. 139). Normally occurring only on the ground floor, and especially on the outer extremity of the *haveli*, abutting the street, these *khambhas* are virtual showpieces of design and pattern. Carved out of blocks of stone around fifteen inches by fifteen inches, the column sits on its own *dasa*, and has a distinctive front, side and back. The rectilinear *khambha* has its own *paggi*, while the entire body is carved with a pattern enclosed within a frame. A row of *galat* moulding carved with the pattern of leaves occur along the extremity of the *khambha*. A *diyaslai* in the pattern of the *nok wala jharokha*, is placed at the height of the springing point of the arch. Twin *surangdar* columns occur as pilasters on the side elevations, placed on the same *dasa*. A circular pilaster is placed along the junction of the rectilinear *khambha* and the *surangdar khambhas*. This pilaster has a capital of alternating rows of petals stacked above each other, similar to the base mouldings of *surangdar khambhas*. The design of the *margol*

interestingly combines two levels of *margol*, with a few centimetres level difference between the two, with a row of petal mouldings running along the length of the curved inner profile of each *margol*. While one *margol* starts from a *tant* comprising scrolled foliage, carved in relief on the body of the stone, and placed atop the circular pilaster, the other *margol* is connected with the twin *surangdar khambhas*. The back of the *khambha* faces the interior of the verandah, and is devoid of any carving or decoration. The rectangular face of the *sakh* is carved with various designs: *bajrangi*, continuous tendrils with flowers etc.

**Margol:** Though shaped like an arch, the *margol* really comprises a pair of brackets, used to brace the *khambhas* at the upper end. As the prime determinant to the shape and outline of an opening, it has an important aesthetic purpose. The shape of the *margol* frames the view of what is behind it, permitting, or obscuring the view, almost like a picture frame, through which a spectator looks through from one plane at other planes beyond. The *margol* is also sometimes addressed by craftsmen as *kara* or *kabagi*. The profiles of the *margol* are broadly speaking, of three types: cusped, split-cusped, and tri-segmental.

**Cusped:** The most elaborate and decorative type, the number of cusps may range from five to eleven (fig. 140). Each cusp is referred to as a *balan* or *karan* in the craftsman's terminology. The number of cusps is always an odd number. Depending on whether the *margol* spans a large or small opening, it may be made in a single piece, or in two pieces, with a joint or *bang*, in the middle at the apex of the arch (*bhenti*). When made in one piece, the *bhenti* is at least seven inches, for structural stability. The cusped *margol* spans a range of openings, and has a general profile varying from semi-circular, elliptical to segmental. The craftsmen explained that there is no rigid geometrical method for its construction. The trained craftsman designs it by estimation of his eye, and a set of geometrical thumb rules using the *prakar* (compass) and *gaj* (scale). The springing point of the arch is called *tant*, and by virtue of it being shaped as the number one in the *Marwari* script, also as the *Marwari eka*. This part of the arch normally comprises one-third of the overall height of the arch from the springing point to the apex of the *bhenti*. The front surface of the *margol* is carved with decorative foliage patterns, comprising flowers, and intertwined stems and tendrils. These decorative patterns are very complex in the parts of the building, where they are meant to be viewed at close quarters.

**Split-cusped:** This type is essentially a pair of cusped *margol* brackets spaced apart, instead of being joined at the apex, with a lintel above spanning the opening (fig. 142). It is also called *halali* in the terminology of craftsmen. Limited in application to internal elevations of *havelis*, in railings coupled with balustrades, and in niches in walls, the *halali* creates interesting shaped openings, especially in the context of their being used in railings, where bits of the blue sky are framed through rows of openings between the vertical balustrades.

**Tri-segmental:** The boldest of the three primary *margol* types, this type comprises three shallow segmental arches joined together (fig. 141). It is supported on a pair of striking pendants, comprising layers of overlapping petals, arched like a bird's beak, along the soffit of the *margol*, with a pendant comprising petal mouldings at the base. Limited in application, as compared to the cusped type, the tri-segmental *margol* nevertheless is striking in its shape and its selective use in key architectural elements intensifies its impact.

**Todi:** The contours of the *todi* follows the profile of the curved acanthus leaf (fig. 143). The soffit is plain. The sides are carved with the profiles of two leaves, one defining the inner contour, the other as an infill design, over the rest of the surface. The carving is in low relief.

Along the soffit, in the centre, another acanthus leaf is carved, which appears in profile as a second leaf following the contours of the first. A smaller leaf is located at the upper end of soffit. This form of the *todi* when used in interior spaces appears as a three way bracket. Only the central form is functional, while those carved in low relief on the wall, to the left and right of the central *todi* are used merely for imagery.

A more showy and elaborate version of the same *todi* is where the whole form is carved in a series of layers of acanthus leaves, each layer with an emphatic curved top along the centre, in the soffit (*fig. 145*). At the apex is a hanging *loom* growing out of the vegetal forms. This type of *todi* is used in the more public parts of *haveli*, for example facing the *chowk*.

*Todis* are often clubbed together for structural purpose, for example double *todis* projecting in opposite directions with an imposed square panel set in between (*fig. 144*). The ensemble rests atop larger *todis*, and are used to support horizontal projections in the facade. A good example of this type is illustrated in section 6.1 (*Jorawarmalji Haveli*) of Chapter 6.

*Chajja*: Fin of stone, horizontal or curved in profile, projecting out from the face of the building to shade the wall surface. It is supported on the *galat*. The inner edge is provided with a drip groove. In later *Mughlai* examples, the soffits are carved with decorative patterns, such as the *marwari* and *moti marwari* designs.

*Valli, Mundi*: The *Valli* and *Mundi* comprise the parapet. *Valli* is a stone bar, used as uprights or horizontal rails. *Mundi* is the knob like termination of the uprights. The *mundi* is usually carved as a three dimensional representation of the lotus bud.

*Bilati*: This is a deep stone cornice used to support the roof in interior spaces.

### Mouldings

*Galat*: The *galat* is a moulding with a convex base and a concave top, used mainly under *chajjas* as a support (*fig. 146*). It may be plain or carved. It is also used in the articulation of internal elevations of rooms, as a horizontal projecting course, above doors, built-in cupboards, or as a string course along the entire length of the wall.

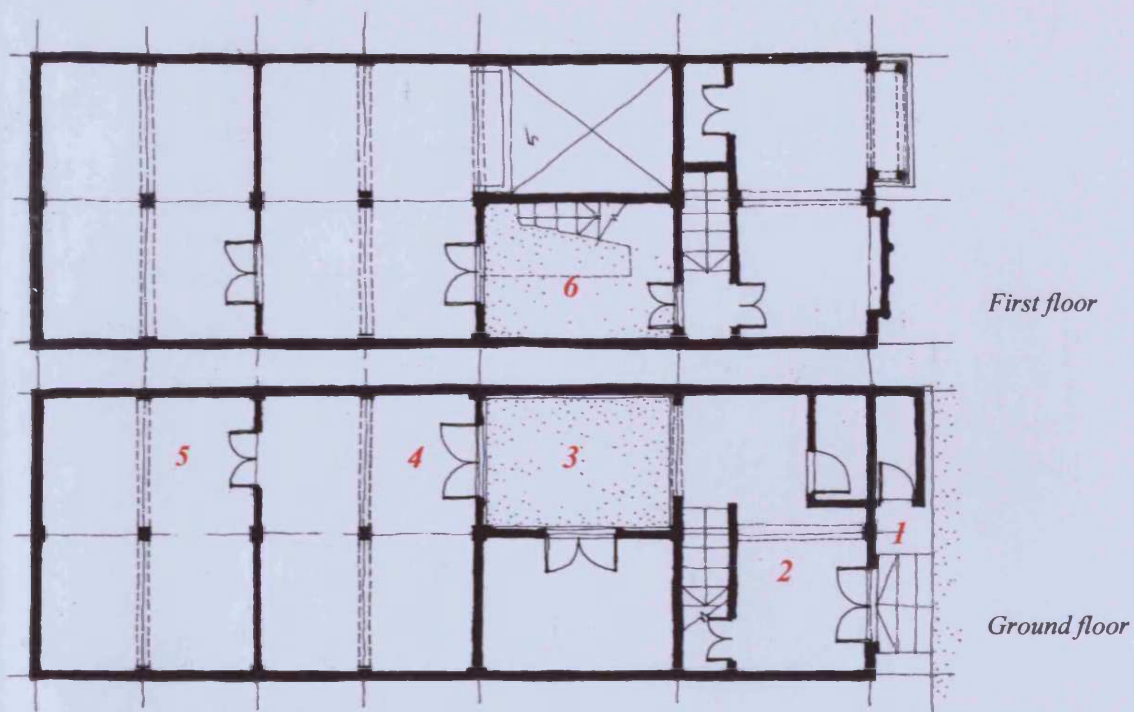
*Kane*: A horizontal v- shaped rib immediately above the *chajja*.

*Kangra*: The flat zone above the *kane* moulding, and is mostly carved with a row of upright and down turned bell-like forms. The basic form is often enriched with organic designs overlapped with the main design (*fig. 147*).

*Chaap*: A flat band of stone right above the *kangra*, terminating the composition of *chajja*, *kane* and *kangra*.

### Aedicules

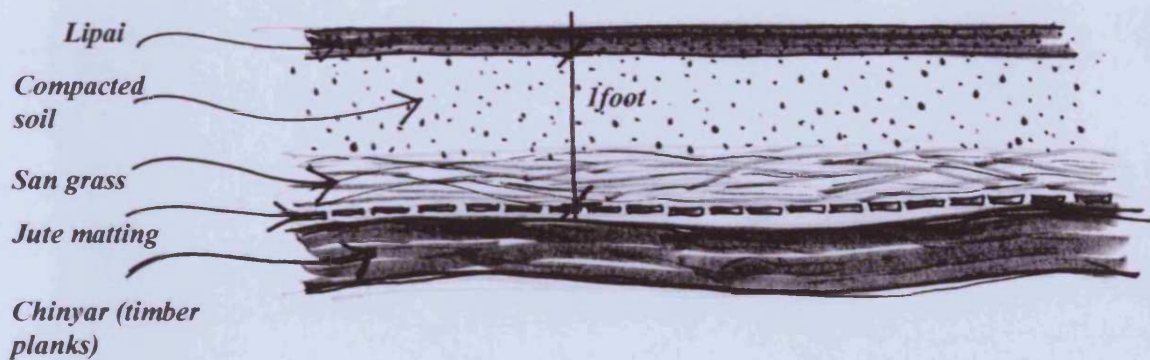
*Ala*: The *ala* is a storage cupboard designed integrally with the structure, projecting partly beyond the wall surface and housed partly within the wall (*fig. 148*). It provides the much needed storage space in a lifestyle, where no room has any specific function, and may be adapted to any use with a light change of furnishings. It has a cupboard space with wooden doors in the centre flanked by decorative stone panels on either side. The entire width of the



*Key*

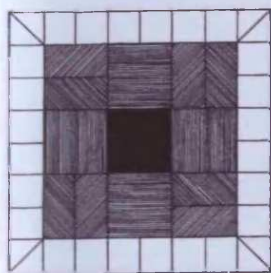
*1 Ota, 2 Moda, 3 Chowk, 4 Pathiyal,  
5 Kotha, 6 Chandni*

*Fig.78 The basic form of the haveli*

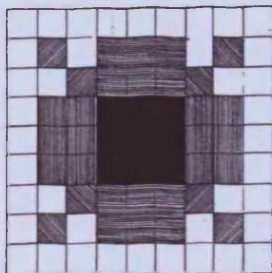


*Fig.79 Typical floor construction*

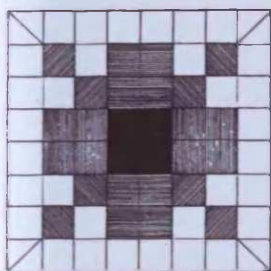




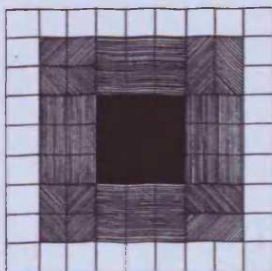
MANDUKA



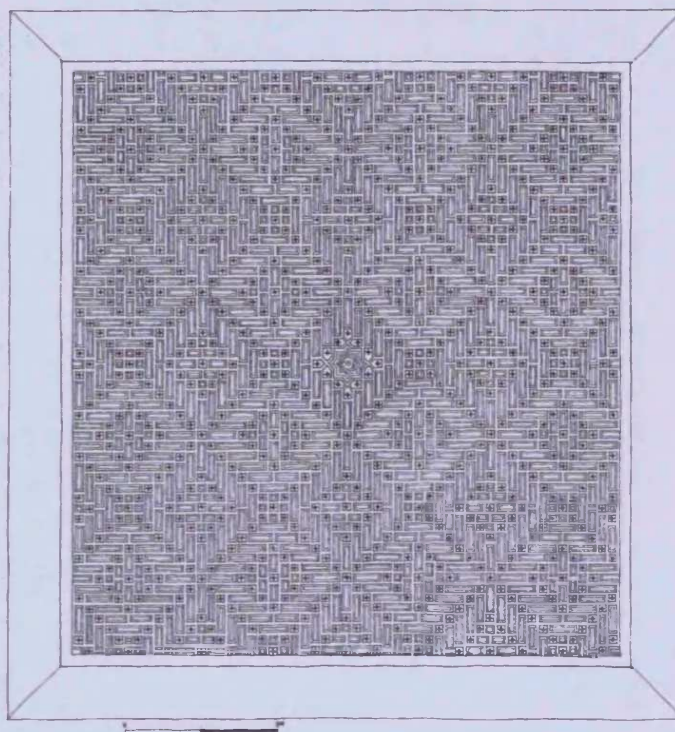
PARAMASAYIKA



MANDUKA



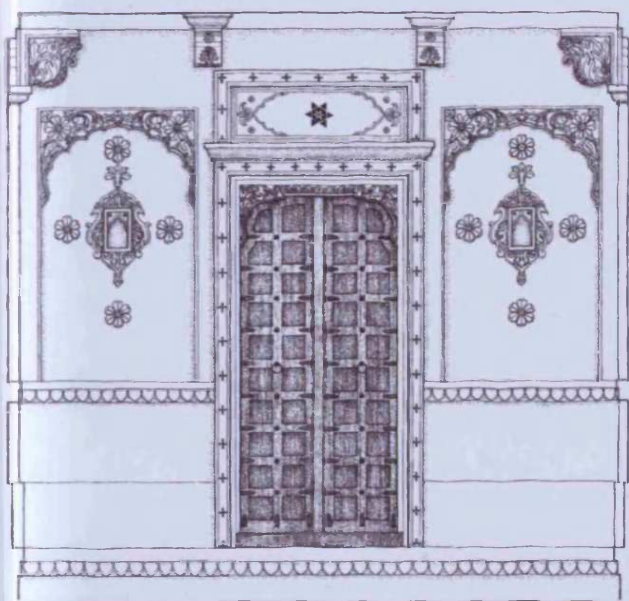
PARAMASAYIKA



Ceiling, Jorawarmalji haveli

### Vastu Purush Mandala

(source: Stella Kramrish, *The Hindu Temple*)



Internal elevation, Jorawarmalji haveli



Elevation to chowk, Bahadurmali Haveli

Fig.80 Concept of 'The Centre'



Fig. 86 Gallery to the south of terrace, Jorawarmalji haveli (note the wider central bay, which is further divided into three equal bays on the rear facade)

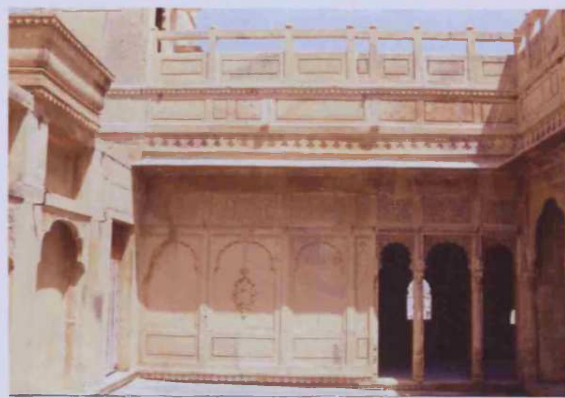
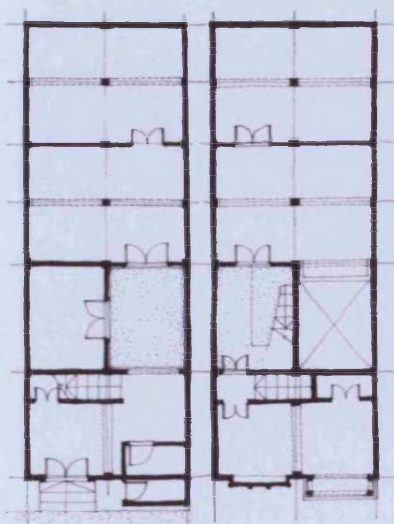
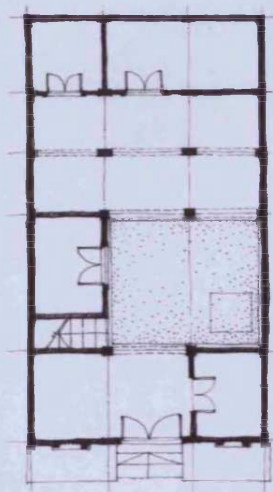


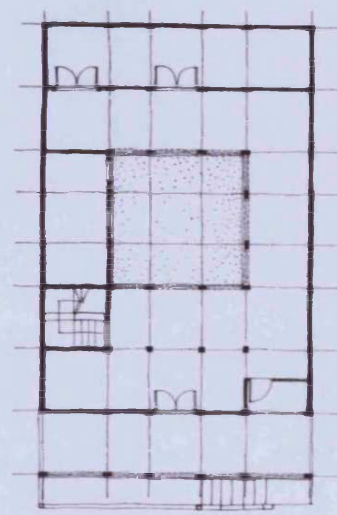
Fig. 87 Formal treatment of bays adjacent to chandni, Jorawarmalji haveli. Two structural bays are divided visually into three bays each using pilasters and surangdar khambhas respectively



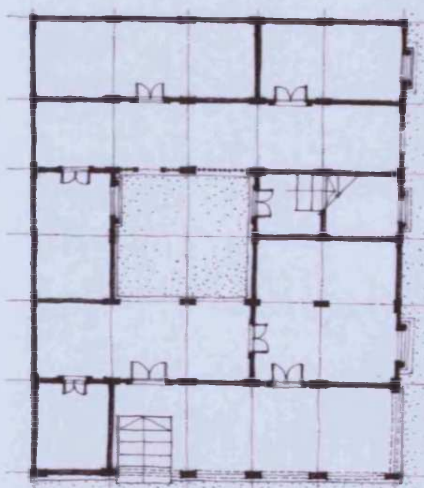
Kevliya Niwas, Ground and first floor (two bay along width)



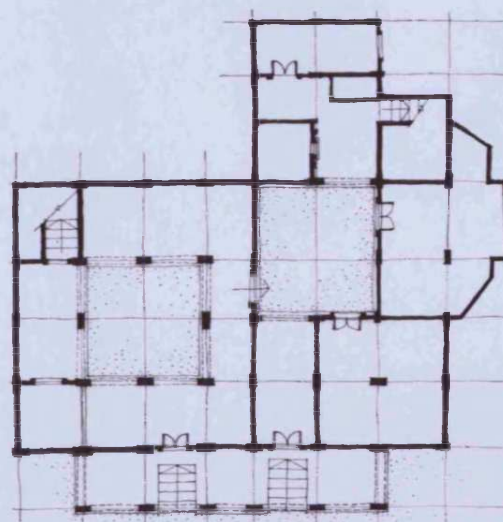
Chainsukhdas Jetha haveli, Ground floor (three bay along width)



Suraj haveli, Ground floor (five bay along width)



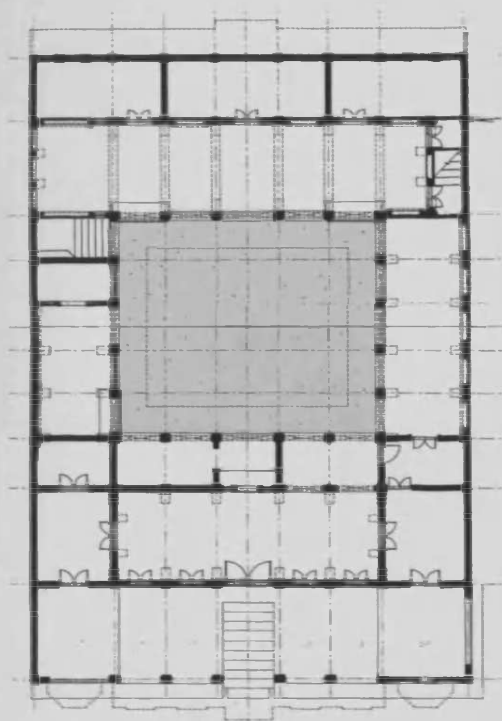
Shri Nath haveli, Ground floor (five bay along width)



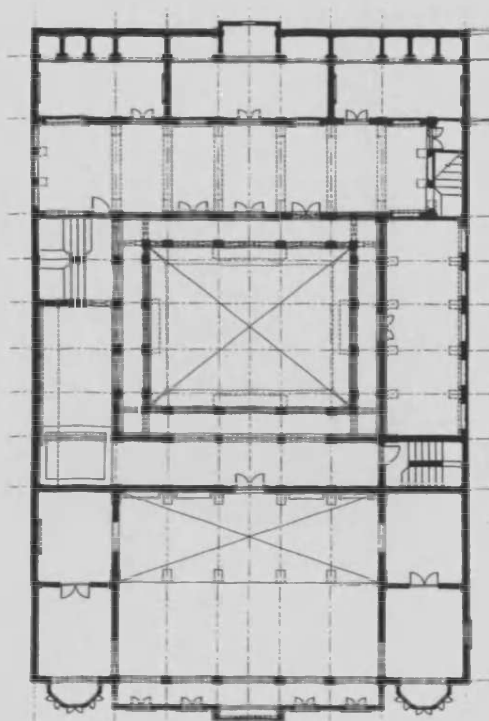
'Desert' haveli, Ground floor (seven bay along width)

Fig. 88 Haveli plan forms

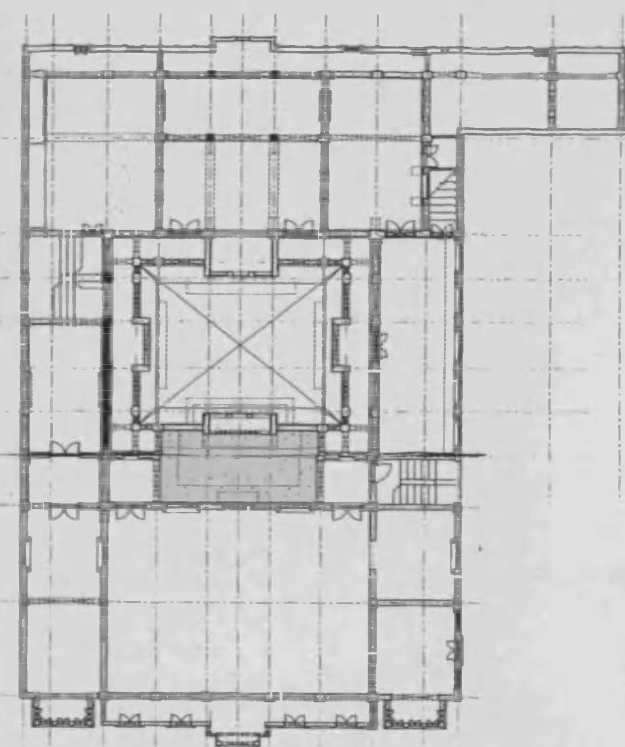




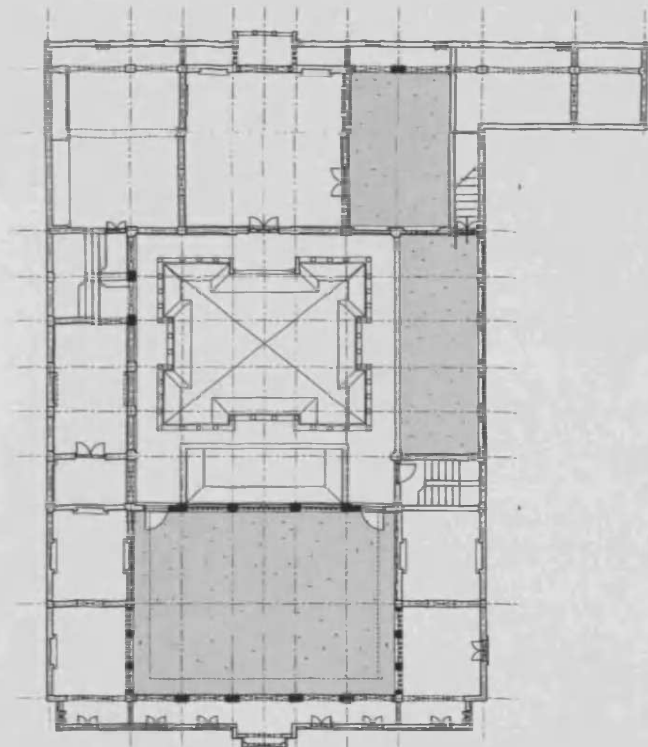
*Ground floor plan*



*First floor plan*



*Second floor plan*



*Third floor plan*

*Fig. 89 Floor plans of Jorawarmalji haveli. Chowk and chandnis on upper floors marked in grey tone*



Fig. 90 Transformation of heavy structural khambhas from lower floors into delicate surangdar forms, on second floor, Jorawarmalji haveli



Fig. 91 Hall at rear on third floor created by eliminating intermediary columns, Jorawarmalji haveli



Fig. 92 Pathiyal on ground floor, Jorawarmalji haveli, illustrating the use of heavy structural elements, and short spans, creating small, rigidly defined spaces



Fig. 93 Chandni at rear on third floor, Jorawarmalji haveli

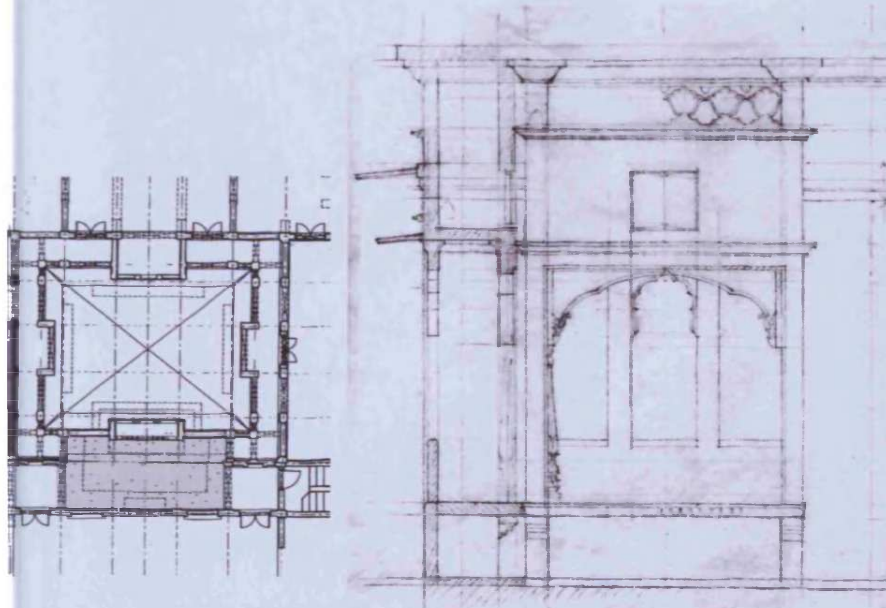


Fig. 94 Plan of chandni on second floor, adjacent to main chowk

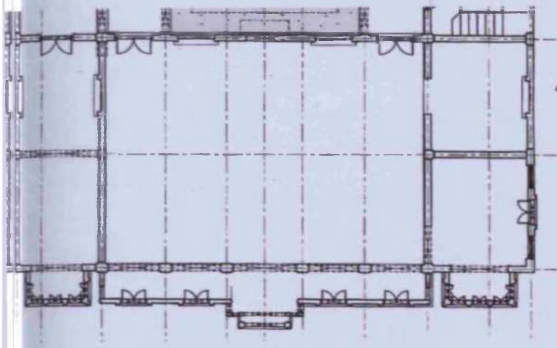
Cross-section through chandni



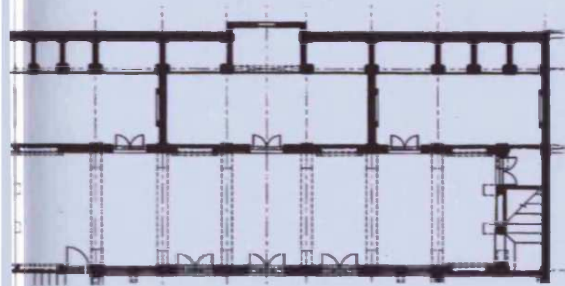
View of main chowk and ranges beyond from chandni

Fig. 94 Spatial relationship of chandni on second floor with adjacent spaces, Jorawarmalji haveli

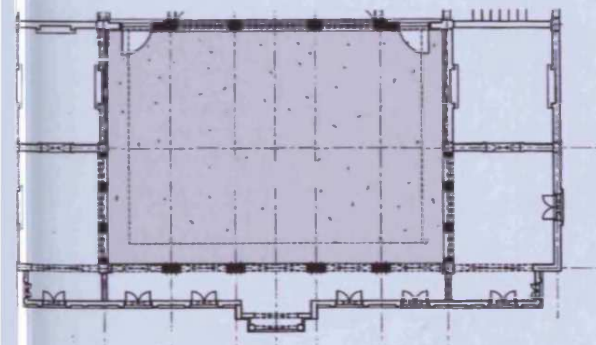




*Gallery space along front facade, Second floor  
Jorawarmalji haveli (refer to photo on right)*



*Built-in storage space along rear facade, First floor  
Jorawarmalji haveli (refer to photo on right)*

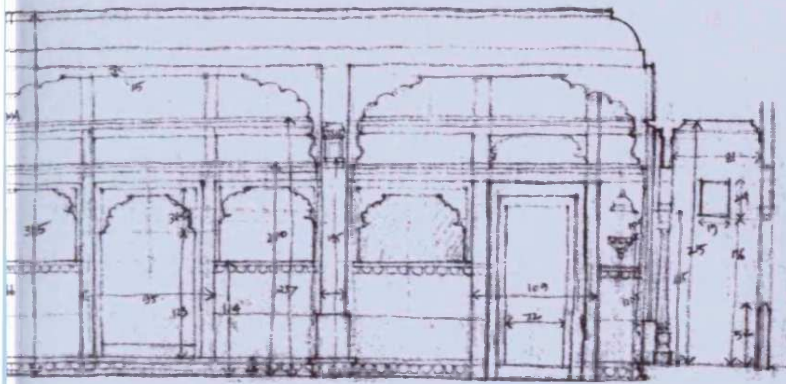


*Gallery space along front facade, Chandni on  
second floor, Jorawarmalji haveli (refer to photo  
on right)*



*Fig. 95 Treatment of gallery space between external facade and line of load bearing columns*





96 Section through room, with gallery space (extreme right) along facade, treated as an intimate seating space with lowered ceiling, floor, Bahadurmal haveli (refer to photo on right)



Fig. 97 The ala, positioned between two khambhas



Fig. 98 Regular rhythm of alas



Fig. 99 Alternate rhythm of alas and doorways



Fig. 100 Built-in storage cupboards and niches in internal walls





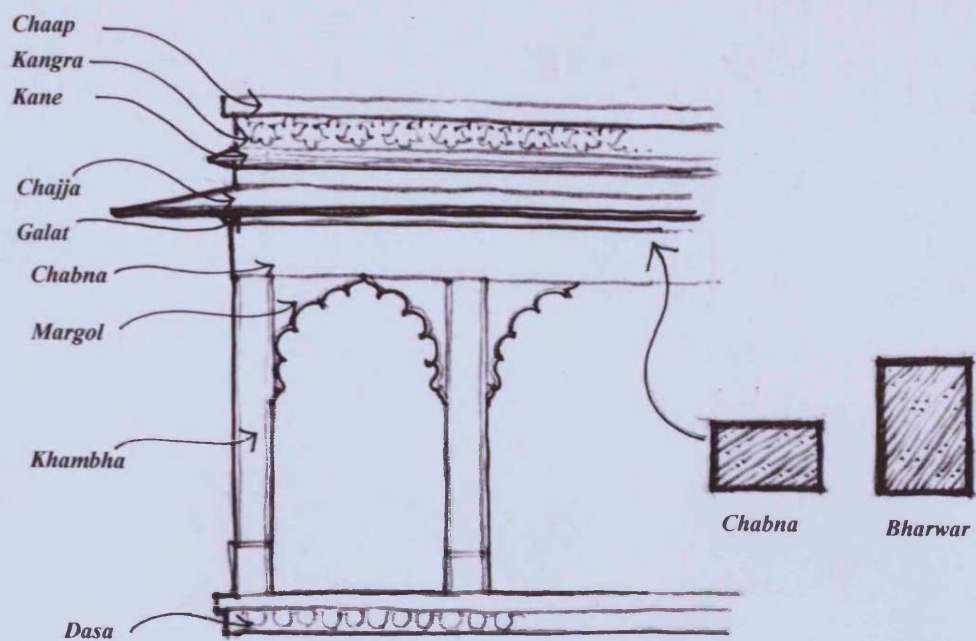
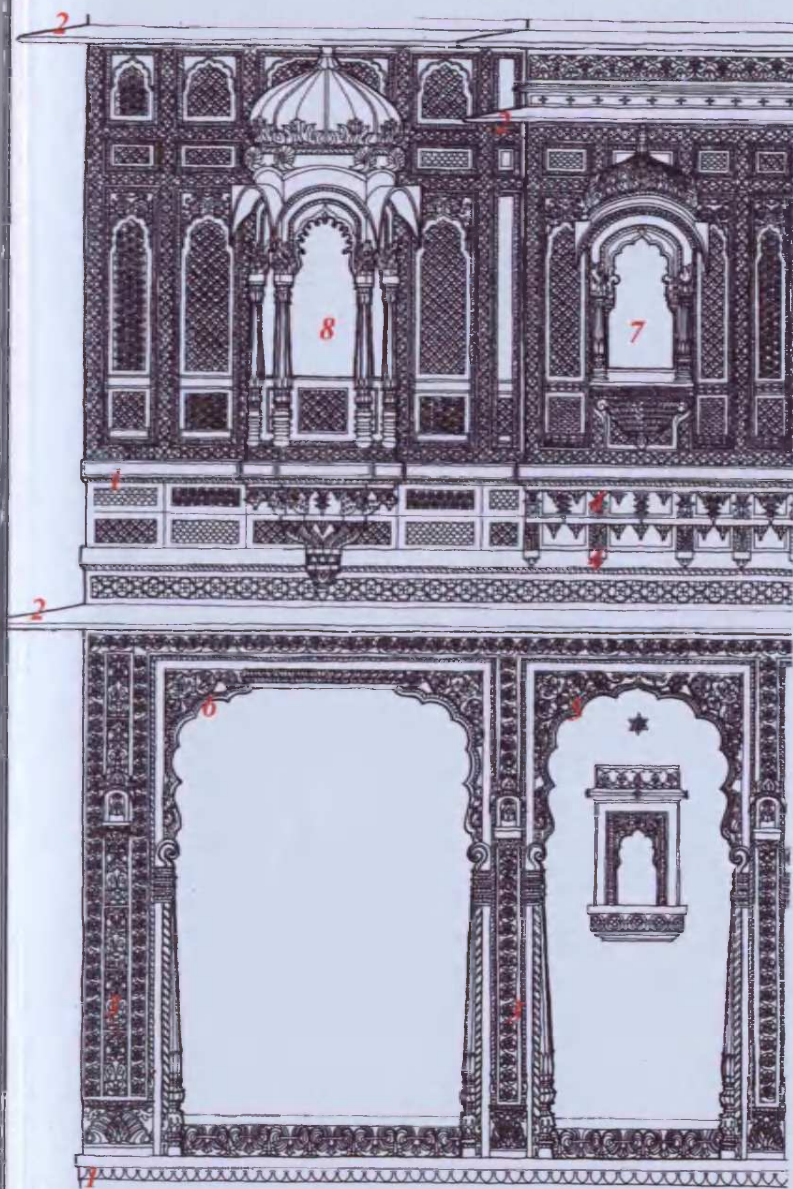


Fig. 101 Primary syntax of architectural elements

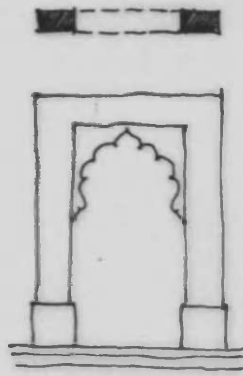


Key

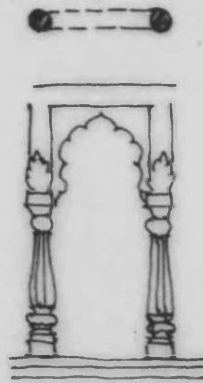
- 1 Dasa, 2 Chajja, 3 Khambha(composite), 4 Todi,
- 5 Margol (cusped), 6 Margol (halali),
- 7 Bari (nokwali), 8 Jharokha (kanwal)

Fig.102 Syntax of architectural elements and aedicules

# 1 MARGOL

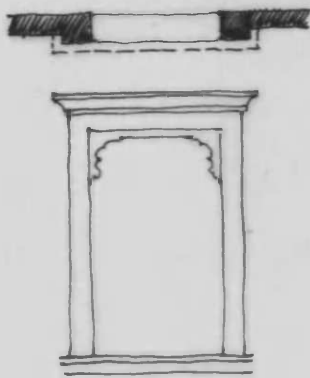


1A Margol with plain khambhas

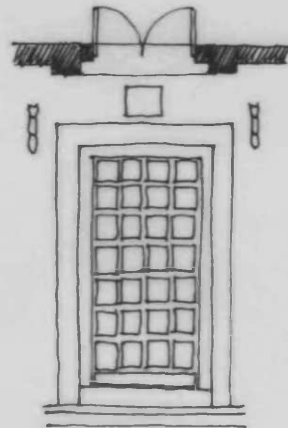


1B Margol with surangdar khambhas

## 2 DOORWAYS



2A Open doorway with halali brackets



2B Doorway with quadratic panels

## 3 BARI (WINDOWS)



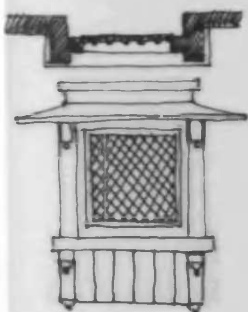
3A Nokwali bari



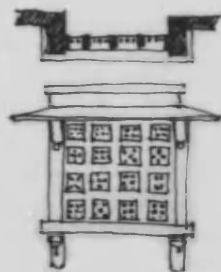
3B Plain bari



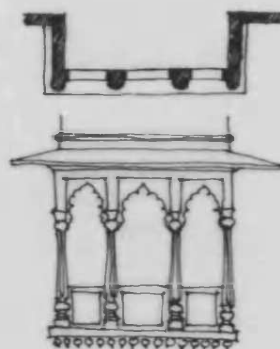
3C Peephole



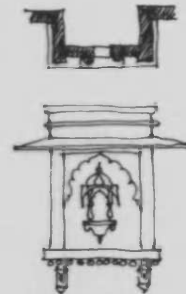
3D Sompuriya blind bari



3E Sompuriya quadratic bari

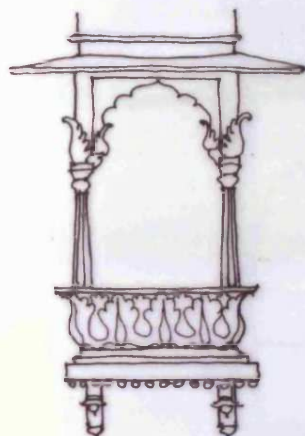
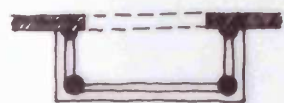


3F Tibari

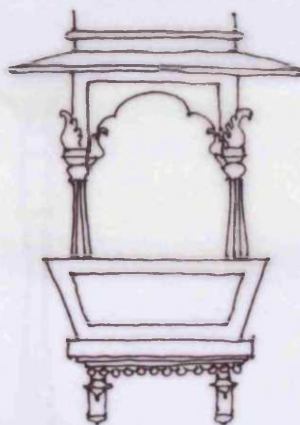
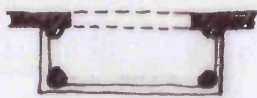


3G Blind bari with peephole

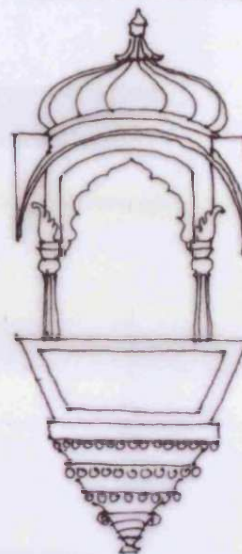
#### 4 JHAROKHA



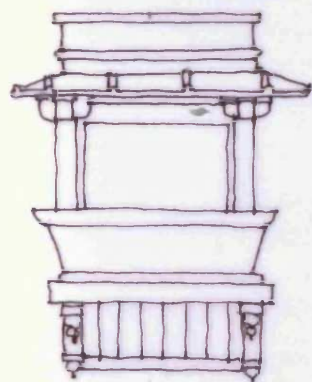
4A Jharokha with cusped Margol



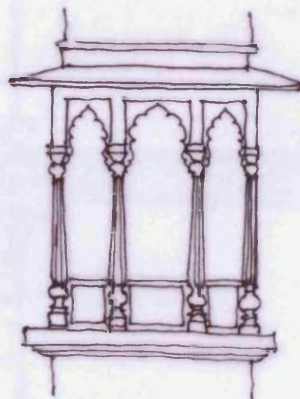
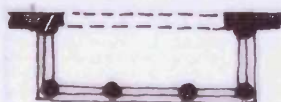
4B Jharokha with inclined takiya



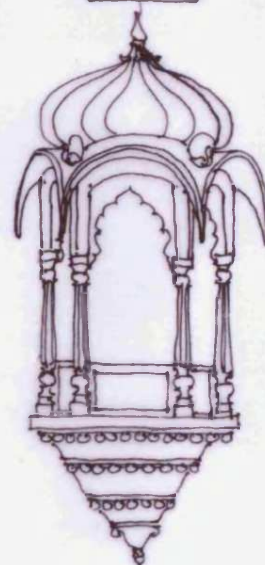
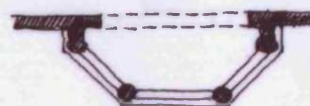
4C Nokwala jharokha



4D Sompuriya trabeate jharokha

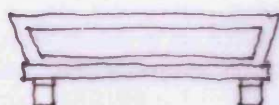


4E Tibari jharokha

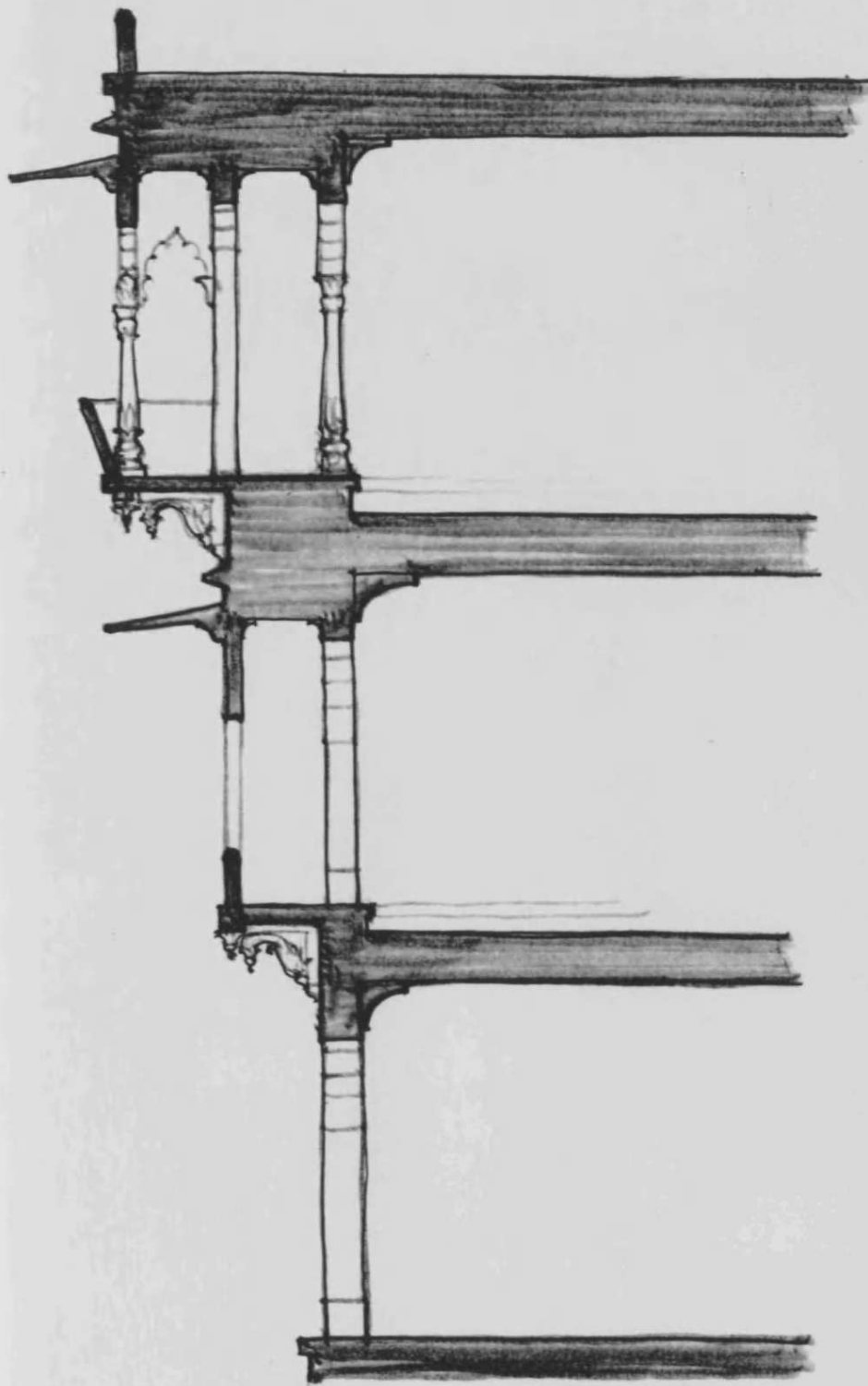


4F Nokwala octagonal jharokha (kanwal)

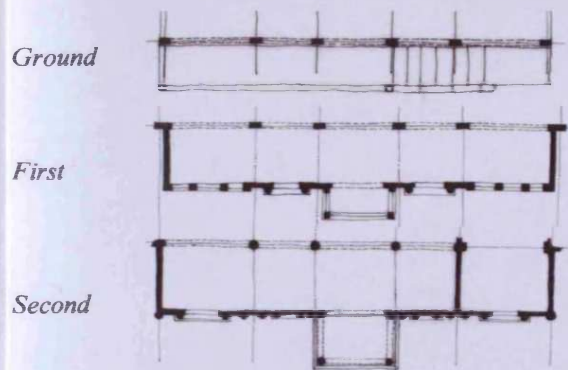
#### 5 GOKHDA







*Fig. 105 Typical section through the front facade of the haveli showing the projection of the facade from the line of the load bearing khambhas. Each step or projection is around one feet in depth, and the stepped out facade is supported on rows of todis*

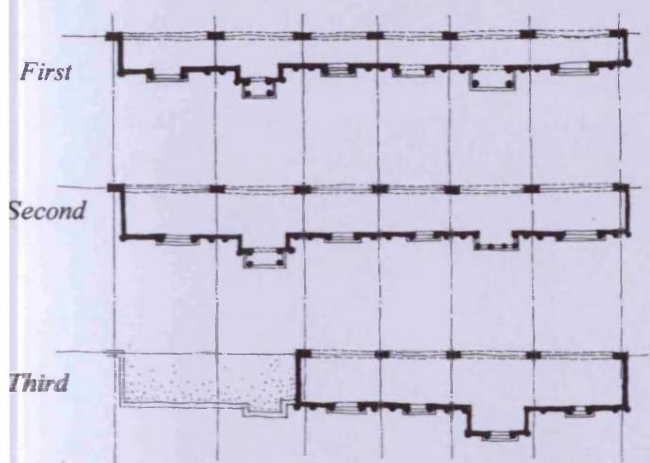


Ground

First

Second

Fig. 106 Suraj haveli: Plans of front facade on ground, first and second floors (refer to photograph on right), illustrating a symmetrical composition

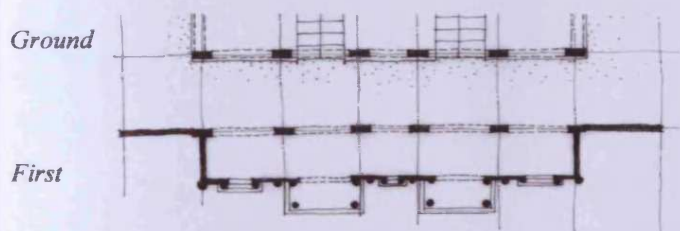


First

Second

Third

Fig. 107 Sri Nath haveli: Plans of west facade depicting the external facade detached from the line of load-bearing khambhas (refer to photograph on right), illustrating an asymmetric, informal composition



Ground

First

Fig. 108 'Desert' haveli: Plans of front facade on ground and first floors (refer to photograph on right), illustrating a symmetrical composition, however without a central focus



Fig. 109 Jharokhas used as key compositional elements



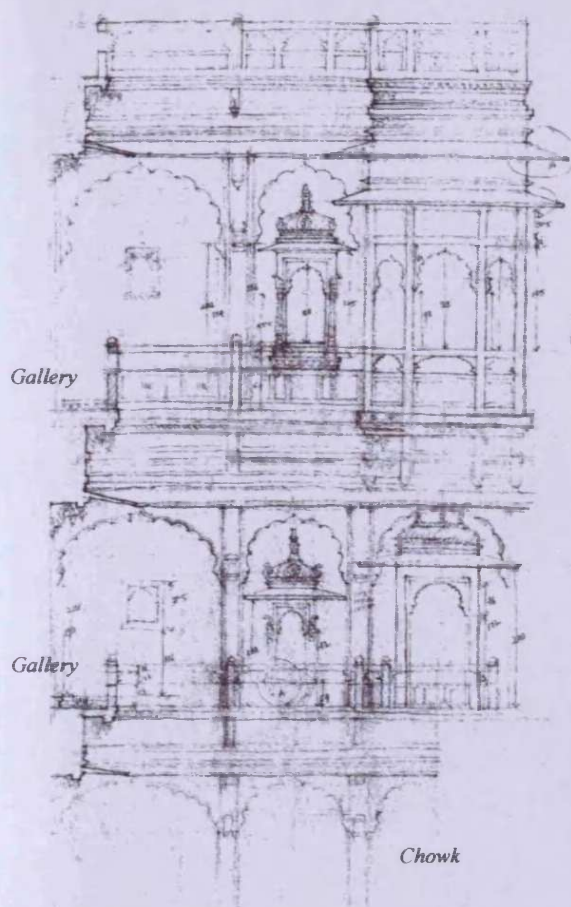


Fig. 110 Gallery around chowk supported on an ingenious combination of double todis, projecting out successively in two steps, Bahadurmali haveli (see photograph below)

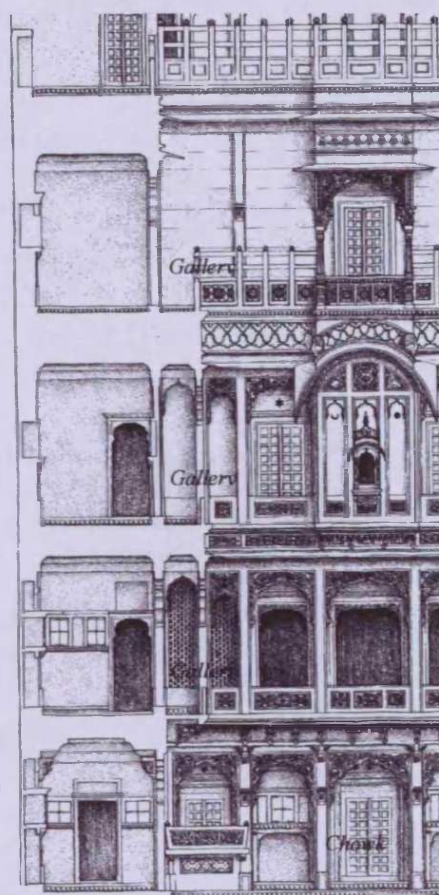


Fig. 111 Gallery around chowk provided with arcade comprising cusped margols. Gallery supported on single row of todis, Jorawarmali haveli (see photograph below)

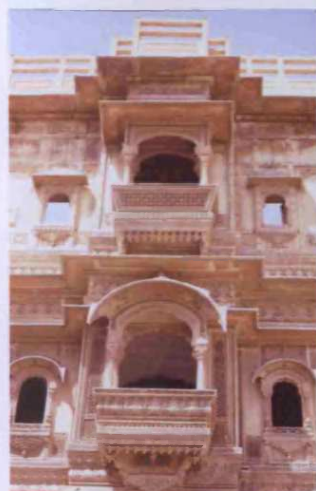
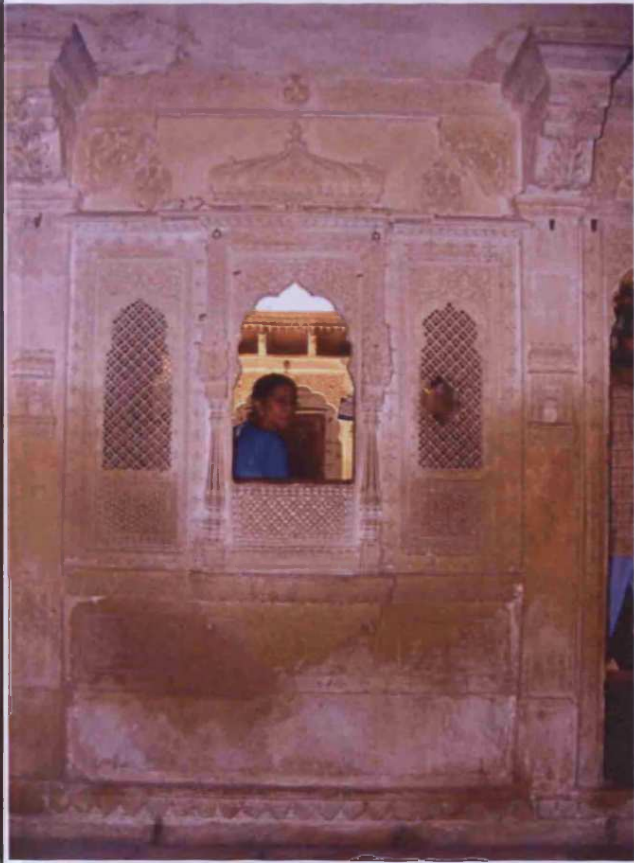
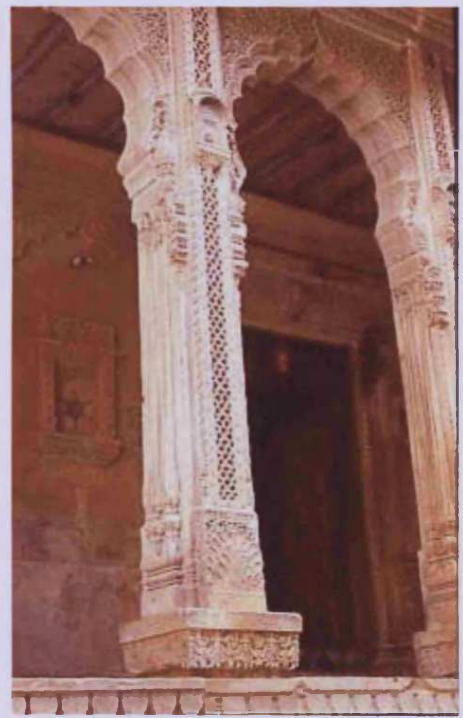


Fig. 112 Patches of open sky framed within openings in the external facade, Patuon ki Haveli





*Fig. 113 Example of punched margol opening in wall treated with the imagery of a bari, complete with chajja, surangdar khambhas, takiya, ravati and pavdi. The wall surface at the level of the todi on either side of it is carved with the image of todis, as if embedded in the body of the wall*



*114 The use of Surangdar khambha as a structural element, and for purposes of imagery, in the nokwali bari, the composite khambha*





Fig. 115 Miniaturisation in the representation of the nokwali bari set as aedicule within larger bari

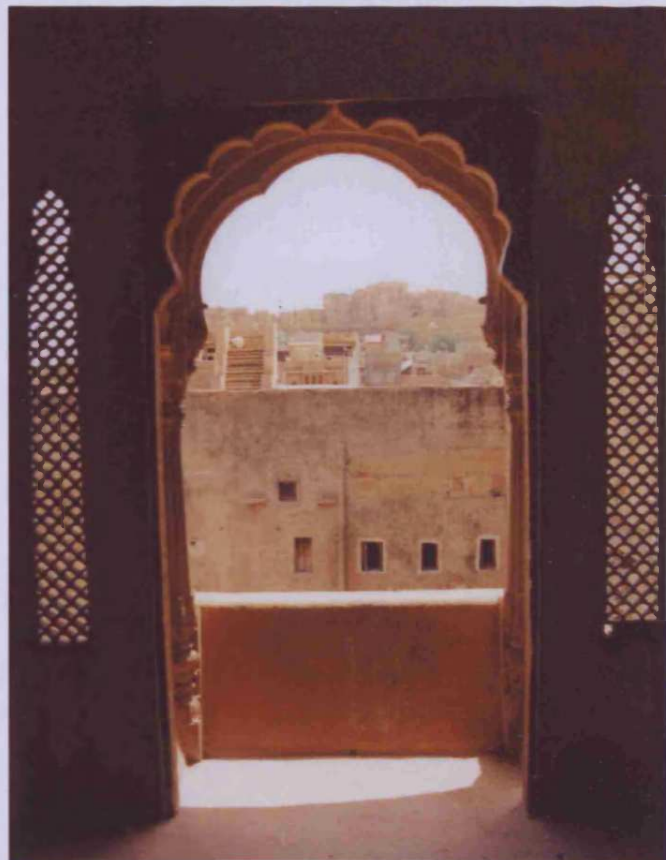


Fig. 116 Openings in successive planes spanned by cusped margol and trisegmental margol, Jorawarmalji haveli



Fig. 117 Three closely spaced planes in a jharokha defined by differently shaped openings, Suraj haveli

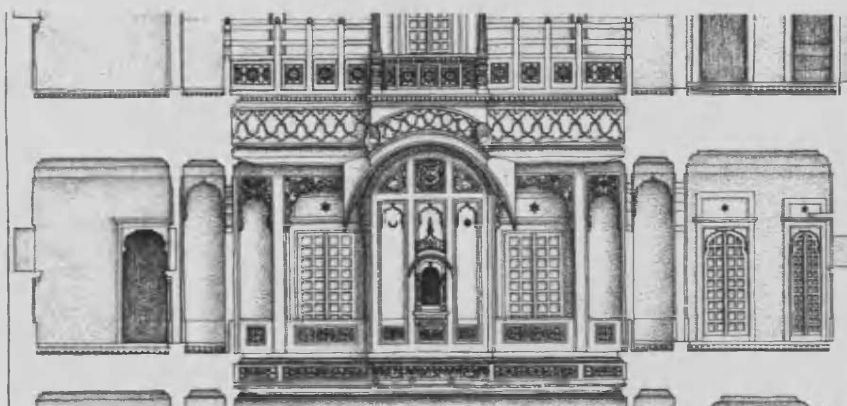


*Key elevation*

*Second floor*



*Plane 2 (rear)*



*Plane 1 (front)*

*First floor*

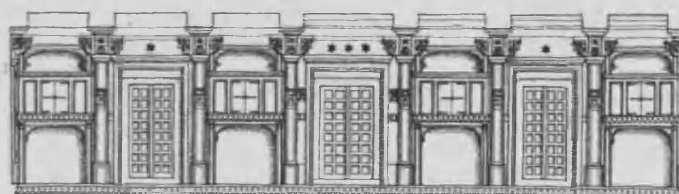


*Plane 2 (rear)*



*Plane 1 (front)*

*Ground floor*



*Plane 2 (rear)*



*Plane 1 (front)*

*Fig. 118 Layering in planes, in range adjacent to chowk, Jorawarmalji haveli. Openings in the front plane selectively frame views of the plane at rear*





Fig. 119 Front elevation, haveli of Sawairamji



Fig. 120 Rear elevation, haveli of Sawairamji

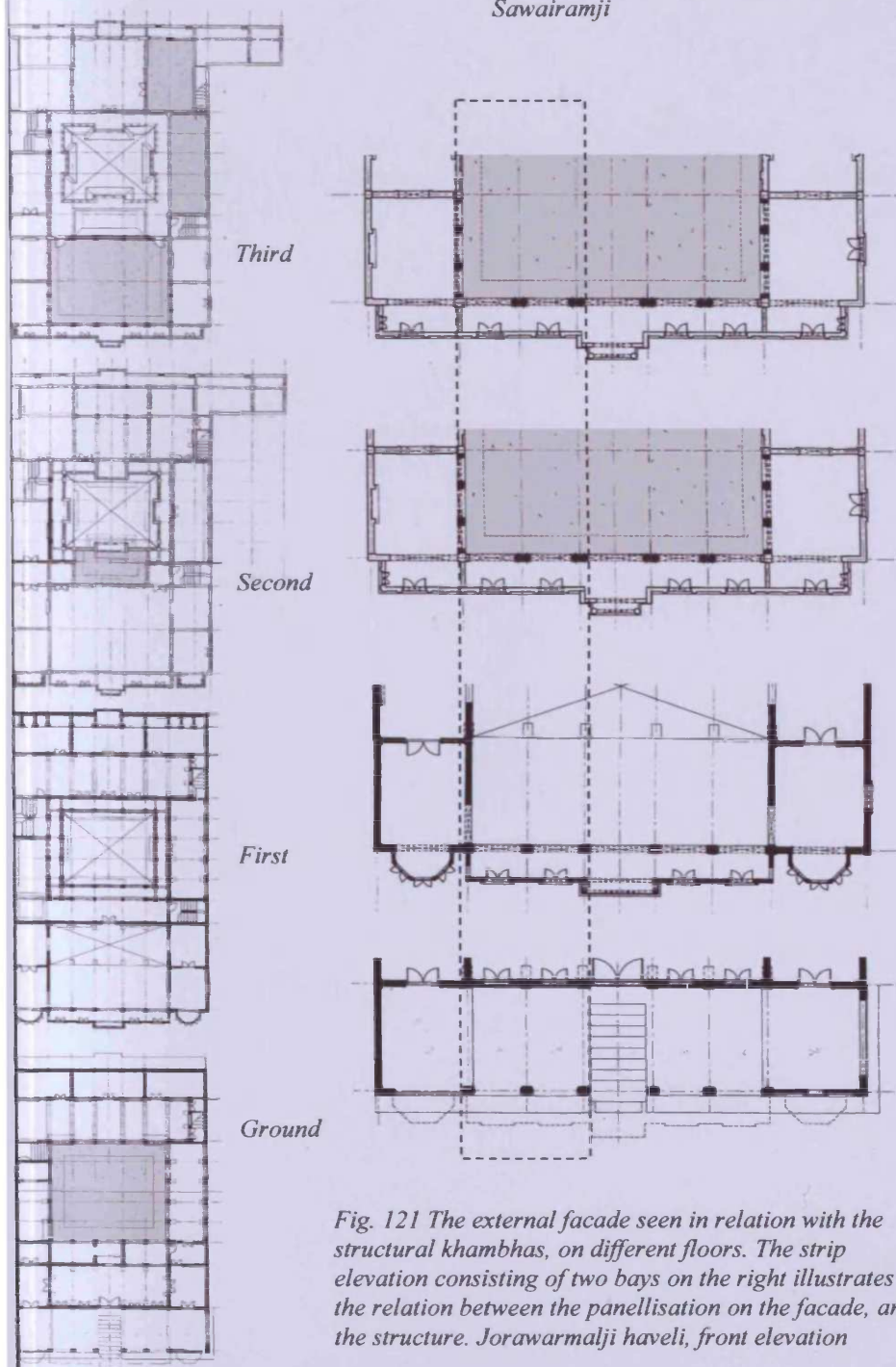
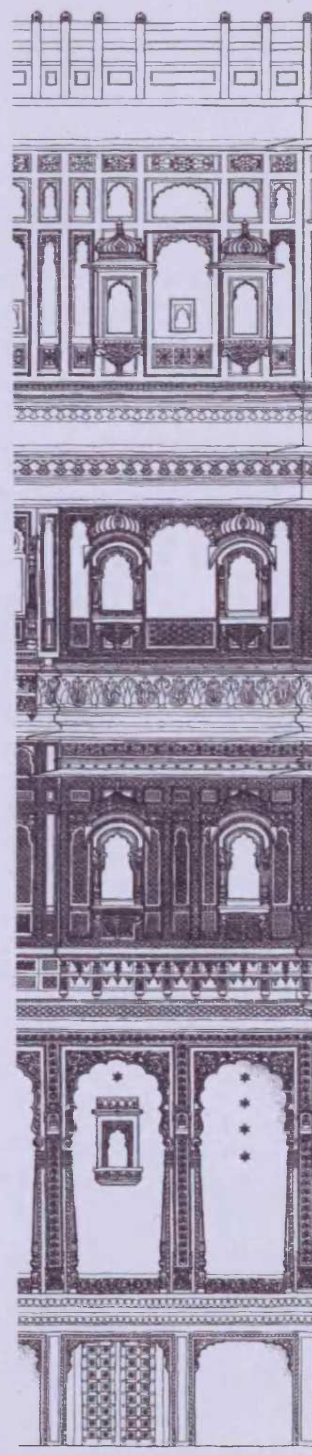


Fig. 121 The external facade seen in relation with the structural khambhas, on different floors. The strip elevation consisting of two bays on the right illustrates the relation between the panellisation on the facade, and the structure. Jorawarmalji haveli, front elevation



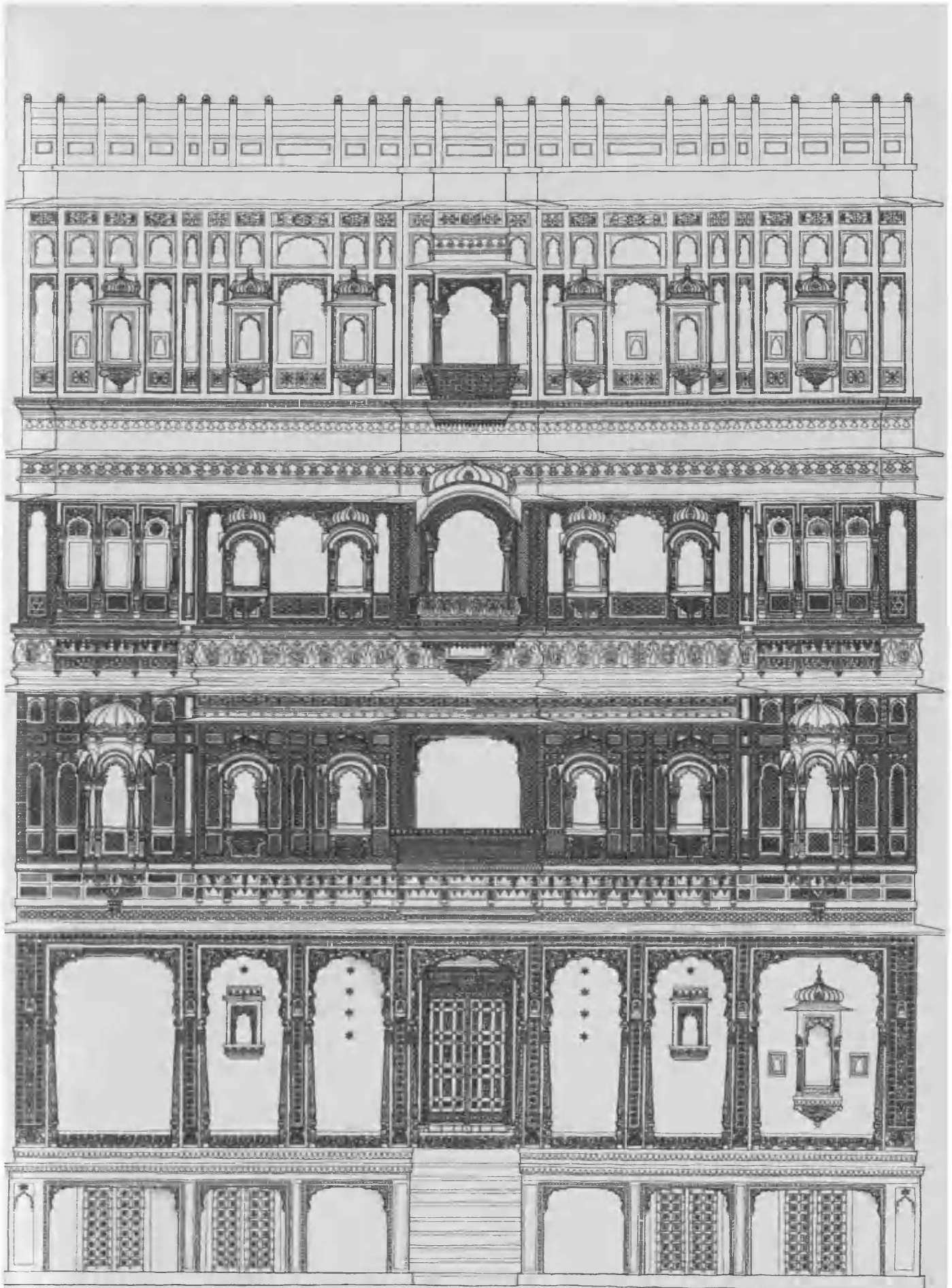


Fig. 122 Front elevation, Jorawarmalji haveli



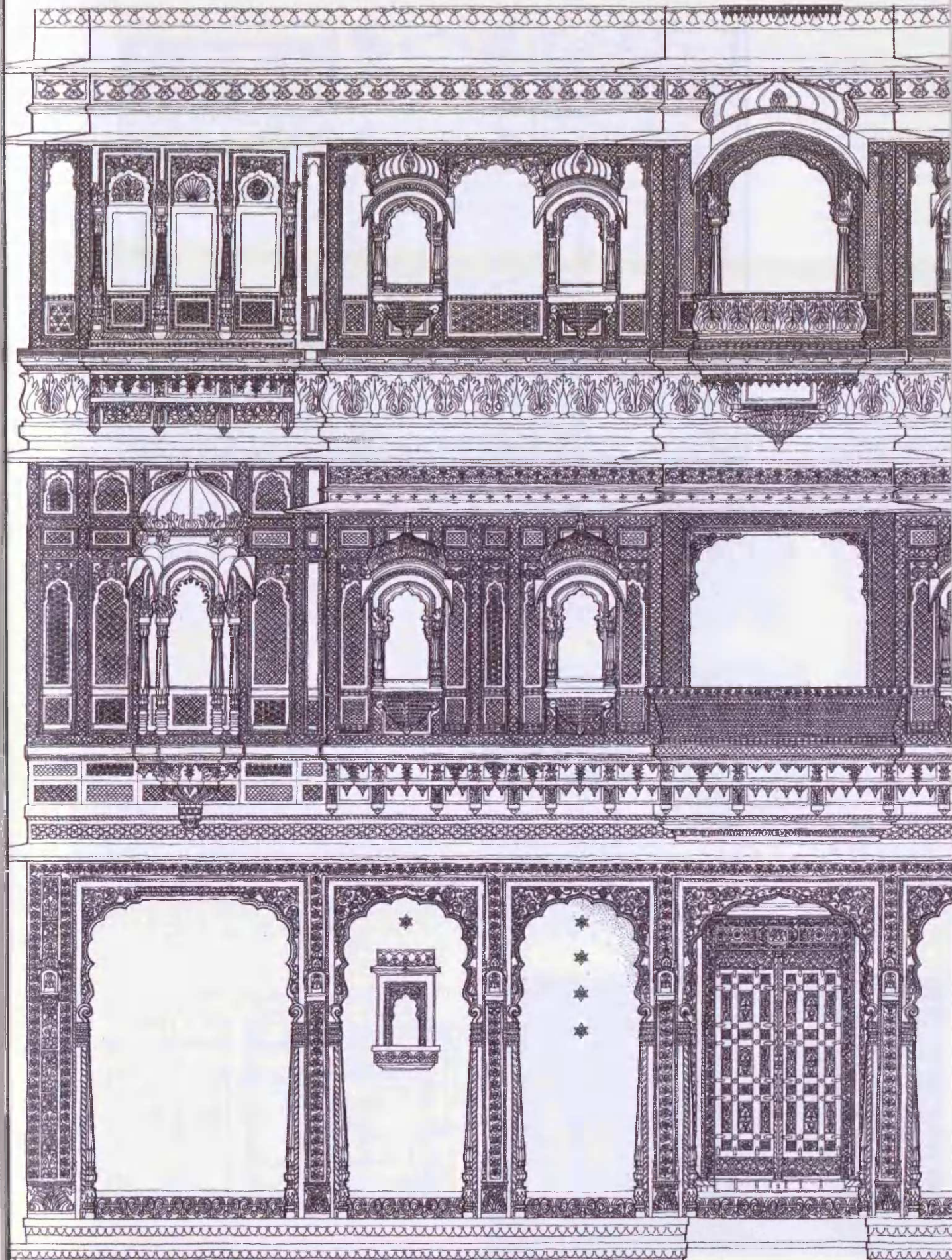


Fig. 123 Part detail of front elevation, Jorawarmalji haveli



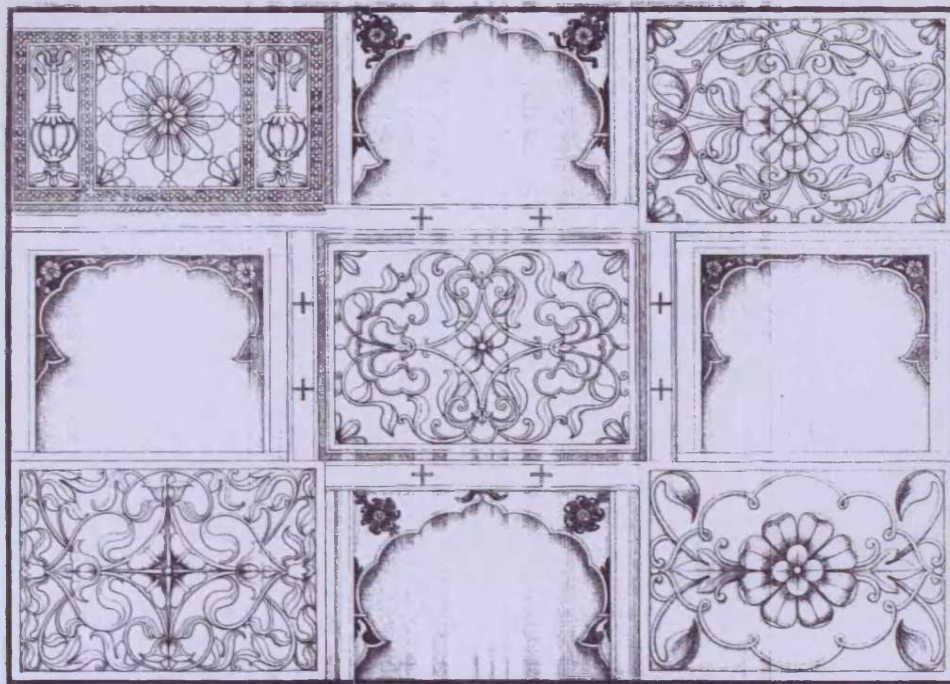
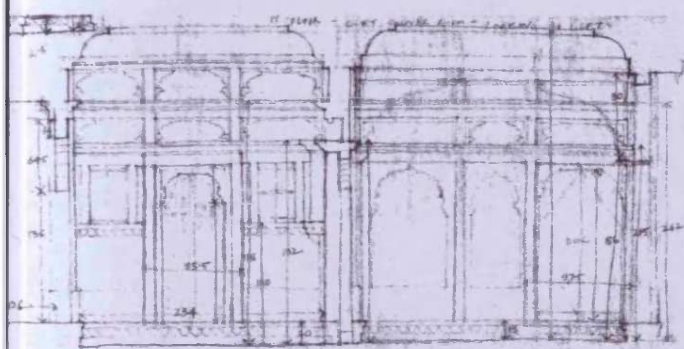
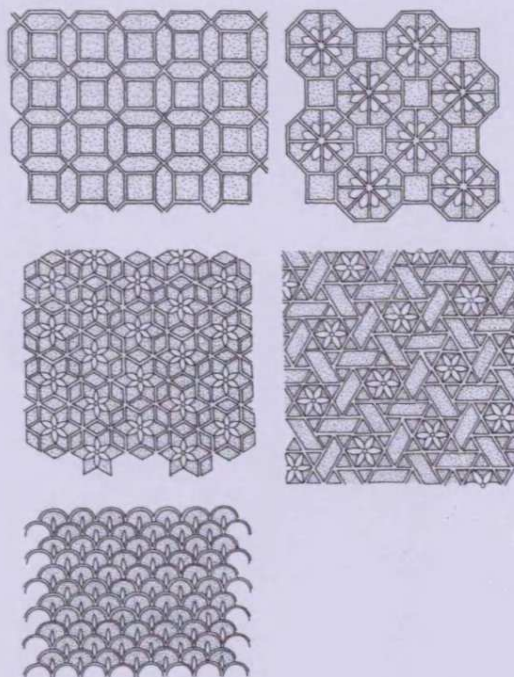


Fig. 124 Typical Mughlai vegetal (above), and geometrical jali designs (right)



125 Panellisation in internal wall surfaces using pilasters, and zontal mouldings such as dasa and galat (see photograph on right)





*Khambha with circular shaft*

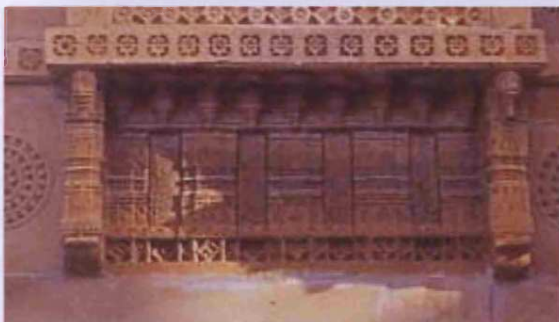


*Khambha with rectilinear staggered profile*



*Polygonal khambha*

*Fig. 126 Different types of khambha*



*Fig. 127 Different types of toti, and dasa, and examples of frieze below dasa*



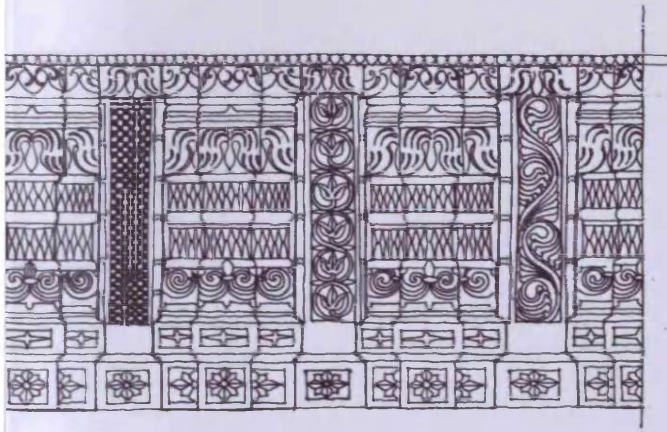


Fig. 128 Frieze comprising alternate projecting and recessed pilasters, on rear wall between todis (refer to fig. 132)

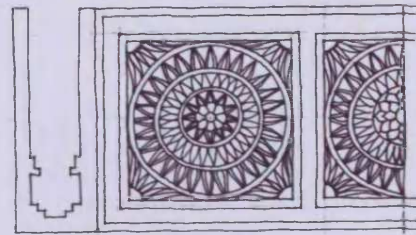
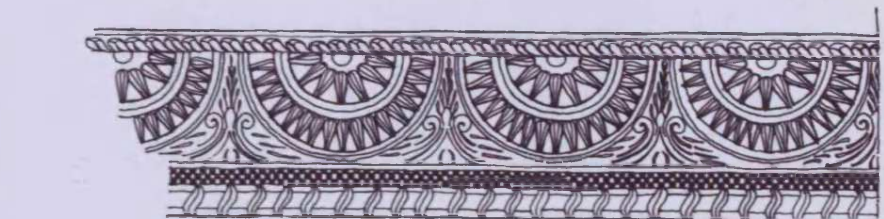


Fig. 129 Treatment of soffit of dasa (refer to fig. 132)



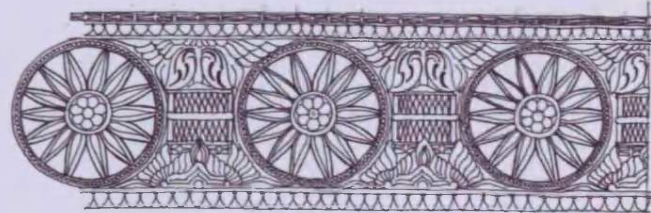
Fig. 130 Example of piling of horizontal mouldings and ribbed chajja



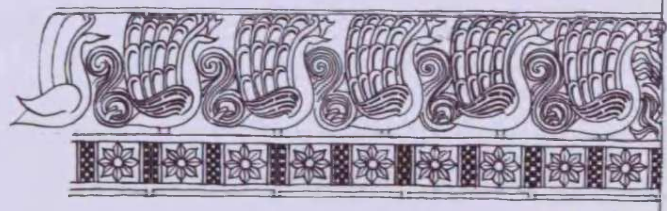
Chabna decorated with row of half sun medallions



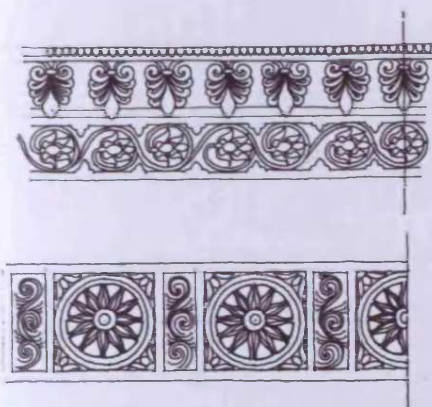
Top part of inclined takiya, comprising row of interconnected foliage and peacocks



Middle part of inclined takiya, comprising row of perforated sun medallions



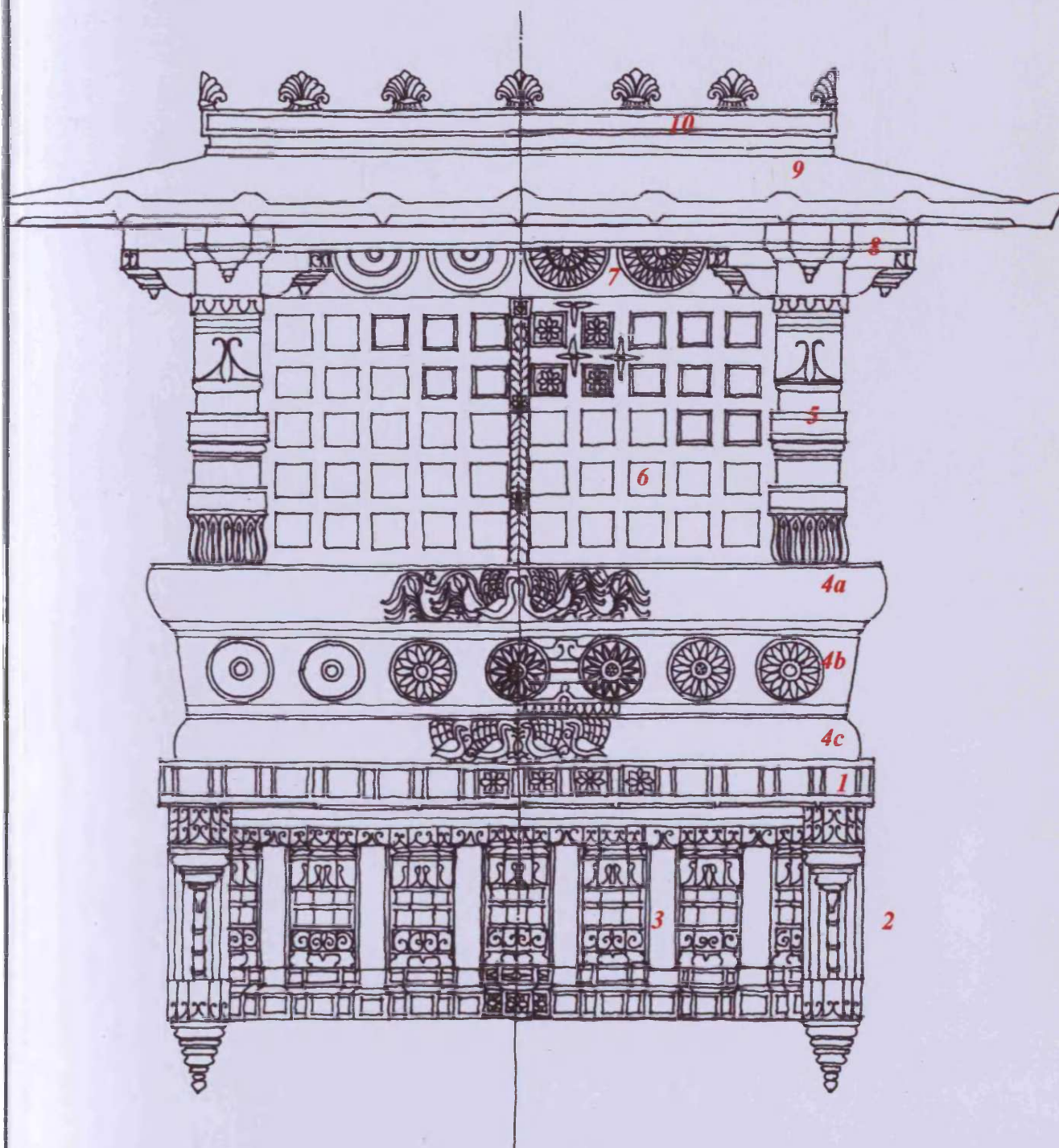
Lower part of inclined takiya, comprising row of peacocks



Soffit of chabna

Fig. 131 Decorative Mouldings (refer to fig. 132)





- |                             |                       |
|-----------------------------|-----------------------|
| 1 DASA                      | 8 TODI (BELOW CHAJJA) |
| 2 TODI (BELOW DASA)         | 9 CHAJJA (RIBBED)     |
| 3 FRIEZE                    | 10 CHAAP              |
| 4 (a, b, c) INCLINED TAKIYA |                       |
| 5 KHAMBHA                   |                       |
| 6 DOOR                      |                       |
| 7 CHABNA                    |                       |

Fig. 132 Architectural components in a typical Sompuriya jharokha



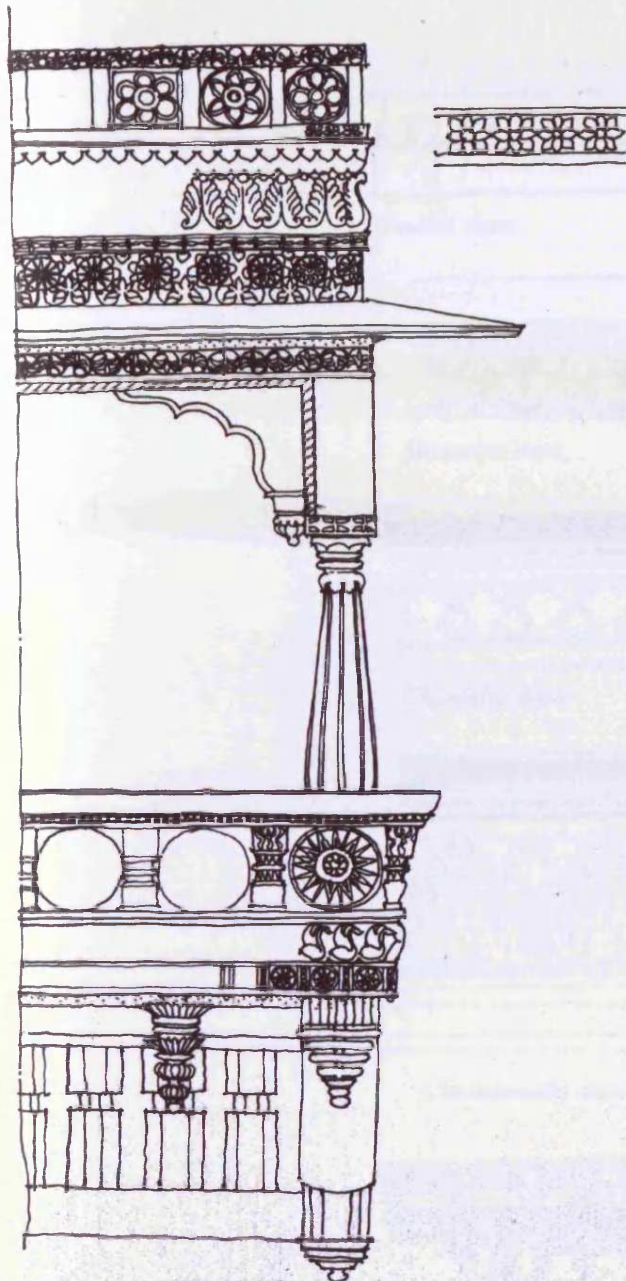


Fig. 133 Example of Sompuriya jharokha transformed through Mughlai influences: surangdar khambha, cusped bracket, and fin-like chajja

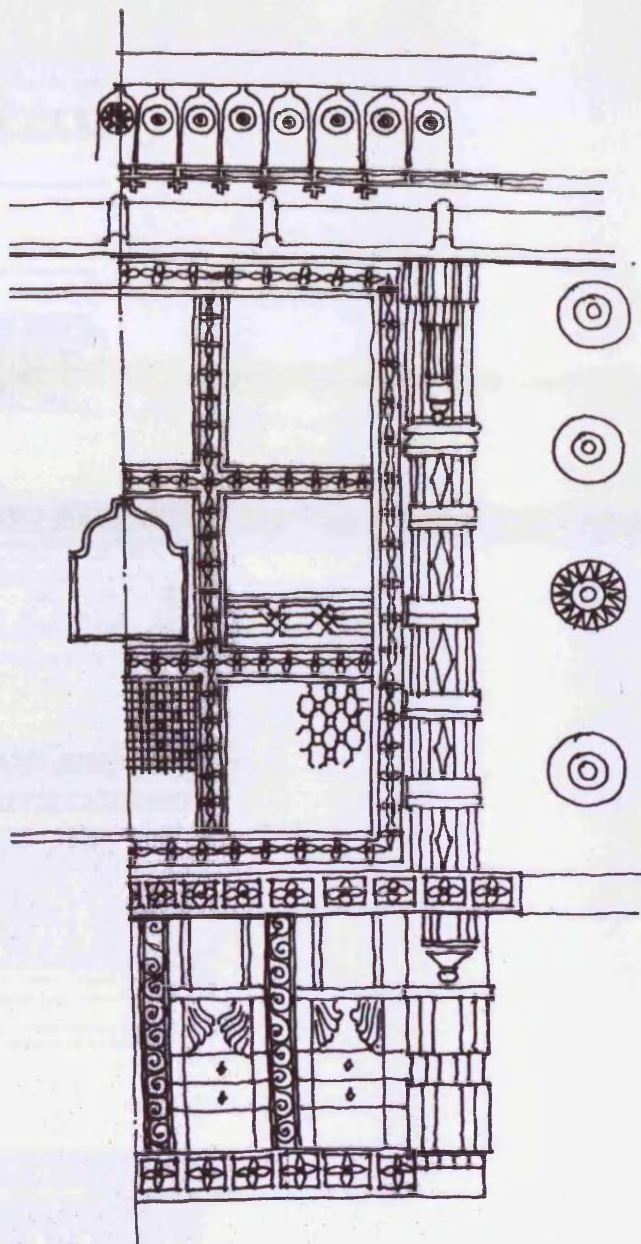


Fig. 134 Typical Sompuriya bari

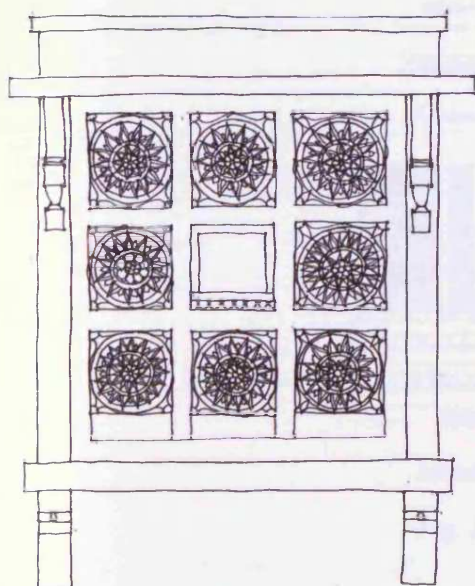


Fig. 135 Example of Sompuriya bari with sun medallions set within a grid of pilasters (left)

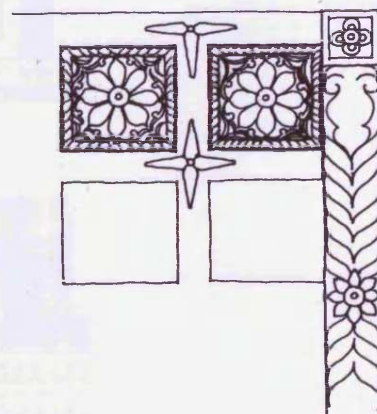
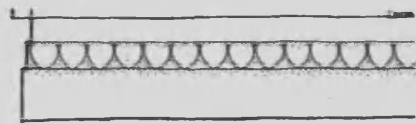
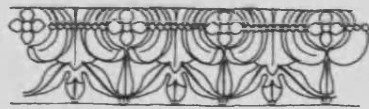


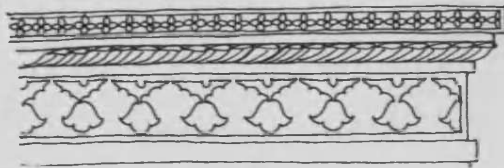
Fig. 136 Quadratic panelled timber door (refer to fig. 132)



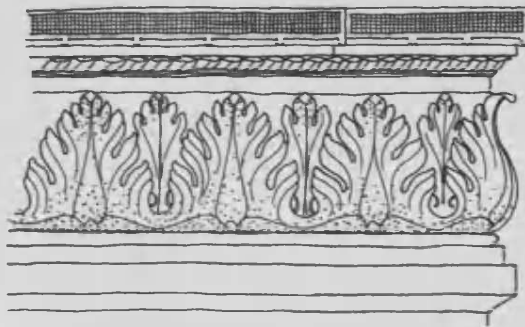
*Paanel dasa*



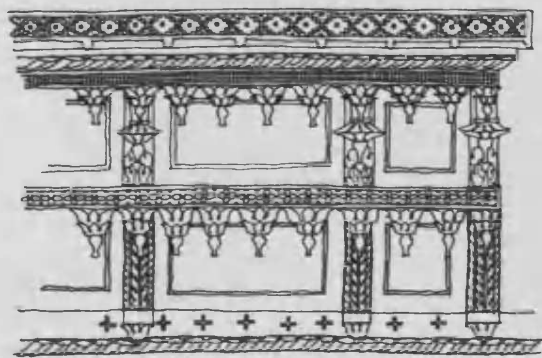
*Munariya dasa*



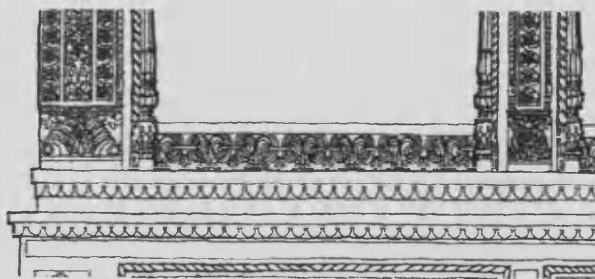
*Chaufulia dasa*



*Chadabandhi dasa*



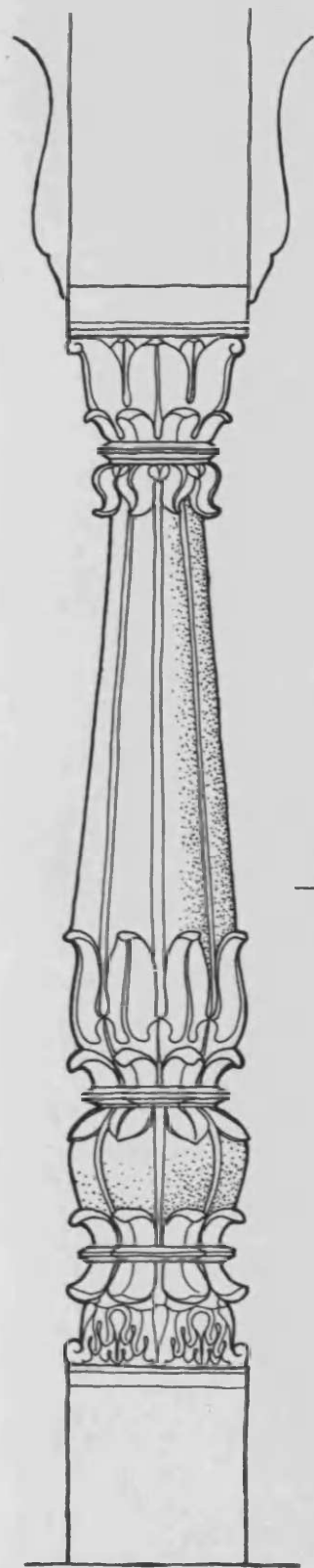
*Chaubla chaubin dasa*



*Munariya dasa*

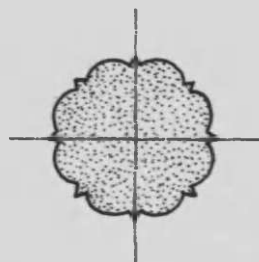
*Fig. 137 Decorative designs in the dasa*



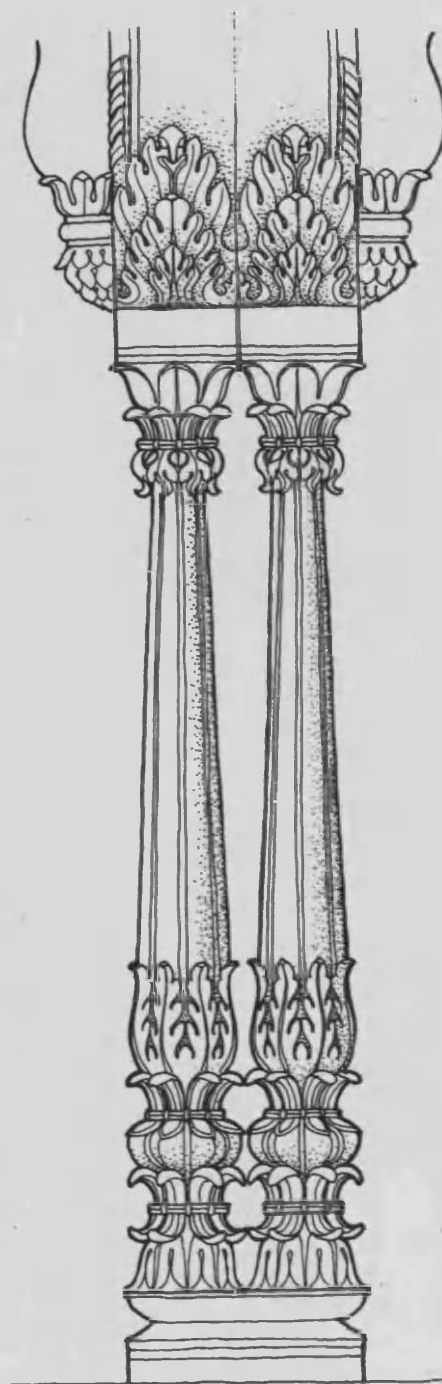


*Elevation*

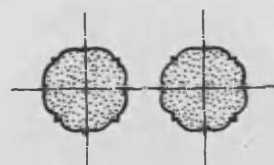
*Single*



*Plan*



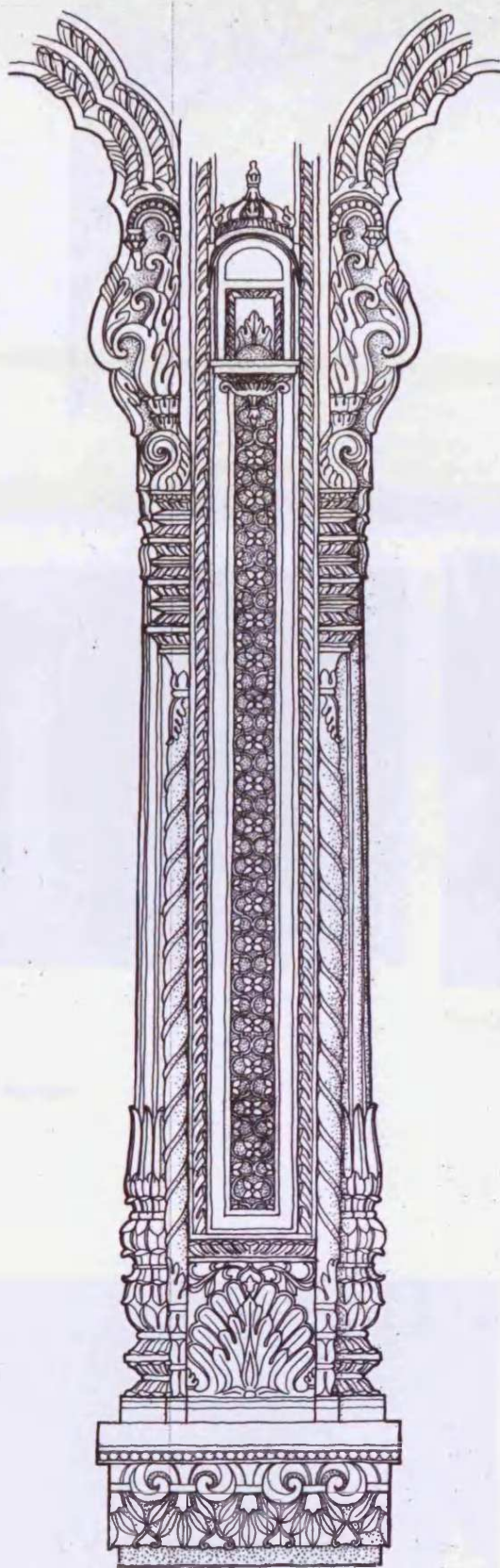
*Elevation*



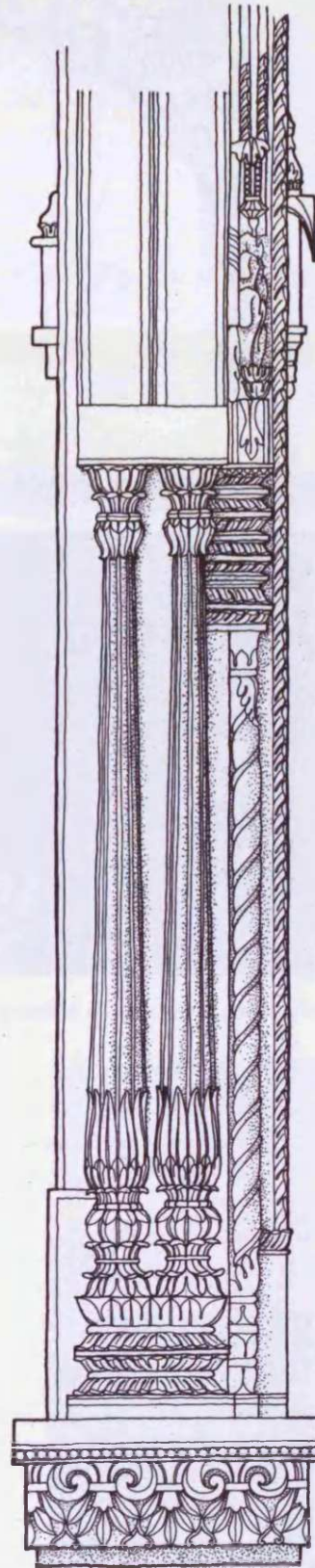
*Plan*

*Twin*

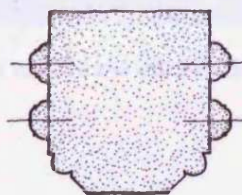
*Fig. 138 Surangdar khambha*



*Front elevation*



*Side elevation*



*Plan*

*Fig. 139 Composite khambha*





*Fig. 140 Cusped margol*



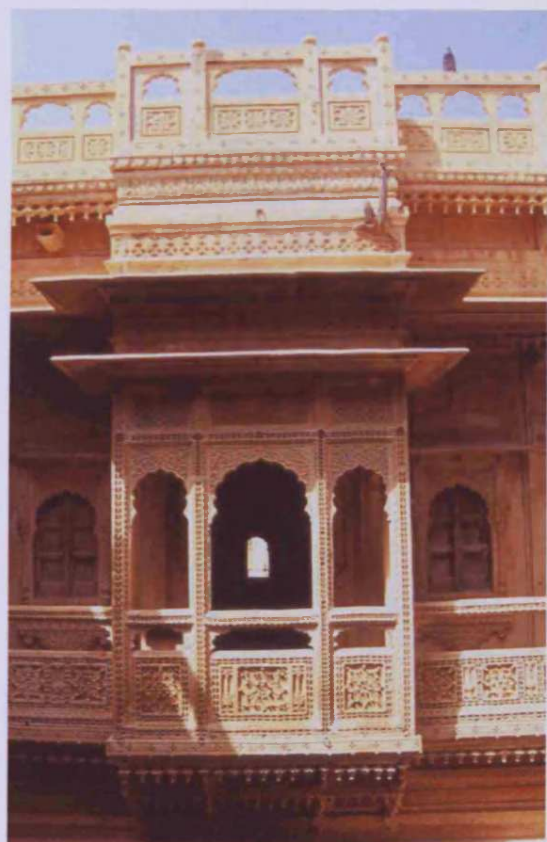
*Detail of pendant at springing point of margol*

*41 Trisegmental margol*



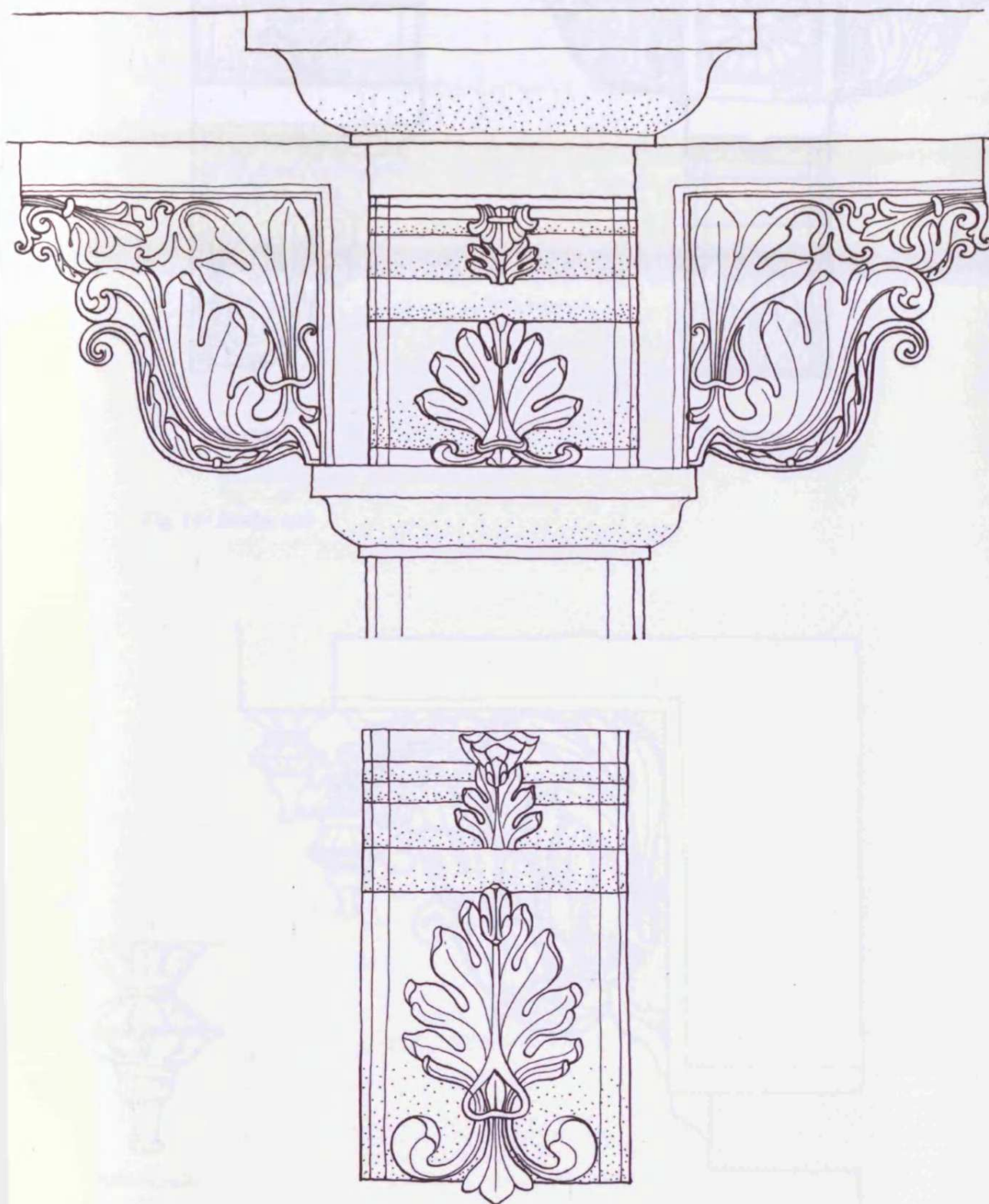
*Cusped halali brackets used in the diwankhana*

*Fig. 142 Cusped halali margol*

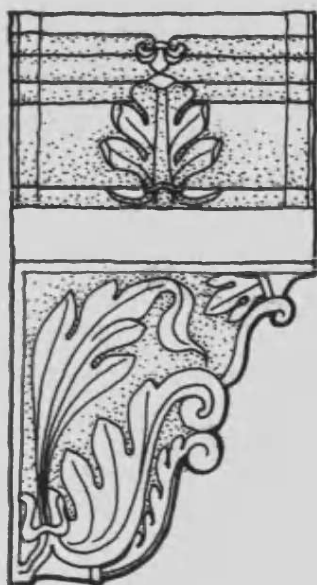


*Halali brackets used in miniature form in the railing panels*

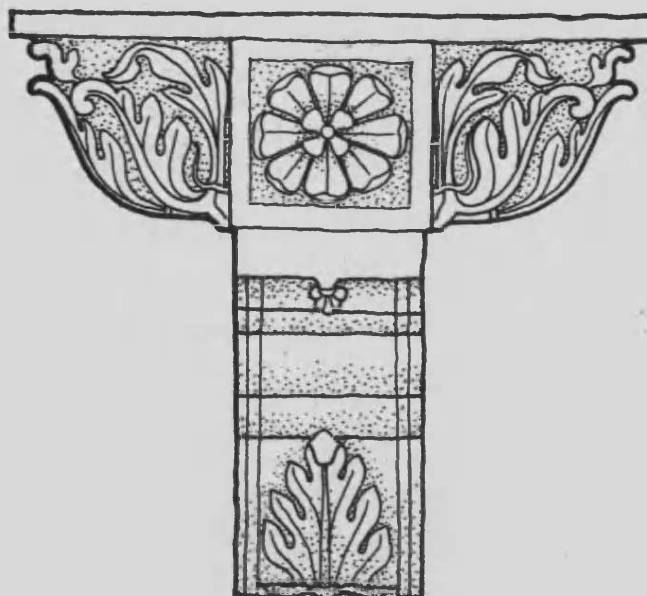




*Fig. 143 Todi with acanthus leaf decoration (used mainly in interiors)*

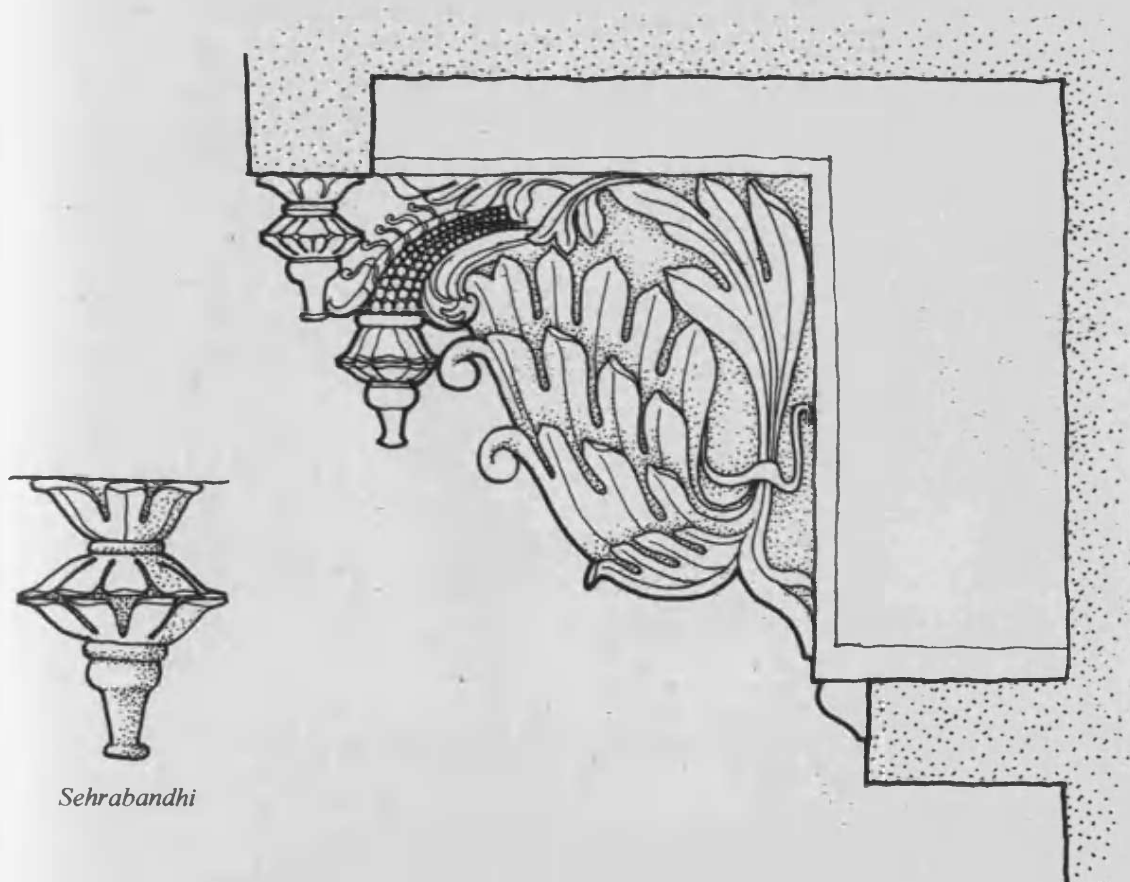


*Side view*



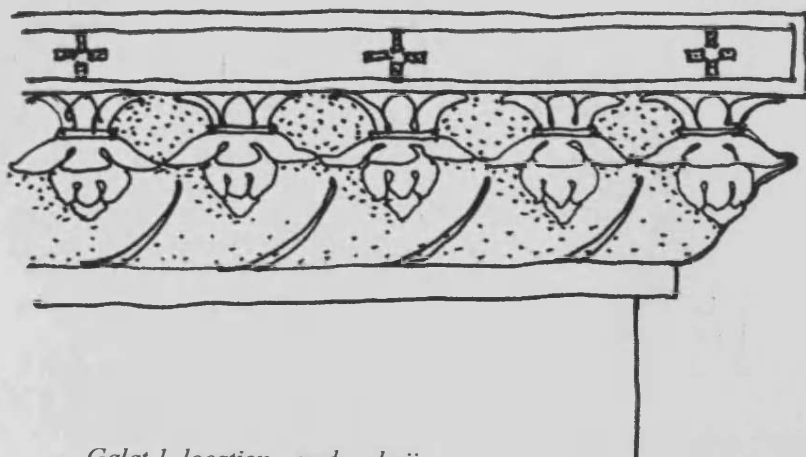
*Front view*

*Fig. 144 Double todi*

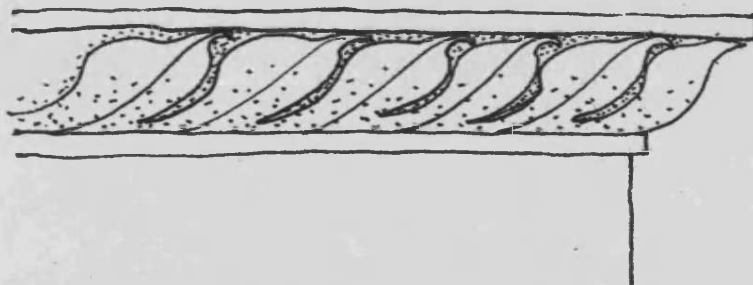


*Sehrabandhi*

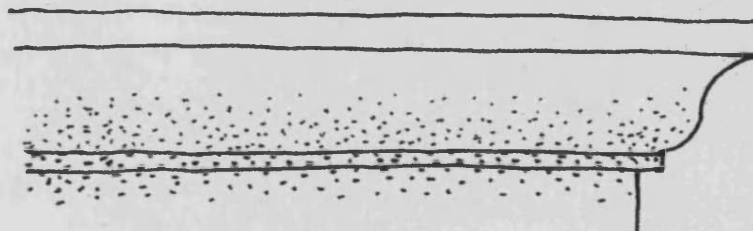
*Fig. 145 Todi with loomb*



*Galat 1, location – under chajja*



*Galat 2, location – under chajja*



*Galat 3, location – under chajja*

*Fig. 146 Galat moulding*



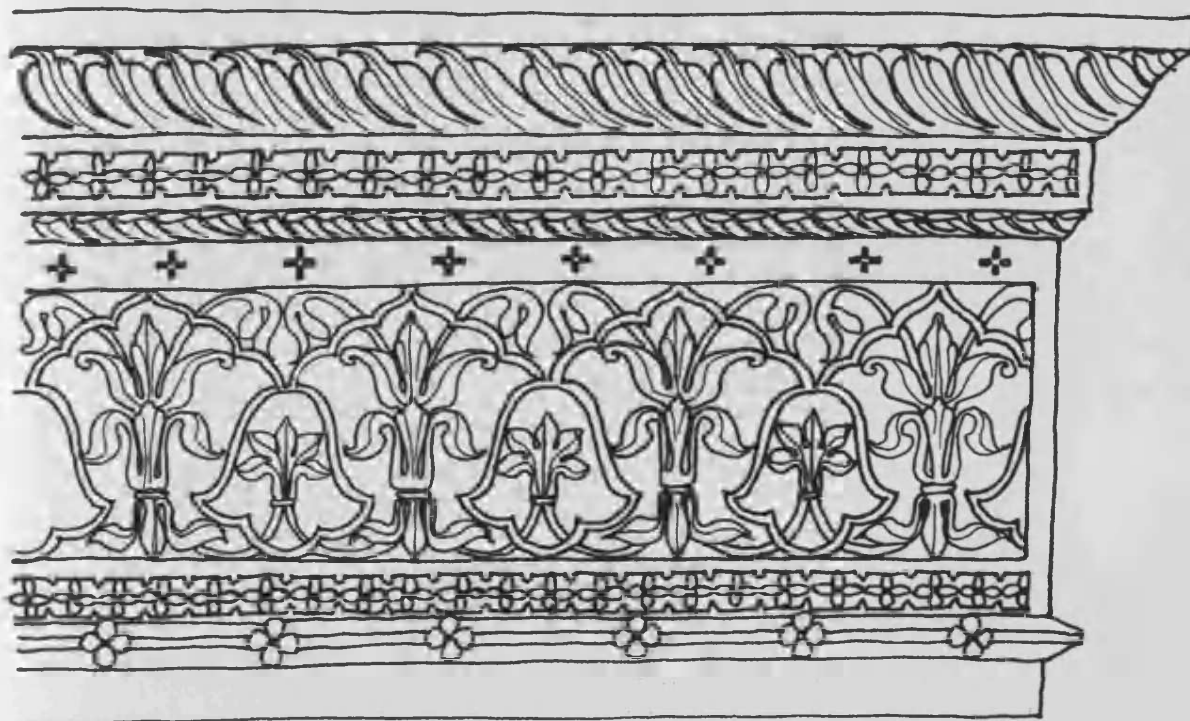
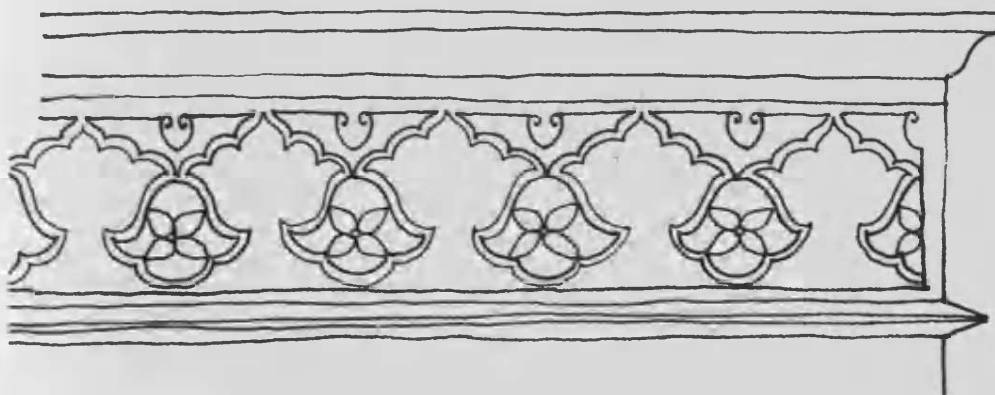
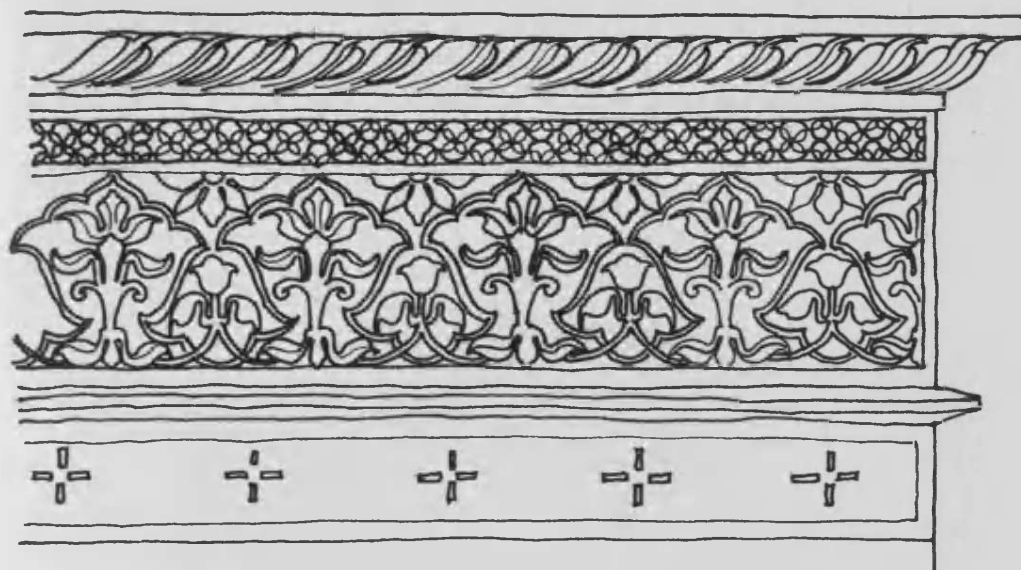
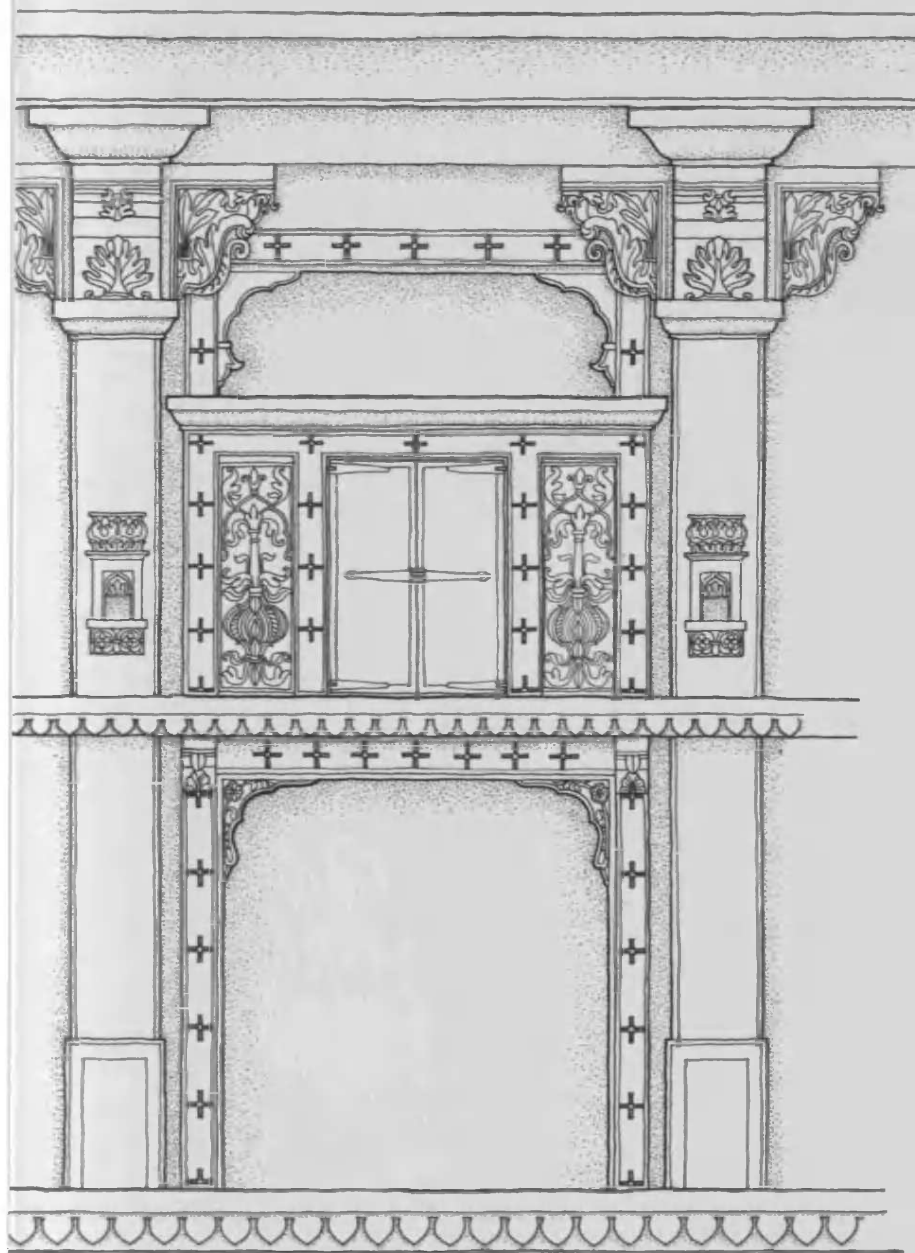
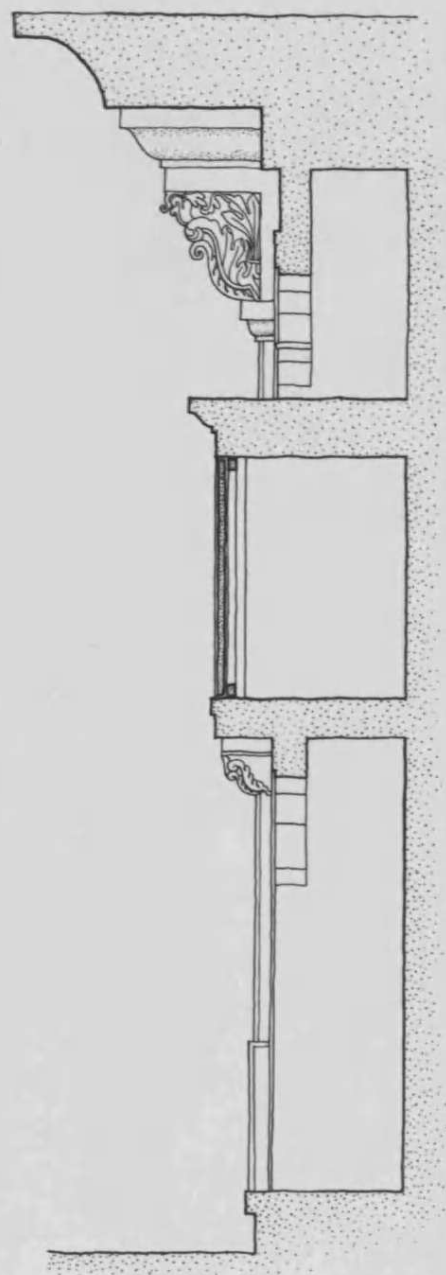


Fig. 147 The Kangra



*Elevation*



*Section*

*Fig. 148 The ala*

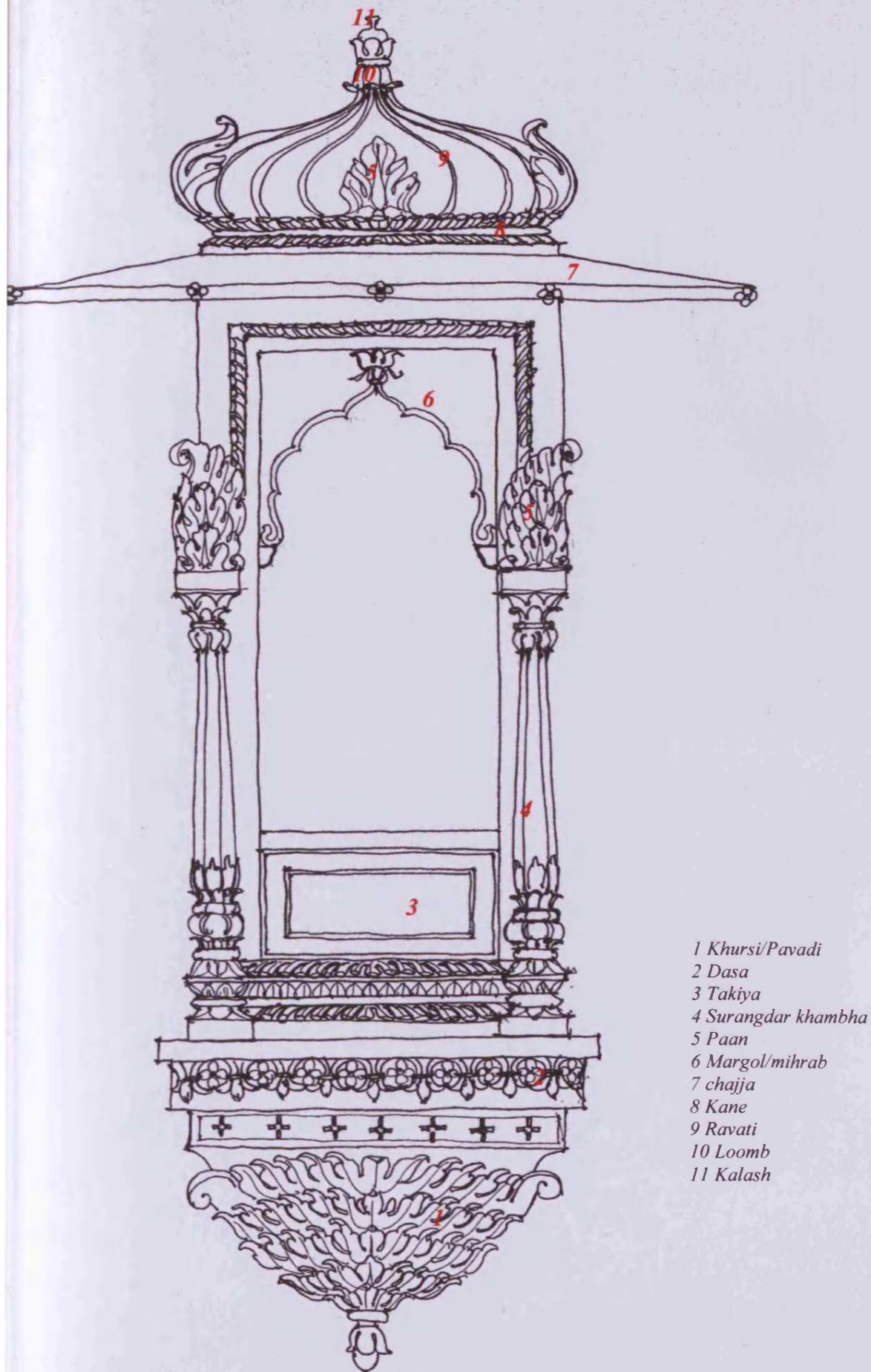
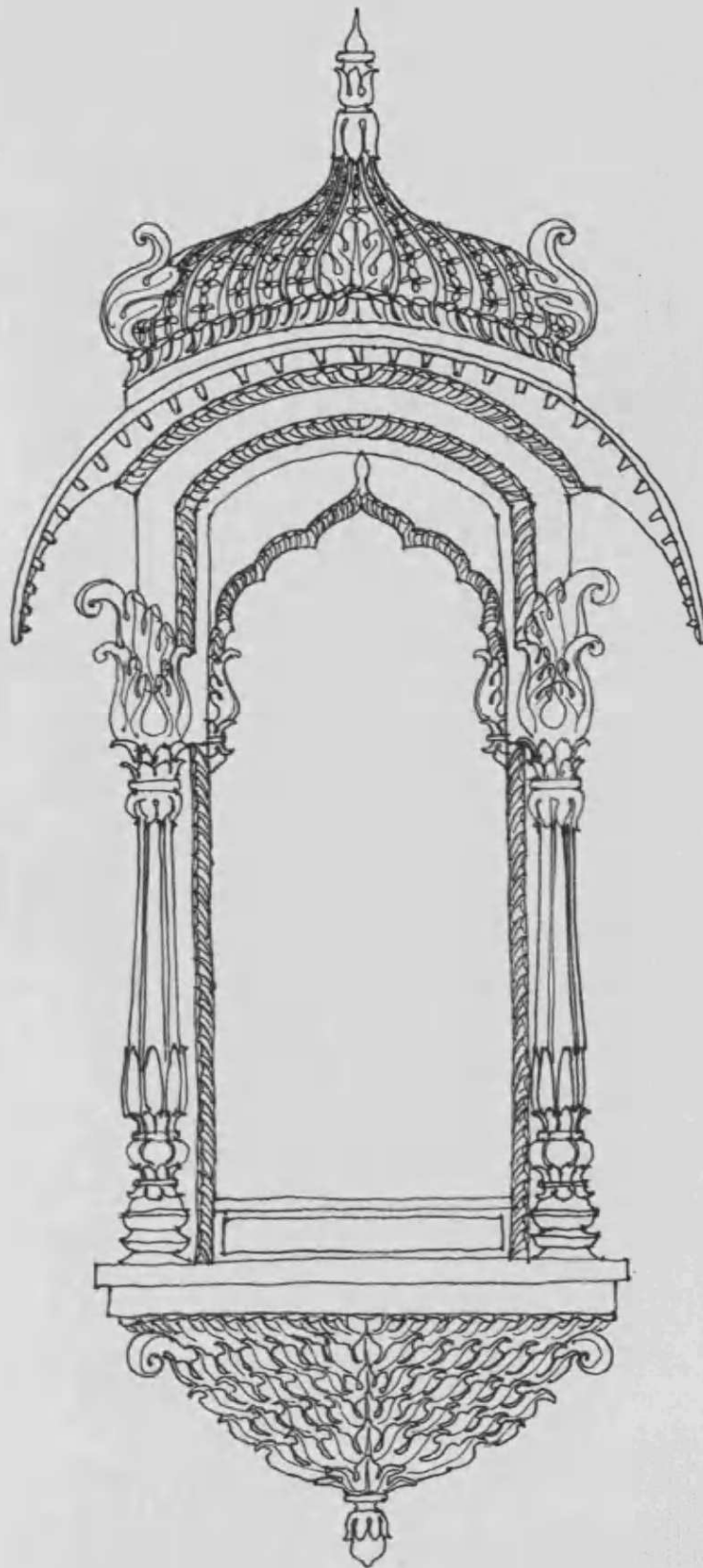


Fig. 149 Typical bari and its components





*Fig. 150 Nokwali bari*

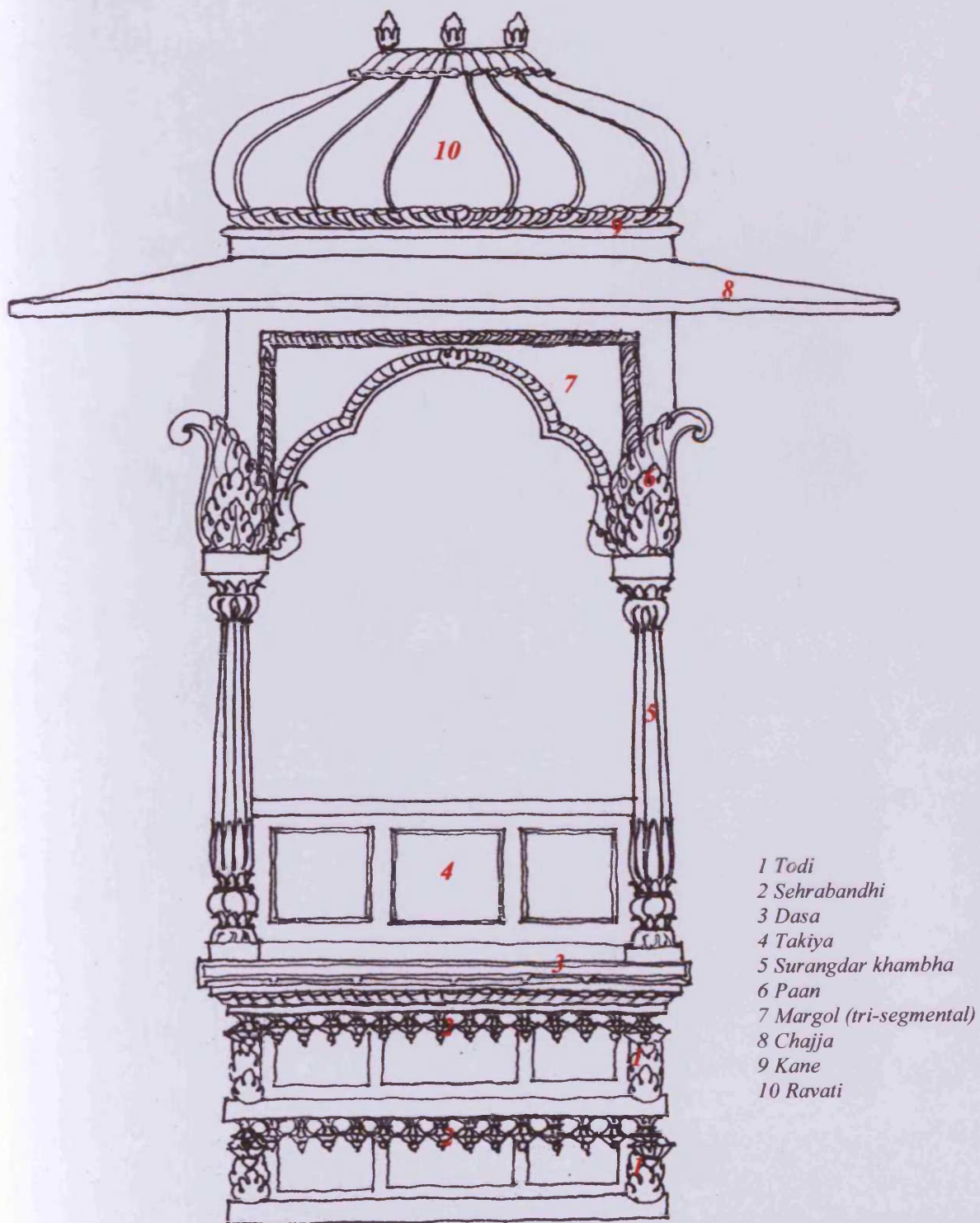
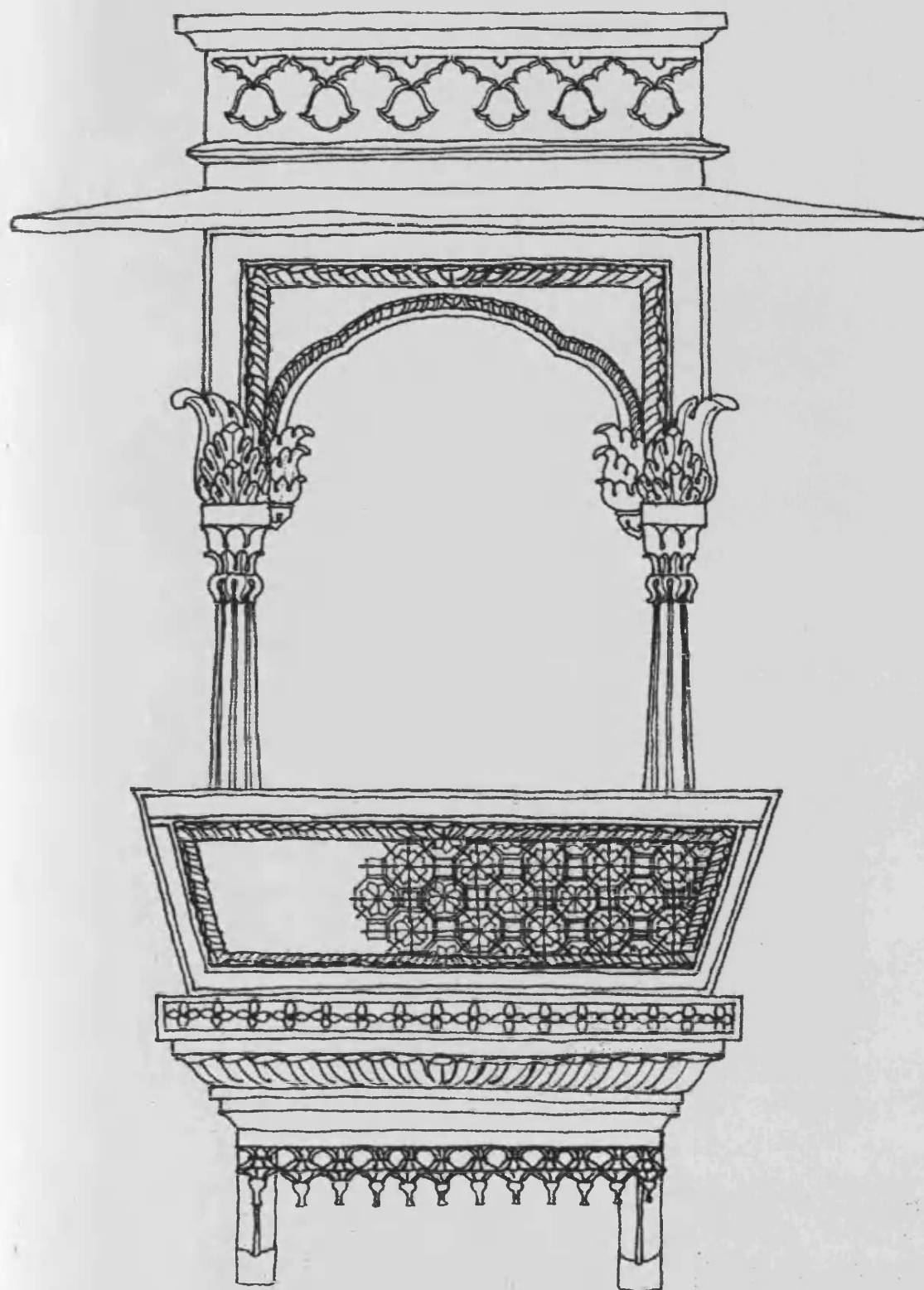
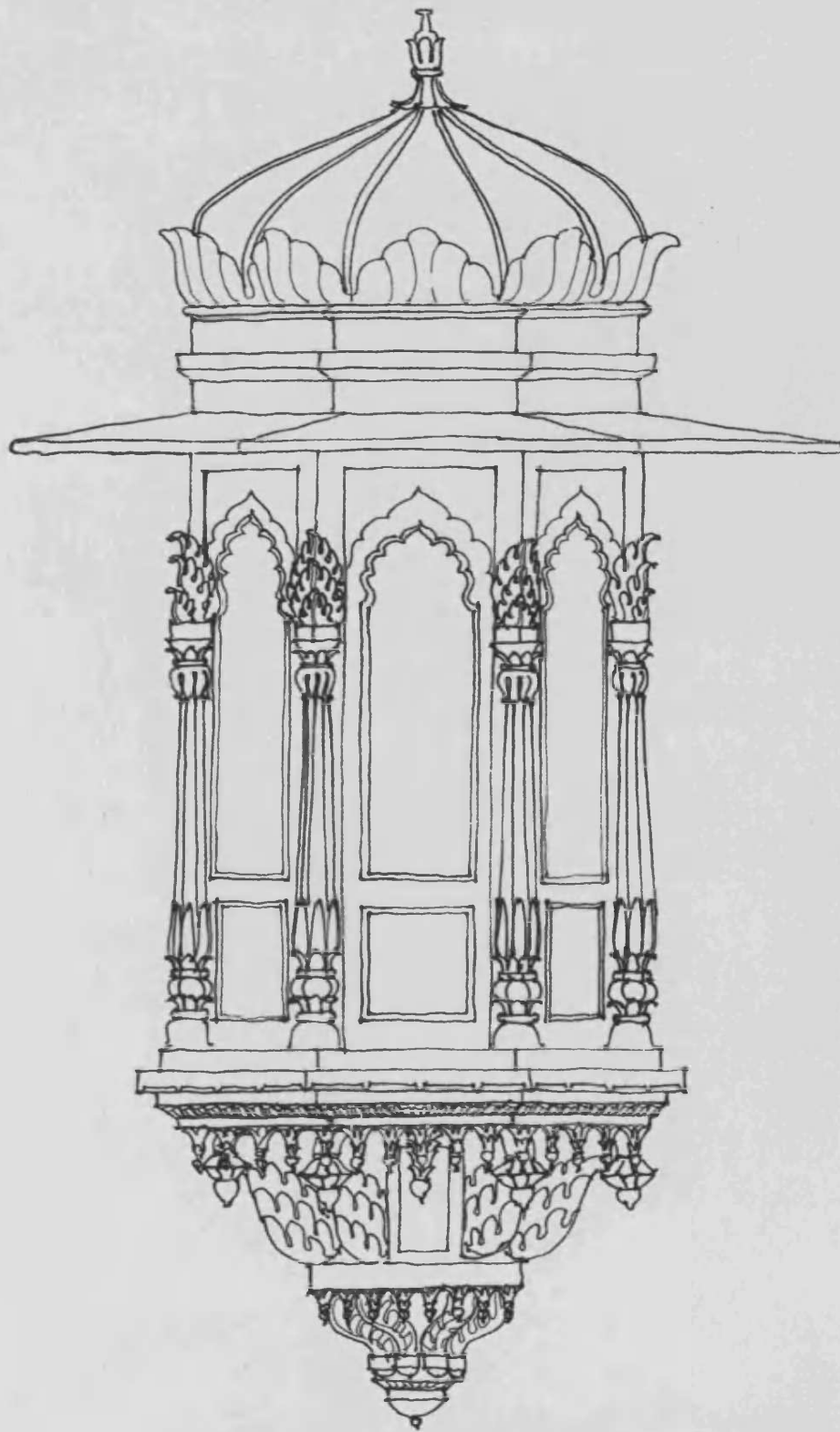


Fig. 151 Jharokha with ravati on double row of todis  
 ((individual components illustrated))



*Fig. 152 Jharokha with inclined takiya*





*Fig. 153 Kamwal (Octagonal jharokha with gumbad)*

*ala* is not seen, on opening the doors, but is easily within reach. The cupboard is capped by a *galat* and supported on a projected *dasa*. There is usually one *ala* per structural bay, sandwiched between the *khambhas*. The projected *dasa* which occurs at mid-room height is supported on miniature *todis* which rest on pilasters below. Vertically the overall form of the *ala* is divided visually into three parts; a base niche from the *dasa* at the floor level of the room to the projected *dasa* at mid-level, the *ala* at the middle level, and another niche above the *ala*, till below the *bilati*. The large niches created below the projected slab of the *ala* and between two *khambhas*, are sometimes framed with cusped brackets at the upper end, sometimes provided with additional shelves, or the whole niche sub-divided into a number of smaller niches. The part of the *ala* above the projected *galat*, is itself used as a niche. The *khambhas*, between which the *ala* is positioned, are capped by *todis* supporting the *bilati*, and form part of the vocabulary of the *ala*. As will be seen in the section on *Patuon Ki Haveli*, there are many creative variations on the basic form of the *ala*.

**Bari:** An opening in the external wall, similar to a window (fig. 149). It may be flush with the external wall surface, or be projected out. If the opening is single, it is called a *bari*, and if the number of openings is three, it is called a *tibari*. A plain *bari* is composed of a projected *dasa*, on which are supported the *khambhas* (either plain or *surangdar khambhas*). The *paan* moulding crowns the head of the *surangdar khambha*. The *margol* may be cusped or tri-segmental. Occasionally split *halali* brackets may also be used. The *chajja* may be straight, or curved. When curved, the *bari* is referred to as *nokwali bari* (fig. 150). Along the edge of the inner soffit, of the curved *chajja*, there is often a row of carved flowers known as *sitaphal*. The *chajja* is surmounted by the *kane*. The composition may be terminated by the *kangra* and *chaap*, or there might be a surmounting dome (represented two-dimensionally in case of a flushed *bari*), known as *ravati*. The *ravati* is ribbed, and has the *paan* motif strung along its base. The convex surfaces between the ribs are sometimes carved with rows of *chaufulia*, in later *Mughlai* examples. The *ravati* is capped by the *loomb* and *kalash*. At the lower part of the *bari*, above the *dasa*, is a protective railing panel, known as *takiya*. Literal to its meaning, it is used as a reclining panel, when sitting adjacent to a *bari*. The *takiya* is mostly carved with decorative infill designs. The base of the *bari*, when flush with the external wall surface, has a large pendant-like knot of overlapping petals (*khursi, pavadi*), terminating in a *loomb* at the base. In case of projecting *baris*, the *dasa* may be supported on a single or double layer of *todis*, with or without a string of *sehrabandhi* along the edge of the *dasa*. There is great variety in the ways the various components are combined by craftsmen to create the form of the *bari*. Examples of this will be seen in the case studies (Chapters 5 and 6)

**Jharokha:** The *jharokha* is a pavilion projected from the facade of the building. The roof is supported on *khambhas*, either plain or *surangdar*. The basic syntax of architectural elements and mouldings is similar to that in the *bari* (fig. 151). There are, however, some elements which are found exclusively in *jharokhas*. The inclined *takiya* is one such element (fig. 152). It steers clear of the supporting *khambha*, and wraps round the three open sides of the *jharokha*, creating a natural back rest within the floor space of the *jharokha*. The *takiya* is usually solid with decorative carving only on the external face. However, there are some rare examples, where the carving is through, and the *takiya* panel is porous. The central and most showy *jharokhas* in the large *havelis*, are the most obvious examples of this. The *jharokha* may have a single span opening in the front or three, when it is referred to as *tibari jharokha*. *Jharokhas* may be surmounted by the *kangra*, or by the *ravati*. Some *jharokhas* have the profile of a half octagon in plan, when they are known as *kanwal* (fig. 153). *Kanwals* are usually surmounted by a dome known as *gumbad*. The *gumbad* is essentially a more substantial form of the *ravati*, the domical form being more visible, due to it being more

detached from the facade than the *ravati*. *Kanwals* are usually supported on *todis* arranged concentrically, and terminating in a pendant at the base. Like the *baris*, particular forms of *jharokhas* are full of novelty, throughout the course of tradition, as if the craftsmen never wanted to repeat themselves.

**Doors:** The doors are generally quadratic, panelled, double shuttered, with high thresholds. The external doors, especially the main entrance doors, are high, and framed with very elaborate architraves, with a wide doorhead containing an image of *Ganesha*. The doorhead is flanked by wooden horse heads called *todiyas*. The door frame and the quadratic panels of the external doors are covered with elaborate vegetal decoration, incorporating decorative steel studs and ivory inlay. The internal doors are lower and plainer. They are framed by plain pilasters and surmounted by the *galat* moulding. Doorheads sometimes have decorative panels above punched with star shaped patterns known as *taraphul*. Internal doorways usually are surmounted by cusped *halali* brackets, with the profile of the shutters aligned with them.

**Panihara:** These are niches, built into the thickness of the wall, in interior spaces.

## Chapter 4 CRAFT PRACTICE

The *havelis* built by master-craftsmen two-hundred years ago are still considered supreme examples of skill and workmanship by contemporary building-craftsmen – an observation endorsed time and again during my successive site visits, by contemporary master-craftsmen visiting the *havelis*, to closely observe specific details, or even to copy designs for replication elsewhere, and often in a different medium. One master craftsman pointed out in his discussions with me that they consider the *havelis* to be a master pattern book, a virtual encyclopaedia of designs, which are always available to them for reference.



As suggested previously, many skilled craftsmen in Jaisalmer claim to have learnt the skill from their ancestors. It is logical to view the claim with skepticism, on the grounds that the tradition may possibly be a revival of an older tradition. The techniques of design and making may thus possibly vary considerably from their original form. For me, however, the greatest evidence in support of the credibility of their claim is not based either on the evidence shown by craftsmen, of the handiwork of their ancestors in historical buildings, or in the very high level of skill of some contemporary craftsmen, comparable with the best craftsmanship of the past. It is based on the fact that the golden period in the tradition occurred not so long ago in history (late eighteenth through the nineteenth centuries). The Badal Vilas within the Jawahar Vilas complex built by muslim *silavats* at the end of the nineteenth century, is evidence that a very high level of craftsmanship was still in existence about a hundred years back. There is great likelihood that the present generation of master craftsmen were trained by the generation of *silavats* who built the nineteenth century buildings. There is, in my opinion, very remote possibility of any major revivalism within the relatively short period of a hundred years.

Through the course of my site visits, and long hours of stay within the *havelis*, occasions arose for numerous discussions with building craftsmen, who happened to be in the same *havelis* in connection with their restoration and repair. Their methods of explaining the design and construction of the *havelis* are completely based on building-form. Columns, beams, brackets, infill-panels, mouldings, ornamental designs and so on, are the building components, which in a new architectural design are combined first in the mind of the master-craftsman, and then executed in stone. The mental concept, though is merely an initial idea, which leads itself to appropriate modifications, either for aesthetic or structural reasons, during the process of construction. The terminology employed by craftsmen to explain building components was initially completely foreign to me as I was trained in the Modernist school. The handicap was removed, however, through a few informal tutorials with the craftsmen.

The main building material is yellow sandstone. *Chhintdar* (spotted) yellow sandstone known locally as *bichiya* stone is used to make icons. Most of the Jain icons in Jaisalmer, especially in the temples within the fort have been crafted out of this stone. The doors and windows of the *havelis*, are made of *teak*, *sheesham*, and *halder* wood. Traditionally, doors were often covered with sheets of copper, brass, and silver, and were sometimes inlaid with ivory. Gypsum from neighbouring areas is used as mortar, with the finer varieties used as distemper. Red ochre from Pokhran and Ramdevra is used as dye.

The craft tradition as practised by craftsmen today, mainly consists of carving various building components such as *khambhas*, *margol*, *todi*, *jharokas* individually from blocks of stone and assembling the finished components on site. The basic blocks of stone nowadays arrive to the workshops as machine sawn blocks or planks, available in standard sizes. These blocks are then further shaped or cut on site using electric saws and grinders. The pieces of stone come planed and are ready to work on directly. This saves a lot of precious time for the craftsmen in having to hew usable blocks from quarried blocks. On the other hand, the availability of limited sizes and shapes of stone puts a rein on the craftsman's creativity, as he has to force his thinking, and his proportioning only on the sizes of stone readily available. However, in looking at buildings of the past, it is fairly easy to deduce that there was generally a standard set of sizes used for various building components, and that these sizes did not alter much in the course of the development of the architectural tradition.

Architectural components were crafted, possibly away from the site of construction, and assembled on site. The nature of construction when viewed in this way is similar to contemporary construction techniques using pre-cast technology. The difference of the present day buildings from the ones of the past lies in the quality and detail of the carving being less substantial and less varied, and this seems to be related directly to the limited sizes and reduced thickness of workable stone blocks, almost akin to the usage of MDF and plywood in contemporary joinery, and what this has done to traditional carpentry using real wood.

I illustrate below, tools and techniques of design and making, as is in use amongst contemporary craftsmen. The observations are based on my direct communication with craftsmen, on site, in Jaisalmer.

### *Design Tools*

The tools used by the craftsmen for designing and carving are very basic and do not seem to have changed at all from the working tools and methods of their ancestors from centuries before. Apart from the use of electric saws and grinders in shaping blocks of stone, there is almost an unreal ignorance of the technological complexity and sophistication reached in the construction industry in other parts of the country. The design tools include a crude steel compass called *prakar* or *ajol* in local terminology and an L-shaped foot scale called *gaj* or *guniya*. The compass is used heavily in the layout of almost every design but its circumference is limited to a maximum of ten to twelve inches. For large radii, required when designing domes, *bangaldar chajjas* etc., a string with a piece of coloured chalk tied at one end is used as a compass. Together with some coloured chalk or pencils, the *prakar* and *gaj* are all that comprise the craftsman's design tools. The craftsman's design repertoire as stated elsewhere includes geometrical designs as well as foliate organic designs. While the *prakar* and *gaj* are indispensable in the basic layout of the geometrical designs, the organic designs are laid out on the surface of stone using a completely different method: the use of punched metal stencils (*fig. 158, 159*). These stencils are made of sheets of tin, and illustrate the design in its positive and negative format, that is, broad chunks of the foliage pattern are left in their silhouette, while areas of the background are punched out of the tin sheet. These stencils are used to transfer the pattern directly to the stone block to be carved, using red clay dust.

Present day craftsmen use feet and inches as a system of measurement. In my observations, the system of using the *hasta* and *angula* as mentioned in the architectural treatises of the past is non-existent among craftsmen today. The craftsmen also describe the old buildings in imperial units. The system of proportioning and measurements, relies equally on actual measurements, as on visual estimation. Visual correctness gauged by the trained craftsman's eye is considered to be of greater importance than adherence to formulaic measurements and proportion.

### *Carving Tools*

The tools for carving are small in number and very basic (*fig. 160*). A flat sturdy chisel called *cheni* is used as the basic shaping chisel and to create rough edges on the stone blocks, for adequate grip in fixing together different blocks of stone. Another large flat blunt chisel called *tinchar* is used to slice stone. For finishing purposes, a set of three chisels are used: *bepri*, *bepira*, and *ghasiya*. The *bepri* has a broad flat sharp carving end, while the *bepira* has a pointed sharp end for fine details. The *ghasiya* has a v-shaped sharp tip and is used for fine

detailing. The mallet comprises a steel head with a wooden handle. The side of the steel head used for hammering is infill with raw steel (*kaccha loha*) and is called *goli*. It creates a cushion for the chisels while hammering, and is gradually consumed in the process of repetitive hammering after which it is replenished with fresh steel.

The carving on the stone is done in stages; the first stage comprises marking the design on the surface of stone. This is done in different ways, depending on the nature of the design to be marked. If the design is geometrical, a base geometric grid is constructed using the *prakar* and *ajol* directly on the stone surface. This grid is called *chiraayta* and is similar to a graph, on which designs are developed. Various geometrical shapes have different grids; designs based on hexagons, octagons and squares have different generative grids. The use of the *chiraayta* will be explained in detail later in this chapter.

Organic foliage designs are transferred from stencils made of tin sheets using red clay dust. After the designs are transferred on the stone surface, the outline is marked using a chisel. Masses in relief are left, while the recessed surfaces are scooped out of the stone block. Next comes modeling and fine detailing. Throughout the carving process, water is used to keep the instruments cool, and to clear away dust, which otherwise obscures the design. In the fixing together of blocks of stone, gypsum is used as binding agent. The gypsum used in Jaisalmer traditionally comes from the Nachna and Mohangarh areas. Locally known as *khaddi*, the gypsum is burnt in the oven using cow dung cakes. The product is powdered and mixed with water, ready to be used as a binding agent.

#### 4.1 Making of Architectural Components

The following methods describe the lay out of the design of three key elements: Cusped *Margol*, *Surangdar khambha* and the *Kangra* frieze motif, on stone. The methods described are closely based on my observations of the working techniques of contemporary craftsmen. Geometrical jali designs are worked out on a base grid, known as *chiraayta*. The *chiraayta* is based on a geometrical mother-form, from which a series of designs are generated. Thus, there is a *chaubla* series of designs based on the *chaubla* (square) *chiraayta*, the *jau* series of designs based on the *chiyaas* (hexagonal) *chiraayta*, and the *athaas* series of designs based on the *athaas* (octagonal) *chiraayta*. Each of these design series is explained, beginning with the laying out of the respective base grid or *chiraayta*.

##### *The cusped Margol/Mihrab*

The overall height of the *margol* from the springing point to the apex, is divided into three equal parts. The lowest one-third part comprises the *tant*, or *marwari eka*, due to the resemblance of this part of the arch with the numeral one in the *marwari* script. The *margol* may be made from one piece of stone, if the span is small. In case of large spans, the two halves of the *margol* are carved separately from two different slabs of stone, and assembled together on site, the junction at the apex of the arch, of the two pieces of stone, referred to as the *bhenti*. After the height of the arch is fixed, and divided into three equal parts, the apex of the arch is marked on the stone, leaving a few inches from the upper edge of the stone slab (*fig. 161*). A curve is then drawn over the remaining two-thirds of the *margol*, through the two extremities, of the span. Next come the markings for the cusps or the *balan*. As a rule the number of cusps should be an odd number, or else the apex at the centre would not have a cusp, but a vertex between two cusps, and this would be visually unattractive. Usually the number is seven or nine cusps, for spans ranging between four and five feet. This is marked



on the curve using the *prakar*. Next comes the process of construction of the cusps: two consecutive *balan* divisions, are divided into three equal parts, and arcs are drawn, using this radius, successively from each vertex of the cusps. The intersection of the arc thus drawn determines the centre point of the arc comprising each cusp or *balan*. With this intersection as the centre point and the distance to the vertex as radius, an arc is drawn between two consecutive vertices, to get the curvature of the cusp. This is repeated for each cusp. At the centre, the cusp is given a pointed ogee profile, to make the arch more attractive. Thus the complete *margol* is obtained. *Phoolpatti* designs are then carved on to the solid part of the *margol*. A narrow margin is left along the inner edge of the *margol*, which may be left plain or be carved with a row of leaves (fig. 163).

### The *Surangdar Khambha*

*Layout of the khambha:* The *surangdar khambha*, as explained previously, comprises eight flutings alternating with eight v-shaped ribs, in cross section, which run along the entire length of the shaft, and in some examples, cross over to parts of the capital and base. A block of stone is selected with adequate cross-sectional area to be able to accommodate the tapering form of the column. The starting point is the drawing of a square (*chauras*), using the *guniya*, on the stone (fig. 164). The two diagonals of the square are clearly marked. Using the *prakar*, arcs are drawn next, with the vertex of the *chauras* as the centre and half the diagonal as radius to cut the outline of the square. This is repeated for each of the four vertices. Next, the points cut by the arcs on the sides of the square are joined together to get an octagon (*ashtakon*). Each side of the *ashtakon* thus obtained forms a unit of measurement which is used in the design of the different parts comprising the base and the capital of the column. The centres of each of the eight sides of the *ashtakon* are marked and joined to the opposite side. These are the points where the v-shaped ribs called *kane* are introduced, within the profile of the *ashtakon*. Arcs are drawn between two *kane* projections, with the convex profile facing the outer circumference of the octagon. At its largest cross sectional area, the diameter of the *ashtakon* which forms the profile of the *surangdar khambha* is generally six inches. Hence a block of stone six inches by six inches in cross section is most frequently used by craftsmen in carving the column.

The unit of measurement forming each side of the *ashtakon*, determines the height of various parts of the capital (*sira*) and the base (*paggi*), as illustrated in the diagram. The uppermost layer of petals in the *sira* forms one unit. The second layer of curved petals forms one unit to the centre of the *kane* moulding, while the third row of petals with the bulging profile also measures one unit, from the middle of the *kane* moulding. In the section of the base, the leaves covering the bulging bottom part of the shaft to the middle of the *kane* moulding form two units. The part from the middle of the *kane* moulding to the bottom of the pot-like element forms one unit, while the construction at the base of the pot like element comprising rows of curved petals with a *kane* moulding in the middle forms one unit. The *kumbhi* below this forms one unit and so does the *chowki*, which ultimately sits on the *dasa*. These vertical proportions in the design of the *khambha* were suggested to me by craftsmen. In my observations, I have noticed variations, especially in the divisions of the *paggi*. This does not suggest that the information provided by the craftsmen is incorrect. Variations in the proportions of the component parts, in my opinion, only reinforces their suggestion that visual correctness gauged by the trained craftsman's eye is more important than mere application of rigid formulae.

## *The Kangra*

The *kangra* is a very popular frieze motif used mostly above *chajjas*, directly above the *kane* moulding. In its laying out, a grid of horizontal divisions is the starting point, and the *prakar* is used dexterously to obtain the design, through a series of interconnected arcs. There are some key factors, however, to remember, before the layout method is described in detail. This design as explained by craftsmen has a base and a top. The design basically comprises a row of upright bell like forms with cusped edges, alternating with hanging bells, smaller in size and with a four petaled flower inserted in it. A petal called *paan* is inserted above the smaller bell in the space between the cusped edges of the two larger bells. The design is right way up when the larger bells point upwards and the smaller ones with flowers point downward. This format is called *sulat* (literally meaning 'right way up'), while in a reverse format, the design is called *ulat* (literally meaning 'upturned'). *Sulat* forms are more attractive and popular according to explanations of craftsmen. Their use historically in buildings is certainly more widespread than the *ulat* forms. *Ulat* forms are also used, but sparingly.

The stone slab on which the design is to be carved is marked with a boundary line within which the *kangra* design is to be drawn (*fig. 165, 166*). The centre line of the width is marked. Next the parts above and below the centre line are divided into four equal parts each and horizontal lines drawn through these points along the entire length of the stone slab. The width of the slab is divided into eight equal parts. Taking the distance between two horizontal divisions as a unit measure, vertical lines are drawn at intervals of these units from the edge of the boundary. These lines are alternately the centres of the large and small bells forming the design of the *kangra*. The *prakar* is used next to draw a series of interconnected arcs that forms the design. With the intersection of the centre line of the smaller bell with the first horizontal division from the base as the centre point, and the distance between the equal horizontal divisions as radius, a semi-circle is drawn, which forms the base of the smaller bell. On the second horizontal division, one unit measure is marked on either side of the centre line. With this point as the centre, and one unit measure as radius, arcs are drawn connecting with the ends of the semi circle drawn previously. This forms the two cusps at the base of the smaller bell. Next, two units are marked on the third horizontal division from the centre line, and with this as the centre point, arcs are drawn facing the centre line, joining the edge of the arcs previously drawn. Next, with the intersection of the third division with the centre line as centre, a semi circle is drawn facing the fourth division (centre line of overall design), and connecting with the edges of the arcs drawn previously. This completes the shape of the smaller down turned bell. As the design is based on a unit measure of the equal horizontal divisions, it may conveniently also be interpreted as based on a square grid of one unit measure. The lower bell has a height of four squares each. At the centre of the bell which comprises four squares is often inserted a four petaled flower: a *chaufulia* with the tips of the four petals touching the ends of the bottom and top semi-circle. Next comes the laying out of the larger upright bells. These bells normally comprise three cusps on either side of the centre line. Starting with the fourth division, leaving one unit from the centre line and the same unit as radius, an arc is drawn connecting with the centre of the semi-circle drawn previously. Leaving two and three units respectively, from the centre line, arcs are drawn from the centre points on the fifth and sixth horizontal divisions to form consecutive cusps, which form the outline of the upright bell. The tip of the bell is given a flat hammer like shape according to artistic convention. Lastly a leaf (*paan*) is inserted between the edges of the two upright bells. This is the design of the *kangra* in its simplest form. In its more elaborate versions, one finds complex organic designs inserted within the profiles of the bells, with the result that it is often difficult to decipher the basic outline of the *kangra* form. One also notices that the

upright and down turned bells are sometimes designed to the same size, so in these cases, there is no concept of *sulat* or *ulat*. This becomes more evident when the bells are infill with the same organic ornament, mirrored about the centre line.

#### 4.2 Geometrical *Jali* designs

Different graphs or *chiraayta* are drawn for designs based on the hexagonal grid, square grid and the octagonal grid. Once the grid is drawn, a number of designs can be derived from it. From the illustrated designs, it is possible to evaluate the potential of the *chiraayta* in generating a range of other designs. As the author has discovered, spending time with the grid in trying to create new designs may prove very fruitful. New designs may be discovered which may potentially be applied to construction in a range of materials. In this way, it might find relevant use in contemporary practice.

##### *Designs based on the Hexagonal Grid (Chiyaas Chiraayta)*

*Chiyaas chiraayta*: The first step is marking out the outline within which the design has to be laid out. Using the *gaj*, the centre of the stone slab is marked along the length and the width, and a vertical and horizontal line is drawn through these points to intersect at the centre of the stone slab (fig. 167, 169). The width above and below the centre line is divided into four equal parts each, so as to obtain eight equal parts of the whole width. With the centre of the stone slab as the centre point and radius equal to two horizontal divisions, a circle is drawn with diameter equal to four horizontal divisions. Using the *prakar* and taking the radius of the circle, arcs are drawn with the intersection of the centre line of the slab and the circle as centre, to create six equal parts of the circumference. These six points form the vertices of a hexagon, inscribed within the circle. The points on the circumference are joined using straight lines. Also lines are drawn connecting alternate vertices within the hexagon creating a six pointed star. Next the *prakar* is taken and resting one point on the centre point of the hexagon, the distance to the outline of the star is taken as a unit radius, and consecutive arcs are drawn diagonally parallel to the inclined outline of the star, in both directions, moving out from the centre. Lines are drawn next, parallel to the inclined outer lines of the star, through these consecutive arc divisions. This process, repeated in the four quadrants of the design produces a diamond shaped network of lines, enclosing equilateral triangles within.

A series of designs based on the combination of six-pointed stars with interlocking rhombii joined at the vertices, is demonstrated in the following section as being generated from the *chiyaas chirayta* (fig. 168). *Jau* is the terminology for the rhombus formed by the joining of two equilateral triangles back to back in the hexagonal grid. In the pattern *do jau*, two such rhombi are joined on their vertices, along their shorter diagonal, and interspersed between six-pointed stars with a six petalled flower inserted in the middle of each. The secret of forming the design lies in the combination of the six pointed stars, to each other in a variety of ways; along vertices, edges or moving them apart from each other, all of which suggest the design possibilities offered by the structure of the hexagonal (*chiyaas*) mother-grid.

*Do Jau*: In this design, the central six-pointed star is joined only to four peripheral stars along the edges of its equilateral triangles, and to two stars along its vertices (fig. 168 A). If one takes the central star and starts joining stars to it in a clockwise manner, the first star is joined along the edge of one triangle, then the next two edges are left free, and a second star is joined to the fourth edge. The next peripheral star is added on its vertex to the third vertex on the central star. The same process of joining two more stars along the edges of the next two



triangles is repeated as the first two stars. Lastly another peripheral star is joined on its vertex to the sixth vertex of the central star. This produces a network of six-pointed stars with two rhombi (formed by the joining of two equilateral triangles of the *chiyaas chiraayta*) joined to each other on their vertices on the short diagonal. Each of these rhombi as mentioned before is called *jau*. As this design has two such *jau*, facing each other created by the joining together of the stars, it is called *do jau*.

*Teen Jau*: The next design is based on the possibility of joining six-pointed stars on their vertices (*fig. 168 B*). With a star placed in the centre, with six peripheral stars arrayed around the central star, so two of their vertices are joined, results in an arrangement wherein one horizontal row of six pointed stars are joined on two of their vertices each pair enclosing a rhombus between them. The next row of stars follows the same arrangement, however, it is staggered such that the line of centre of each star is on the line of junction between two stars in the previous row. This staggering encloses two more rhombii between the first and second row, with their intersection on the vertex of the rhombus of the first row. Thus, an arrangement is obtained wherein a mesh of six-pointed stars enclose a set of three rhombi, or *teen jau*, between themselves. Hence this design is called *teen jau*.

*Chaar Jau*: The six-pointed stars are pulled further apart in the next design, wherein six stars are arrayed around the central star, such that each peripheral star is joined to the central star only on one vertex (*fig. 168 C*). This manner of interlocking the stars encloses hexagons comprising three rhombi each. Visually, however, it also produces the effect of two pairs of rhombi facing each other on either side of the line of junction between two six-pointed stars. The design, is therefore, referred to as *chaar jau*, to account for the four *jau* arrangements occurring in between the stars.

These examples demonstrate a few design possibilities inherent in the *chiyaas chiraayta*. Various other designs may be generated for example by moving the star arrangements apart, along their axis orthogonally, or diagonally, or by the way in which they are joined to each other. An example is *tarichanvas* wherein each six pointed star is arrayed with six parallelograms comprising two rhombi each joined together, arranged in an anti clockwise direction around the centre of the star (*fig. 170*). All designs based on the hexagon can, in fact be related to the *chiyaas chiraayta*, however, visually complex and dissimilar it might appear to be, in comparison with the basic *chiraayta* diagram.

#### *Designs based on the Octagonal Grid (Atthaas Chiraayta)*

*Atthaas Chirayta*: The first step is the construction of the *athaas*, or octagon (*fig. 171*). A square is marked on the stone slab, using the *prakar* and *guniya*. Diagonals of the square are marked next by joining opposite vertices of the square. With half of the diagonal of the square as radius and the vertices of the square as centre, arcs are drawn to intersect the four sides of the square at eight points. These points are joined together to form the basic octagon. Next the diagonals of the octagon are extended outwards from the centre of the octagon. Taking the distance from the centre of the octagon perpendicular to the opposite edge of the octagon, arcs are drawn successively on the diagonals, in opposite directions from the centre

of the octagon. Lines parallel to the chamfered edges of the octagon are drawn next, through the points of intersection of the arcs on the extended diagonals. Horizontal and vertical lines are drawn next, through the points of intersection of the lines parallel to the diagonals of the main octagon. This network of lines produces the octagonal grid or the *athaas chiraayta*, based on which a number of designs can be generated.

*Gulathaas*: *Gul* in the name of the design means flower and refers to the flower inserted in the middle of the octagon (fig. 172 A). The basic design is a combination of octagons and squares. To an octagon, squares are added on its outer edge in the four cardinal points, with the side of the square equal in length to each side of the octagon. Four octagons of the same size are joined to the central octagon, in the four intermediary directions, along the four chamfered edges. This network of octagons results in an arrangement where octagons alternate with squares in the cardinal directions, and where octagons are joined edge to edge the lines of the vertical and the horizontal axes and the inclined diagonals are expressed through the network of the entire design, so that the octagons are divided into eight segments and the squares interspersed between the octagons are divided into four smaller squares. An eight petalled flower is inserted next in the centres of each of the octagons, to produce the *Gulathaas* design.

*Athaas*: This design is a variant of the *gulathaas*, except that the flowers in the centres of the octagons are omitted (fig. 172 B). The octagons are joined on the cardinals with the squares and on the diagonals with other octagons. In the centre of the octagons are placed squares with sides equal to each side of the octagon. The vertical and horizontal axes in the cardinal directions are omitted but the diagonals are expressed, however, only connecting vertices of the squares.

*Gaj Athaas*: In this design, octagons intersect each other along their perimeter in the four cardinal directions, enclosing elongated six sided polygonal forms called *kharaliyas* in the terminology of craftsmen (fig. 172 C). As a result of the intersection of four of these *kharaliya* forms, squares are formed in the centres of the octagons. Two parallel lines with the distance between them equal to one third of the edge of the central square, are drawn about the central axis of the octagon, both horizontally and vertically. These parallel lines are referred to as *gaj*, hence the design is called *gaj athaas*. In a variant form of *gaj athaas*, in the centre of the *ashtakon*, where the lines of the *gaj* meet, star shaped diapers are inserted. This design is known in local terminology as the *bhavra athaas* (fig. 172 D).

*Kharalia Athaas*: In this design the basic unit is two *kharaliya* forms intersecting each other diagonally, thus creating a square unit on its diagonal in the centre (fig. 172 E). Four such *kharaliya* forms are arranged within the four inclined edges of the octagon. When *kharaliyas* are set along cardinal directions and joined to each other vertex to vertex, it produces an eight pointed star in the space between four intersecting *kharaliyas*.

#### *Designs based on the Square Grid (Chaubla Chiraayta)*

The square grid is the simplest but most widely used grid to generate a range of designs using both squares units and arc repeats. We look at the designs using square units first.

*Chadabandhi*: The square grid is laid out using the *guniya* and the *prakar* on the surface of the stone to be carved. The simplest design is a chessboard pattern consisting of every alternate square punched out, leaving a solid square surrounded by four punched out squares

(fig. 173 A). This pattern is commonly used as borders to panels with floral designs. A variant of the design is when the pattern is created using five or nine squares. An arrangement of a central square with four more squares joined to it along its four edges, may be treated in two ways; all five squares may be punched, or the four peripheral ones may be punched leaving the central square intact. Both these designs are used as framing panels to organic, vegetal designs, or on horizontal and vertical members of balconies, door frames and on pilasters and are referred to as *chadabandhi*. Another design involves the arrangement of punched squares diagonally. The design involves twenty five squares wherein the central square is punched out. Surrounding this central square, twelve squares, two each along the four sides and one in each corner are left intact, while twelve squares on the periphery of this arrangement is punched out. This creates an arrangement of punched squares in a diagonal fashion, with a punched square in the centre of an arrangement of thirteen squares. It is referred to as *chaubla chaubin*.

*Gadhakhori*: Each square in the grid is sub-divided into four parts and the division lines are extended through the line network of the grid. This design is made of a series of semi-circles joined in a row, edge to edge, with two consecutive rows staggered by half the diameter of the semi-circles (fig. 173 D). Each semi-circle is drawn with its centre on the centre of the square, and radius equal to half the length of the square. A series of semi-circles are drawn, connected edge to edge, using centres of consecutive squares in a row. In the next row, the same process is repeated, however, the centre now shifts to the line of junction between two squares of the grid. Thus a fish-scale network of semi-circles is obtained. At the centre of each semi-circle, a pointed bud like motif is introduced which renders the pattern more attractive. Due to the resemblance of the semi-circles with a donkey's hooves, this pattern is known as *gadhakhori* (translated into *marwari* it means donkey's hooves).

*Gaj Chauras with Chaufulias*: This design is based on the diagonals generated on a *chaubla chiraayta*. The diagonals of the *chiraayta* are expressed, to produce a lattice of diamonds. In the centre of each diamond, a *chaufulia* is placed, such that the vertex of each petal is on the mid-point of each side of the diamond (fig. 173 C). This is a popular design used mainly in framing panels containing geometrical or organic designs.

*Khatarva Chaufulia*: This design is also based on the diagonals generated on a *chaubla chiraayta*. Four petalled flowers referred to as *chaufulia* are drawn on the diagonals, with their centres on the points of intersection of two diagonals (fig. 173 B). This layout produces a mesh of *chaufulias* joined vertex to vertex in a diagonal manner. A variant on this design comprises overlaying the mesh of *chaufulias* with a diagonal arrangement of arc repeats. This design combines features of *gadhakhori* with *khatarva chaufulia* (fig. 173 E).

*Bajrangi*: A very popular design used in pilasters and borders framing panels of foliage and geometrical patterns, this design is based on the diagonals of a *chaubla chiraayta*. Arcs alternately in opposite directions are woven together along the diagonals of the grid, to produce a wave like network of arcs (fig. 173 F). *Chaufulias* arranged on the diagonal grid are inserted in the empty spaces created between the arc network, connected to each other on their vertices. Sometimes, the *chaufulias* are omitted totally from the scheme, especially when this design is used in making punched metal *jalīs*.



## **Chapter 5 CASE STUDIES OF OVERALL PLANNING AND COMPOSITION**

This section of the case study illustrates with examples the principles of design, in their application, in the overall spatial and formal design of the *haveli*. It does not venture in detail into issues of language and architectural syntax. This is done in the next section through the study of two *Patuon ki havelis*. Nine different *havelis* from different parts of the city, both within the fort and outside it, have been illustrated in this chapter. These *havelis* range from small two-bay buildings to large, spatially complex, multi-bay buildings, in varying degrees of formal elaboration.

Stylistically, there are examples from both the *Mughlai* and *Sompuriya Shailis*. There are also examples of the early phases of incorporation of *Mughlai* elements and design characteristics, in *haveli* design, which occurred during the second phase of artistic growth, between the sixteenth and late seventeenth centuries.

The methodology for illustrating the spatial organisation in the plan form is based on the analysis of various floor plans. The floor plans indicate the disposition of structural bays, and the location of *khambhas*. The aedicular composition in each *haveli*, is indicated with an alphabetical key, which may be referred back to a comprehensive legend of key aedicular types (*fig. 103, 104*) used in section 3.2 (Composition of Elevations) of chapter 3. The legend identifies various key aedicular types and variations within each type. The location of the *havelis* in the city of Jaisalmer is indicated in *fig. 174*.

### 5.1 *Haveli in Malpani Para*

This unpretentious *haveli*, located in Malpani Para is two storeys high adjacent to the street, and three storeys high at the rear. The present owner Mrs Gita Banerjee primarily occupies the ground floor and part of the first floor.

#### *Planform and Spatial Organisation*

It is a two bay house, and is two storeys high in the front part and three storeys at the rear (*fig. 175, 176*). The ground floor arrangement comprises the raised *ota*, *moda*, and *chowk* with kitchen adjacent to it on the left side. There is no *pathiyal*, however. The *kotha* to the rear of the *haveli* is two bays deep and wide and is accessed directly from the *chowk*. The stairs on the left in the *moda* lead up to a *chowk* built over the kitchen bay on the first floor.

A room is built across the front two bays on the first floor with a characteristic timber ceiling supported on *todis*. At the rear of the *haveli*, the front bay is a *pathiyal*-like space with a *gokhra* in the right bay overlooking the *chowk* below. The ceiling is formed by unshaped logs of wood laid crosswise over beams supported on brackets (*fig. 178*). The characteristic *ala* are present on the side walls. Two doors one in the middle of each bay, lead to the room at the far rear end of the house. The *chandni* on the first floor has steps cantilevered off a wall built adjacent to the *chowk* below leading to the terrace over the front part of the house. The same stair continues in a dog-leg formation to lead to a *chandni* built over the left bay at the rear of the house. The right bay is roofed over, however, with two sides open forming a *pathiyal*-like space with an edge abutting the *chowk* on the ground floor. The bay has a *jharokha* with a trisegmental arch overlooking the *chowk* below (*fig. 179*). The *pathiyal*-like space faces the *chandni* in the left bay, and is provided with a raised plinth and *takiya* panels, creating a semi enclosed verandah like space (*fig. 177*). The bay at the rear end on this floor forms a deep *kotha* accessed from the *front*. The *chowk* on this floor has a flight of cantilevered steps which leads to the terrace at the rear. Stylistically this house displays characteristics of the *Sompuriya shaili*.

#### *Composition of the Elevations*

The ground floor is solid except for the entrance doorway in the left bay (*fig. 180*). The two bays on the first floor have a *bari* and a *jharokha*, with a projecting *gokhra* over both bays at parapet level. The elaborate trabeate *jharokha* is characteristic of the *Sompuriya shaili*. The columns are faceted with curved brackets supporting a lintel decorated with half sun

roundels. The *chajja* has the characteristic ribbed formation. The railing is the inclined *kakshasana* type decorated with perforated sun roundels, with rows of ducks and peacocks carved on the horizontal members. The brackets are serpentine with emphatic circular pendants. The wall panel between the brackets are richly carved with alternately projecting and recessed pilaster forms. The *bari* is supported on shallow corbelled brackets, and is basically solid. The infill pattern, however, is a form of *bajrangi* pattern comprising flowers set in a mesh of diamond fretwork. The flowers here are large and the pattern sparse, as compared with its denser appearance later in *Mughlai* examples. Sun roundels are splattered on the solid wall around the *jharokha* and *bari* in the typically *Sompuriya* fashion.

## 5.2 Kevliya Niwas

The *Kevliya Niwas* is located in the Gangan Para area of the city. The present occupants of the house are the descendants of the original owner; the family of Govindlal Kevliya comprising his wife, son, daughter in law and their two children. The family lives like a joint family and occupies virtually the entire house.

### Planform and Spatial Organisation

The house is a typical two bay house (*fig. 181*) spread over two floors, with a partial third floor. Like many houses in the city it has a basement over a portion of the area at the rear of the house which is used as retreat during the hot summer months.

The entrance to the house is through doors located in the left bay on the ground floor, which is otherwise solid with no other punctures in it (*fig. 185*). A set of *pidhakiyas* leads up to the entrance door from the street, with a raised *ota* on the right. Seen from within, the house is two bays wide and five bays along the depth. The first bay along the depth comprises the *moda*, with a projecting bathroom in the right bay. The staircase leading upstairs starts in the left bay along the rear wall of the *moda*. The space under the stairs has been used as a storage space with a double door, accessed from the left bay of the *moda*. A deep wooden beam runs right across the middle of the *moda*, while narrow timber planks span the entire depth, parallel to the main beam. The next bay along the depth accommodates the kitchen and the *chowk*. The kitchen occupies the left bay while the *chowk* is located on the right bay with the only access to the kitchen from it. The next two bays along the depth of the house from the *pathiyal*, which is a space covered on top but open to the elements on the side. The *pathiyal* in this house is two bays wide and two bays deep, and is adjacent to the *chowk* on the right bay. The present owners have built a pair of doors in the right bay, accessing this space from the *chowk*, so it feels more like a room enclosed on all sides. The *kotha* is an enclosed room, which occurs at the farthest end of the plan, with the access to it from the *pathiyal*. The *kotha* in this house like the *pathiyal*, is two bays deep and two bays wide. The entrance door to the *kotha* is located in the right bay from the *pathiyal*. The ventilation of the *kotha* is through the *pathiyal*.

On the first floor, there is a room over the front two bays of the house. The room on the first floor over the *moda* is two bays wide and one bay deep. Coming up the steps from the ground floor, there is a landing in the front of the entrance door to the room, in the left bay. On the external wall of the room, there are two projecting architectural features in the centre of the two bays. In the left bay, there is a blind projection similar to a projection meant to house a built-in cupboard. In the right bay a pair of *halali* or split cusp brackets frame an opening



which opens onto a *jharokha*. A pair of folding shutters occurs on the line of the *halali* brackets (fig. 185).

We shall be examining the architectural details of the two projections later, while discussing the elevation. We resume our discussion of the room built over the *moda*, across the frontage of the *haveli*. The roof is spanned by a deep timber beam, which runs in the centre of the room, along the depth of the room. Thin timber planks run cross-wise to the main beam, along the width of the room. In the right bay, the edge of the room adjacent to the *chowk* has a small room built over the staircase from below, with a pair of doors located in the centre of the bay. In the second bay of the house along the depth, there occurs a *chandni* with a solid wall separating it from the void over the main *chowk* on the ground floor. The *chandni* in the left bay is built directly over the kitchen on the ground floor, and is entered through a pair of doors off the staircase landing. The right bay is a void overlooking the *chowk* on the ground floor. A staircase made of stone slabs cantilevered from the wall occurs along the junction wall between the two spaces. The *chandni* is screened from the deep *pathiyal* beyond with a wall, a pair of doors defining the entry to it. The *pathiyal* is two bays deep and two bays wide, with a *gokhda* projecting over the *chowk* on the ground floor in the right bay. At the rear end of the *pathiyal*, doors in the middle of the left bay mark the entrance to the *kotha* at the far end, which like the *kotha* on the ground floor is two bays wide and two bays deep. As one climbs up the staircase in the *chandni* on to the second floor, one notices that the built mass in the centre disappears with only the front and rear edges built. In the front part of the house, the left bay over the main staircase from the ground floor, opens up to the sky as a tiny *chandni*. A cantilevered staircase winds its way up along the walls on the edge of the *chandni*. Doors in the left bay provide access from the *chandni* to a room, built over the front bay, across the entire frontage of the house (fig. 184). There are two projections, one in each bay on the external front wall of the house. The left bay is a *bari*, while the right bay is a *jharokha*, with shutters on the line of the wall. These will be discussed in detail later as part of the elevations. At the rear of the house, there is a terrace over the two bays of the *pathiyal* below (fig. 183). However, the side and the rear walls show the remains of a timber roof, in the form of brackets anchored to the wall, similar to the floor below. This space most likely was a *pathiyal* with an open *chowk* in the left bay accommodating the staircase. The staircase in the left bay is cantilevered from the adjacent wall, and leads up to the terrace over the *kotha* built at the rear of the house. The *kotha* at the rear is two bays deep, with the door to it in the right bay. The ceiling in the room in the front of the house is made typically with deep timber beams and planks. The terrace over the front part of the house is accessed exclusively from the tiny staircase located in the tiny *chandni* at the entrance to the room below. Two *gokhras* occur in the terrace in the two projections in the facade overlooking the street below.

### *Composition of the Elevations*

The facade is very interesting as it is a medley of styles and elements from the *Sompuriya* and *Mughlai shailis* (fig. 185). The ground floor is solid relieved only with the entrance door in the left bay, similar to the houses built in the *Sompuriya shaili*. The entrance door is panelled comprising a quadratic lattice of struts, bolted to planks with steel studs and rivets. The door head is typically flanked by wooden horse heads.

The first floor has two projecting elements in the two bays: a blind *bari* in the left and a *jharokha* in the right bay. In the style of the *Sompuriya shaili*, the external wall is not visually

integrated with the *bari* and the *jharokha* – it is solid and splattered with the sun roundel motif on either side of the *jharokha*. Only the floor line is marked with a continuous *dasa*. The design of the *bari* and the *jharokha*, however, use elements from the *Mughlai shaili*; the *bari* is framed with two *surangdar khambhas*, and has a *margol* carved in relief with typical *Mughlai* vegetal infill patterns in the cusped brackets. The area inside the *margol* is splattered with large flowers and the stylised *surahi* motif, used so frequently in the built-in cupboards inside the houses. At the centre of the *bari* is a miniature *bari* carved in relief with a *bangaldar chajja*. The *bari* is crowned with the *kangra*, inset with *chaufulias*, and crowned with the *chaap*. The *jharokha* has a characteristic slanting *kakshasana* typical of the *Sompuriya shaili*. However, the rest of the forms and the carving style employed are all *Mughlai*. The outermost layer of the *jharokha* comprises a tri-segmental arch supported on *surangdar khambhas*. The *kakshasana* is not carved in the typical *Sompuriya* style. Instead, a row of eight petalled flowers are simply punched out of the railing with a border of *chaufulias*. The opening in the plane of the wall is delineated with a pair of cusped *halali* brackets. The *todis* supporting the projected *dasa* and the infill pattern between them are all *Mughlai*. The carving on this floor is light and the modelling is flat, completely dissimilar from the rich modelling and dense overlapping patterns of *Sompuriya jharokhas*. The carving style is influenced more by the *Mughlai* tradition. Stylistically, the second floor is a distinct departure from the first floor. The centres of the two bays are expressed again with projecting aedicules; the left with a *bari* and the right with a *jharokha*. The *madhya-sutras* or centre lines of the *baris* and *jharokhas* line up perfectly, vertically, on the different floors. The architectural style on this floor is distinctly *Mughal*.

The *bari* and the *jharokha* are visually unified; their eave lines match and the line of the balustrade in the *jharokha* is picked up and runs across the whole length of the elevation, defining a panel between itself and the floor slab, infill with geometrical designs. The *bari* is framed with plain *sakh* pilasters infill with the *bajrangi* pattern. A *margol* is inset within the *bari*, and in the centre is a miniature *bari* with a *bangaldar chajja*, with an opening. The wall surface within the *margol* is filled in with the *gadhakhori phulri* pattern, which gives it the appearance of a porous panel. The *jharokha* in the right bay is subdivided into three bays with the central bay wider than the two flanking bays. *Surangdar khambhas* support cusped arches, defining the three divisions of the *jharokha*. The floor of the *jharokha* and the *bari* are supported on *todis*, which are anchored back to the wall surface of the projecting *bari* and *jharokha* on the floor below. The infill wall between the *bari* and the *jharokha*, and to the right of the *jharokha* are also projected on this floor, with a characteristic row of *Sehrabandhi* mouldings running continuously along the soffit of the projected floor slab. The infill walls are treated as divided into panels with inset *margol* and infill with geometrical designs, visually integrating them with the overall elevation. A pair of tiny *margol*-openings occur in the centre of the two infill panels. The *galat* moulding running below the *chajja* is continuous across the length of the elevation as in the *chap* moulding above the *kangra*. The roof slab is marked by a *daasa* moulding, and has a continuous row of acanthus moulding running below it, similar to the *Patuon Ki Haveli*. Two *gokhdas* occur in the two projecting bays on the terrace level. The parapet comprises a network of *balli* and *mundi* elements with inset *takiya* panels carved with flowers. The vertical *balli* elements in the right bay pick up the rhythm of the three divisions of the *jharokha* below.

The stylistic differences of the two floors is another example of the conscious choice made by craftsmen guided either by the stylistic predilection of their respective guild or by the taste of their patrons, in embellishing their work from the vast array of styles and elements at their disposal. The house was built in one go, as suggested by the present owners, and due to the

stylistic affinity of the second floor with the *Patuon Ki Haveli*, it may reasonably be dated to early to mid nineteenth century. The mixture of styles exercised is also similar to one of the *havelis* in the *Patuon Ki Haveli* group; the *haveli* of *Pratapchand*, where the lower floors are built in the *Sompuriya shaili*, with the upper floors built in the *Mughlai shaili*.

### 5.3 Haveli in Vyaspara

This *haveli* currently owned jointly by Sumit Vyas and Hari Singh Rathore, has been operational as the Desert *Haveli* guest house since the past nine years. One of the current owners claims that his Vyas ancestors, who built the *haveli*, were part of the royal nobility. The porous *diwankhana* in the front elevation does suggest that the *haveli* belonged to a *diwan* in the royal ministry. The *haveli* is located in the *Vyas Para* area within the fort, and abuts the battlement walls of the citadel.

#### *Planform and Spatial Organisation*

It is a two court *haveli*, with two separate entrances, and an internal disposition of rooms such that there are two parts to the *haveli*, each part complete and independent with its own internal courtyard and staircase (fig. 186). It is likely that the two parts served as the *mardana* and the *zenana* or *rawala*, an observation corroborated by the present owners. As the house belonged to a *diwan*, there is the characteristic veranda or *diwankhana* in the front of the house, accessed through two sets of *pidhakiyas* or stairs in front. The house is a seven bay house and is only two storeys high. The *diwankhana* (fig. 188) does not stretch across the full width of the facade. It has five equal divisions corresponding to the central five bays, each spanned by cusped *margol*. The *margol* are plain devoid of any ornamental carving with the *bang* or joint between the two cusp brackets forming the *margol*, clearly visible. The *khambhas* in the front, overlooking the street are plain too, relieved with *diyaslais* located at the level of the springing point of the *margol*. The *paggi* of these *khambhas* are plain too, and so is the *dasa*, marking the floor of the *diwankhana*.

The two entrances are located in the third and fifth bays on the rear wall of the *diwankhana*, with the second, fourth and sixth bays blind with infill wall panels, each delineated with a *margol* carved in relief. The two entrances are different. The entrance in the second bay of the *diwankhana* has a *margol* on the external face and a pointed arch with a plain soffit on the inner face. A double shuttered door situated behind the pointed arch provides access to the first courtyard. The entrance in the fourth bay has a characteristic double shuttered door with latticed shutters inset with carved flowers. The wide door head is richly carved with vegetal patterns, with an image of *ganesha* in the centre. Characteristic wooden horse heads flank the door head. Through the entrance in the third bay, one enters the *moda*, which is one bay deep. The depth of the *haveli* in this part is four bays. Next to the *moda*, along the depth occurs *chowk A*, which is two bays deep and two bays wide (fig. 189). The narrow bay along the entire depth of the *haveli* to the left of *chowk A* forms a *pathiyal*-like space and provides access to a staircase in the farthest bay located to the left of the *chowk*. The *pathiyal* is one bay deep at the rear of the *chowk* with a blind wall at its rear. Right through the middle of the *haveli* along the width runs a single bay which functions as a *pathiyal*-like space adjacent to *chowk A*, and has a solid wall running along its right edge. *Chowk A* comprising two bays, with a *khambha* running right through the middle of it, is unusual. One expects to see a *chowk* with a symmetrical arrangement of bays, so that the central feature is a bay and not a

column. A column through the middle disrupts the visual integrity of the architectural composition, dividing it into two. However, the treatment of each individual bay right through the entire height of the *haveli* is symmetrical about its respective centre line or *madhya sutra*. This is in consistency with the principle of symmetry in the unitary bay as discussed previously. There are other examples of two bay courtyards that will be discussed as part of the case studies (see 5.4, 5.7).

We look next at the part of the *haveli* to the right of the wall running through the middle. Through the doors in the fifth bay, one comes to a two bay deep corridor with a two bay wide room on the right. From the passage, one is led to the second *chowk* in the *haveli*: *Chowk B*. This *chowk* similar to *Chowk A* is two bays deep and two bays wide. It occupies the fourth and fifth bays along the depth and the fifth and sixth bays along the width. The two parts of the *haveli* arranged around the two chowks: *Chowk A* and *B*, are virtually segregated on the ground floor. The only connection between the two is through an opening in the central partition wall, accessible from *Chowk B*. Apart from this connection, the dividing wall between the two halves is devoid of any other opening. It is very likely that this part functioned as the *zenana*, while the other half with its generous reception space in the form of the *moda* was the *mardana*. The ground floor, being the public part of the house was used to receive guests. The division of the *mardana* and *zenana* is thus, more acute on this floor, while on the upper floor which was for private use, the zonal demarcation disappears.

*Chowk B*, unlike *Chowk A*, is devoid of *pathiyal*-like spaces wrapped around its edges. It has rooms built around it to its front and right, with a passage on its rear providing access to another room in the farthest bay along the depth and a staircase adjacent to the external wall. This staircase was probably for the exclusive use of the *zenana*.

On the first floor, there is a disposition of several rooms and *pathial*-like spaces around the two courtyards. On coming up the staircase in the *mardana* section, one enters a gallery overlooking the courtyard below (fig. 193), which provides access to the *mol* which runs across the entire width of the *haveli*, and is two bays deep (fig. 194, 197). Along the external edge of the *mol*, facing the street, the wall is stepped out on *todis*, with *jharokhas* projecting further out in the third and fifth bays, in line with the two entrance doors in the floor below. This creates a thin gallery like space beyond the line of the original wall, where the load-bearing *khambhas* are located (fig. 194). The openings between the *khambhas* are spanned by a pair of *halali cusped brackets* with *todis* placed on top of the *khambhas* supporting the deep stone cornice above. The windows and doors to the outside are positioned on the line of the stepped-out external wall. The second, fourth and sixth bays have small *baris*, while the third and fifth have *jharokhas*. The openings on this plane for the *jharokhas*, internally are framed with cusped *halali brackets*. Externally, the two *jharokhas* are *nokwala jharokhas* resting on *surangdar khambhas*, with a tri-segmental arch laid across the front (fig. 190). When seen from within the room, the respective openings in the three planes can be seen simultaneously, each with its characteristic profile (fig. 194) and with no apparent visual relation to each other in terms of springing point and height, thus creating an element of formal playfulness and variety.

The access to the *mol* from the staircase is through a gallery along one edge of *Chowk A*, the floor of the gallery projecting out of the wall. The *chowk* on the remaining three sides is sealed with walls, with clearly defined *baris* in the centres of various bays (fig. 191, 192, 193). The solid walls, conceal a number of rooms arranged around the *chowk*. In the rear wall of the *mol*, there are a series of niches framed with *halali brackets* and with projecting cills



supported on brackets alternating with *baris* and doorways (fig. 197). Like the front wall, brackets on top of the *khambhas* support a deep concave cornice, taking the load of the roof above. The ceiling is made of wide flat planks of wood, laid parallel along the depth of the room. A door in the fifth bay on the rear wall of the *mol* leads to *Chowk B*, on the first floor (fig. 195, 196). The floor of this *chowk* has a steel grille on this level and is accessible from the ranges around it. There have been very damaging modifications to the original scheme to adapt the *haveli* to hotel use. The open colonnade to the left and right sides of the *chowk* previously providing access to two *pathiyal* like spaces, have been blocked off with doors. The front and rear colonnades have been similarly walled in. However, one can decipher the original scheme; it is a two bay *chowk*, both along the width and the depth, with *Surangdar khambhas* spanned by *margol*. On the right of the *chowk* is a half octagonal bastion-like projection housing a room. At the rear end of the plan is a room, with the staircase to the right. The terrace is flat with cut outs overlooking the two *chowks* below. The only structures built on the terrace are the two staircases and a room at the rear end on the right.

This *haveli* is unusual in two respects, about its two *chowks* and the unusual front elevation. The two *chowks* are both two bay, in width and depth. A *chowk* is an architectural entity which is perceived from within the *haveli*, as an entity complete in itself. Symmetry in the design of the four ranges wrapping it is the most popular design device employed in their design such that each range comprises an odd number of bays. The central feature of each range is thus a bay, and not a column. This central bay is normally wider than the other bays and is lavished with special architectural attention, on all the floors, right to the level of the parapet of the building. Key architectural features such as *jharokhas* and *baris* are usually arranged as the central feature in a range, so that they act as its visual focus.

In this *haveli*, however, the situation with both the *chowks* is quite the reverse. In being two bay *chowks*, each range is visually divided into two, with a *khambha* passing right through the centre. However, in the architectural treatment of each bay, symmetry about the centre-line of the bay is consistently expressed in all the ranges. In *Chowk A*, on the ground floor, each range has two equal bays with plain *khambhas* spanned by cusped *margol* (fig. 189) with a plain *chabna* resting on the top of the *khambhas*. Above this is a plain *galat* moulding with a *chajja* on top. A *diyaslai* is inserted in each *khambha* at the level of the *tant* or springing point of the *margol*. On the first floor, the architectural treatment of each range is different. If we first look at the range at the rear of the *chowk*, we notice that the *khambha* in the middle is plain with a distinct *paggi* resting on a projecting *dasa* (fig. 189). A projecting lintel runs through in both the bays. The bays are infill with stone slabs, recessed from the level of the *khambhas*. The left bay is blank, while the right bay has a *bari*, located right in the middle of it. If one were to draw the centre line of the *margol* below, and extend it upwards, the centre-line of the *bari* would line up exactly with it. A plain *chabna* sits atop the *khambhas*, with a *galat* and *chajja* above. Next we look at the treatment of the parapet above. A plain *dasa* marks the floor level, while the two bays are divided into six equal parts with vertical *ballis* crowned with *mundis*. Continuous horizontal *ballis* are notched into the vertical *vallis* at the top, creating a frame within which thin slabs of stone are infill. At the upper part of each infill slab, a *margol* is punched out. On relating the parapet back to the central *khambha*, one notices that three divisions of the parapet correspond to one bay left of the *khambha*, and the other three divisions to the other bay on the right (fig. 191, 192). What is interesting to note is that each bay has been divided into three parts, when it could have been more easily divided into two. This is the most revealing part of the design philosophy: the centre of the bay has been expressed by dividing it into three. Two divisions would have split the bay into two parts. Thus, the centre of each bay is expressed consistently on every

floor right through to the parapet. On the left bay, though the first floor wall panel is blank, the parapet nevertheless expresses the centre of the bay, as does the ground floor *margol*, hence the integrity of the idea remains. This manner of architectural treatment is consistent in the design of every bay in the four ranges; the range to the right of the chowk has two *baris* on the first floor each on the centre-line or *madhya sutra* of the two *margol* on the ground floor (fig. 192). The parapet is divided into six parts, the centre of each set of three lining with the *madhya sutra* of the bay. The range to the front of the *chowk* is a handed form of the range to the rear (fig. 191). The range to the left is different from the other ranges on the first floor. As illustrated previously, it is a gallery on a projected slab supported on brackets, anchored back to the wall (fig. 193). The gallery is also divided into two bays, with the central *khambha* and supporting bracket or *todi* aligning perfectly with the *khambha* below. Each bay is spanned by a *margol*. In the design of the railing of the gallery, one notices the same principle of design as discussed in the parapet; each bay is divided into three equal parts, hence establishing the centre of each bay. In the design of the parapet of this range, one sees the same principle at play. Though the *chowk* has no overall centre, each unitary bay that makes it, has a clearly marked centre-line, and this idea is expressed consistently in every bay. The principles of symmetry have not been ignored, on the contrary, have been rigorously followed, but in a different way; not in the design of the overall, but in the design of the part which makes the whole.

This incremental approach to form-making which has been explained in detail in Principles of Design, is characteristic to the architecture of Jaisalmer, and helps explain many architectural compositions which fall flat, if ideas of overall symmetry and centre are applied in their analysis. It must be said however that most *havelis* have *chowks* and facades where a discernable overall symmetry is observed. However, there are instances where they are not, such as this *haveli*, howsoever rare, such instances might be. Out of the eleven houses surveyed by me, there were three *havelis* where the application of this principle was discernable (5.3, 5.4, 5.7). The principle encompasses the principles of symmetry and balance. Only in its manner of application, it is unique, and comes as a surprise to the spectator unaccustomed to this way of seeing. To some, it might even seem an anomaly. If it were an anomaly, why is it that every unitary bay has been so carefully composed with clear and precise symmetry and balance? To the traditional craftsmen, the idea of the centre is of pivotal importance, and it is impossible that he can design anything arbitrarily, or just for visual effect. It is therefore crucial that this unique aesthetic be appreciated as an essential design principle, in the traditional architecture of Jaisalmer.

*Chowk B* of this *haveli* has plain *khambhas* on the ground floor, with *surangdar khambhas* on the first floor (fig. 195, 196). The design of all bays, and the parapet employs the same principles as the *mardana* court.

### *Composition of the Elevations*

Perhaps the most unique aspect about the design of this *haveli* is the design and treatment of the front elevation. On the ground floor, the five bays along the *diwankhana* are equal, with plain *khambhas*, spanned by *margol*. The two entrance doors are located on the third and fifth bays (fig. 188). The *margol* are crowned with the *chabna*, *galat* and continuous *chajja*. On the first floor the whole facade steps out, supported on *todis* or brackets, with a continuous row of *sehrabandhi* along the projected floor slab. What is very unusual about this part is that there is no clear central element, that establishes the centre of the *haveli* (fig. 190). In most *haveli* facades, the centre is hierarchically exclusive from the rest of the facade. Here,

however, there are two prominent *jharokhas*, on line with the two entrance doors on the floor below. These *jharokhas* are *nokwala, bangaldar jharokhas* with a *kakshasana* projecting out from the wall surface in two successive steps. They occur on the third and fifth bay, while there are *baris* in the second, fourth and sixth bays. The fourth bay, which lies in the middle of the elevation, and which one would expect would have the largest and most elaborate architectural feature, here is recessed and has the same feature as the second and sixth bay. The centre of each bay, however, is expressed consistently on both floors. The unusual arrangement of prominent and subservient elements on the facade is worth discussion here. The clue is provided by the entrance doors and the two inner *chowks*. The large *nokwala jharokhas* are lined on the two entrance doors and correspond to one bay each of the two *chowks*. The option of designing a facade with a prominent central element was possible, but the craftsmen chose to do things in a different way. They chose to express the two entrances to the two *chowks*. The choice is not arbitrary, simply unusual. The result is a facade that is symmetrical about its centre, but without a hierarchically expressed central element. One needs to resort to the principle of an incremental approach to form-making, to appreciate the design.

In terms of architectural language, the style of the first floor projected facade is *Mughlai*, employing slim pilasters and *surangdar khambhas*. Each of the five bays on the first floor correspond in extent exactly with the bays on the floor below. The wide *khambhas* on the ground floor, however, are not expressed as *khambhas* on the first floor wall, instead they become panels framed with thin pilasters. So each of the five bays on the first floor is separated from each other not with *khambhas* but these panel equivalents of *khambhas*. The panel equivalents of the *khambhas* have their independent bay in the parapet, while each of the five bays have been consistently divided into three bays each, in the design of the parapet. The two *nokwala bangaldar jharokhas* rest on *surangdar khambhas* with a tri-segmental arch thrown across the front. Peacock crests are attached on the two corners above *bangaldar chajja*. The *kakshasana* railing employs a row of acanthus leaf mouldings, with the horizontal members punched with a row of the *chagola* motif. The aedicules (*jharokhas* and *baris*) are individually surmounted by chajjas. In addition, there is a continuous chajja running across the stretch of the facade above the aedicules. The facade is surmounted by the *kane, kangra and chaap* mouldings, with *balli*, and *mundi* elements making up the parapet.

#### 5.4 Haveli in Vyaspara used as Hotel Sri Nath

This *haveli* built in the *Mughlai Shaili* is very similar in style to the *Patuon ki Havelis*, and can reasonably be dated to the same period. Located in the *Vyas Para* area within the fort, the *haveli* is owned by Omji Vyas, who is a direct descendent of the family of the original owners. It is currently used as hotel accommodation on the first floor only, while the ground and second floors are used exclusively for residential purposes by the owners.

#### Planform and Spatial Organisation

The location of the *haveli* is noteworthy. It is adjacent to a public street along two of its edges: the front and one side, while the other two edges comprise party walls with adjacent properties. The width of the *haveli* comprises five bays, with the central bay wider than the other four bays (fig. 198). Along the depth, the house comprises six bays. There is one *chowk* on the ground floor and one *chandni* on the second floor at the rear of the house. The *haveli* has the characteristic *diwankhana* in the front, as Omji Vyas's ancestors served as *diwans* at

the royal court. The plinth is high with a set of *pidhakiyas* or steps leading up to the main entrance door located in the second bay. The ground floor *khambhas* are plain, with a distinct *paggi*, and spanned with *margol*. Beyond the entrance door is the *moda*, which is one bay deep, and three bays wide, spread over the first, second and third bays, along the width. There is a room built over the fourth and fifth bays, with a separate entrance door from the *diwankhana*, located in the fourth bay.

The *chowk* is spread over two bays; the second and third bays, along the width, and two bays; third and fourth bays along the depth. The kitchen is accommodated in a single bay to the left of the *chowk*, and the staircase is spread over two bays to the right. The columns around the *chowk* are plain with a distinct *paggi*, and spanned by cusped *margol*. The *pathiyal* beyond the *chowk* is one bay deep, with a one bay deep *kotha* at the farthest end of the *haveli*. The *pathiyal* and *kotha* run across the entire width of the *haveli*, with a door in the second bay providing connection between the two spaces. The front and rear facades to the *chowk* are porous, comprising two bays each spanned by *margol*. The ranges to the left and right of the *chowk* have solid walls with doors providing connection with the *chowk*. Timber trellises, with cusped edges, fitting within the profile of the cusped *margol*, are used to screen the *pathiyal* from the *chowk*.

On the first floor, the *mol* is spread over the second, third, fourth and fifth bays along the width, and sits above the *diwankhana* and the *moda* on the ground floor (fig. 203, 204). It is the largest single room in the house, and spectacular in architectural treatment especially along the external edges. There is a room to the left of the *mol*, built over the first bay (fig. 203). The columns in this room, both structural and those used as pilasters are *surangdar khambhas*. The *surangdar khambhas* are combined with *margol* and cusped *halali* brackets to span openings. The scheme also includes *todis* which support the timber beams in the timber ceiling above. The two edges of the *mol* abutting the street, along the front, above the *diwankhana* and on the right, adjacent to the fifth bay, are both non-structural curtain walls, supported on *todis*, and detached from the line of the structural *surangdar khambhas*. It is important here to briefly describe the external elevation of the first floor before going into further details about the internal features of the *mol*, as this has a direct relation with the disposition of openings in the internal elevations of the *mol*. The first, second, fourth and fifth bays, have projected *baris* (fig. 198) out of which only the first and fifth have real *baris*, and the rest two are blind. The third bay, which lies in the centre of facade, has a *nokwala jharokha*, with a full height door accessing the *jharokha* from the *mol*. Along the right edge of the *haveli* too, the external wall is treated as a curtain wall, stepped out supported on brackets, and independent of the line of the main structure (fig. 198). There is a *nokwali bari* corresponding to the centre of the first bay and a *jharokha* with a *margol*, corresponding to the centre of the second bay.

We now return to the discussion on the interior of the *mol*. From within the room, the *nokwala jharokha*, which is positioned in the centre of the elevation when seen externally, is not in the centre of the *mol* when seen internally. This is because the *mol* comprising only four bays has its centre located eccentrically in relation with the overall facade.

From the interior of the *mol*, the opening to the *jharokha* on the line of the gallery is spanned by a pair of cusped *halali* brackets, while the *jharokha* itself is spanned by a tri-segmental arch. The space between the line of the structure and the line of the external wall is a gallery space on a raised *dasa*. In the facade to the right however, the space in the gallery has been provided with some storage space built into the external wall, in the bay between the *bari* and



the *jharokha* (fig. 204). The openings in each plane have their own respective profiles. The line of the structural *khambhas* are spanned by *margol* and *halali* brackets, with the openings in the line of the wall spanned by another set of *margol* and *halali* brackets. The *jharokhas* are spanned by tri-segmental arches. The interior scheme incorporates a *galat* moulding which runs continuous as a cornice above the *margol*, along the perimeter of the room. Each *surangdar khambha* is crowned by the *paan* moulding, and the *margol* have large flower pendants in the cusped brackets.

A very similar scheme occurs in the room above the *mol*, on the second floor, with some minor differences. On the external wall in the front, there is a half octagonal *nokwala jharokha* each in the first and fifth bays, with full height doors opening into them, from the room (fig. 198). The first bay along the width, above the small room, on the floor below, is a toilet at present, but it shows evidence that it was a *chandni* originally, accessed from the room. The evidence is in the form of two *baris*, with shutters located on either side of the door opening in the central bay, in the wall separating the two rooms. The openable shutters in the *baris* suggests that there was an open space adjacent to the wall, for there is no purpose of *baris* between two enclosed rooms, with a door between them providing access. This manner of creation of open terraces at higher levels, linked to rooms, thus lightening the building structure at the upper levels, is consistent with other large *havelis* built in the *Mughlai Shaili*, for example the *Patuon ki haveli*.

We now analyse the ranges to the rear of the *chowk*. The space above the *pathiyal* on the first floor is a room across the width of the *haveli*, with another room behind it, above the *kotha*. The walls are arranged with built in niches, shelves and cupboards, with a timber ceiling supported on *todis*, anchored to the columns (fig. 202). On the floor above, the arrangement of rooms is similar. On the third floor, the building continues only to the rear of the *chowk*. The space is a *chandni* (fig. 201), spread across the second, third and fourth bays along the width. There are *pathiyal*-like spaces on the rear two sides. The two shorter ends of the *chandni* are spanned by *halali* cusped brackets supported on *surangdar* pilasters. The longer edge along the rear, corresponding to three structural bays has three *surangdar khambhas* spanned by *margol*. Corresponding to the centre of the *chandni*, there are projecting *baris* in the external wall to the side and rear. The floor of the *chandni* is lower than the surrounding ranges, which have a *paanel dasa*, a few inches higher than the floor level of the *chandni*. The rain water collected in the *chandni* is disposed through projecting spouts positioned at floor level on the side facade. The *chandni* has a projecting *chajja* with the *kane*, *kangra* and *chaap* mouldings above. The railing above is slanting, of the *kakshasana* type and is carved with flower stalk motifs set in elliptical frames. The *chandni* is probably the most delightful space in the *haveli*. It is spacious, with the added advantage of openings on the external wall, along two of its edges. The semi-enclosed *pathiyal*-like spaces adjacent to the *chandni* add to the sense of space, and of enjoying an open space from the comforts of an adjacent shaded space. The terrace over the front part of the house is connected with the terrace above the ranges around the *chandni*, with an open staircase at terrace level.

### *Composition of the Elevations*

The most interesting aspects of this *haveli*, like the *haveli* in *Vyaspara* (see 5.3) is the two bay internal *chowk* and the richly articulated external elevations, with its cascade of projecting and recessed bays, embellished with a variety of *baris* and *jharokhas*.

We look at the *chowk* first. As described previously, the *chowk* on the ground floor has plain *khambhas* with *margol* on the front and rear edges and walls with doors on the two sides (fig. 199). The two bays along the width of the *chowk* are wider than the two bays along the depth (fig. 198). A continuous *chajja* runs around the four sides of the *chowk*. The *chajja* is surmounted by the *kane*, *kangra* and a *galat* moulding supporting the projected floor slab or *dasa*. A pair of *surangdar* pilasters corresponding to the width of the *khambha* on the ground floor occurs directly above it (fig. 200). A *margol* is thrown across each of the two bays, carved in relief on the infill panel. The two *margol* are carved within a frame set within each bay, and carved with foliage patterns. The twin *surangdar khambhas* are capped with the *paan* motif carved in relief on the pilasters. In the centre of each of the two bays, are placed a *bari* each. These miniature *baris* have a *margol* laid across two *surangdar* pilasters, and are capped with a flat *chajja* supported on the *galat* moulding. A *ravati* sits atop the *chajja*. The *surangdar khambhas* rest on a *paanel dasa*, with a *khursi* below, carved with layers of acanthus leaves. Above the *dasa*, is the *takiya* carved with the *bajrangi* pattern. The architectural treatment of the two bays on the floor above is exactly similar to the floor below, except that the twin *surangdar* pilasters are closer together, joined together at the top and at the base. The scheme is repeated in the ranges to the front and rear of the *chowk*. In the ranges to the left and right, *baris* are located along the centre lines of only one of the bays, while the other bay is blind. In the range to the left, the centre of the blind panels, occurs a motif of a miniature punched *margol* flanked by a stylised representation of the peacock carved in relief. This motif is used extensively in the centres of infill panels in the internal elevations generally in the *Mughlai Shaili* as in the *Patuon ki havelis*. This *chowk* is another example of the incremental approach of form-making, wherein the part making the whole is treated symmetrically about its centre-line, while the whole as an entity has no central element. Like the *haveli* in *Vyaspara* (5.3), the centre of the *chowk* on each range is a *khambha*, but the two bays flanking it have their respective centre-lines or *madhya sutras* clearly articulated on each floor, right through to the top of the facade.

We look at the external elevations next. The front elevation consists of five bays (fig. 206). On the ground floor, the first bay is blind while the rest of the four bays are spanned by *margol*. Entrance doors are located on the second and the fourth bays, at the rear wall of the *diwankhana*. On the first floor, the focus shifts to the centre of the facade, with an elaborate *jharokha*, with a *bangaldar nokwala chajja* placed in the third bay, which lies in the centre of the facade. The *jharokha* has a tri-segmental *margol* laid across the front supported on *surangdar khambhas*. It has a *kakshasana* railing carved with acanthus leaf mouldings on a *paanel dasa*, which runs along the length of the entire facade marking the floor line. The projecting first floor slab is supported on *Mughlai todis*. A row of *sehrabandhi* runs along the length of the entire facade below the projected floor slab. Flanking the central *jharokha* are two projecting *baris* each corresponding to a structural bay, on either side. The projection, however, is marginal and looks awkward, on the immature stunted *todis*. Each *bari* projection is framed by a pair of *surangdar* pilasters crowned by the *paan*. The balustrade height of the central *jharokha* is continued along the elevation as a band, so is the projected *chajja* above. Each *bari*, has a *localised* second level of *chajja* projection, below the continuous *chajja*. The width of the *khambhas* on the ground floor are visually treated by their panel equivalents, in a typical *Mughlai* fashion. The *bari* projections and the central *jharokha* alternate with these panel equivalents of *khambhas*, throughout the building on the upper floors. The *baris* flanking the central *jharokha* (in the second and fourth bays) are blind, while the two peripheral ones (in the first and fifth bays) have a small punched opening delineated with *margol*. The zone above the ground floor *chajja* and the projecting *dasa* of the first floor is lavished with richly carved panels, in organic and vegetal designs.

On the second floor, the central *jharokha* projects out further from the line of the *jharokha* on the first floor, supported on *todis* decorated with acanthus leaves. A *paanel dasa*, skirts along the periphery, marking the floor line. The central *jharokha* is a *nokwala jharokha*, with cusped *margol* supported on *surangdar khambhas*, with *kakshasana* railings carved with acanthus leaves. The zone above the *nokwala chajja* to the continuous *chajja* above is also decorated with the acanthus leaf moulding. The central *jharokha* is flanked with *bari* projections either side, inset with a miniature *nokwala bari*. The *chajja* over the central *jharokha* extends to these *bari* projections in the second and fourth bays. There is a continuous *chajja* running along the entire periphery, crowning the elevation. The miniature *bari* in the second and fourth bays thus has three *chajjas*: its own, the extension of the *chajja* of the central *jharokha*, and the overall continuous *chajja*. The *baris* are supported on *Mughlai todis* stepping out further from the plane of the curtain wall below. At either extremity of the elevation is a half-octagonal *jharokha* with a *ravati* and *nokwala jharokha*. The half-octagonal *jharokha* is supported on *surangdar khambhas* with *margol* laid across, to span openings. The base consists of successive rows of receding string courses, with a row of *sehrabandhi*, strung along its base. The zone above the *chajja* of the central *jharokha*, is divided into two parts. Panels are formed between these horizontal members and the vertical pilasters, which are carved with vegetal motifs. The treatment of the parapet has been left incomplete, by omitting the characteristic arrangement of *balli* and *mundi*. Instead the parapet terminates with the *chaap* moulding. The *kangra* above the *kane* is densely carved with the design of the basic *kangra* outline, with interconnected flower and foliage designs inset within it.

We now analyse the side elevation of the *haveli* (fig. 205). Along the depth, the *haveli* consists of six bays. The first two bays are built to a height of three storeys. The third, fourth, fifth and sixth bays are four floors high. The elevation has no central focal element overall. The *chowk* occupies the third and fourth bays, and it may be argued that it occupies the centre, with two bays flanking it on either sides. However, on the elevation, the two bays corresponding to the *chowk* are not treated distinctively; they are flat with *baris*, just like other bays. Nevertheless, there has been an attempt to organise the elevation to an overall balanced composition, at least on the first three floors. The second and fifth bays project out continuously on all floors and are marked with *jharokhas*, while the first, third, fourth and sixth bays are flat, and articulated with *baris*. The flat two bays in the centre, flanked symmetrically by two projected bays marked by *jharokhas*, with two more flat bays on the two extremities, does present a symmetrical composition, however, with no focal element in the centre. The six bays comprising the elevation means there can be no central bay, which is only possible in an odd number of bays. This is no possible explanation as to why there is no hierarchically designed central element in this elevation, while the front elevation comprising five bays, has one. However, we have seen previously in the *haveli in Vyaspara* (5.3) that even in an odd number of bays, it is not necessary that the central bay be expressed formally as the centre of the elevation composition. We have to rely on the principle of symmetry in the part to legitimately explain such compositions.

We analyse the elevation next, in terms of detailed architectural language. The ground floor is generally solid and the six bays are delineated by plain *khambhas*. The first, third and fourth bays are short and spanned by cusped *margol*, and the second, fifth and sixth bays are larger spanned by *halali* split cusp brackets. A range of *baris* are splattered across the elevation, at different heights, but positioned in the centres of each bay. On the first floor and above the

external wall is a curtain wall, supported on a double row of *todis* (fig. 206). The external wall remains on the same plane on the upper floors.

We will first look at the bays which have been treated as flat surfaces. The first, third, fourth and sixth bays are each divided into three equal panels each (fig. 205, 207, 208) with *surangdar* pilasters. In the centre of each bay is located a *nokwali bari* with a *ravati*. The area of the walls corresponding with the width of the *khambha* have been visually treated as panels like the other panels, framed with *surangdar* pilasters, with a continuous *dasa* at floor level and *chajja* above. The second and fifth bays are projected, and their treatment here is noteworthy. The entire bay has not been projected. It has been divided again into three bays, with a wide central bay flanked by two narrow bays. The narrow bays are flush with the wall surface, while the central bay projects forward (fig. 205). The treatment of this projection varies in the two bays and on the two floors. We look at the second bay first. On the first floor, the central bay is a *jharokha* with a *margol* supported on a pair of *surangdar khambhas*, with inclined *kakshasana takiyas*. On the first floor, the central bay has a *nokwala ravati jharokha*, with a tri-segmental arch, resting on *surangdar khambhas*, set in the middle flanked by two thin panels framed with *surangdar* pilasters, similar to the wall panels in the flat areas (fig. 205).

In the fifth bay, on the first floor (fig. 207), we have a plain *jharokha* with a tri-segmental arch supported on *surangdar khambhas*. On the second floor, we have a *tibari jharokha*, with three *margol* resting on *surangdar khambhas*. Both the *jharokhas* on the second floor have their own *chajjas*, set lower than the main *chajja* which is continuous across the stretch of the elevation. The wall is panelised with pilasters and horizontal bands, each panel infill with decorative carving, in a typical *Mughlai* fashion. Towards the rear of the *haveli*, the third, fourth, fifth and sixth bays only are built on the third floor. The third and fourth bays are treated as the floors below, with plain *baris* set in the middle of bays. The projection in the fifth bay is panellised into three equal bays with a plain *bari* set in the middle. The whole floor is crowned with a continuous *chajja*.

The principle of symmetry in the part successfully explains, all the aspects of design in this unusual and complex design. It demonstrates, how each bay has been consistently treated as an entity on every floor, with its own centre-line expressed formally, the architectural expression nevertheless changing from floor to floor. It also helps explain the absence of a central focus on one elevation and the use of a strong central focus in another. While demonstrating the generation of a unique architectural rhythm of recesses and projection, and of framed panels, from a relatively simple structural layout, this example, perhaps more than other *havelis*, suggests that these rhythms are just examples of variations on a theme, and that a huge amount of creative opportunity rests with the craftsman as to organising these rhythms and formal delineations to create aesthetically pleasing compositions.

### 5.5 Haveli of Hari Vallabh Gopa, Kund Para

The *haveli* is open on all four sides, with streets on the front, rear and one side with the fourth side facing a public *chowk*. Entrance is through a cul de sac street, which also doubles up as a private space for social interaction for the inmates of the *haveli*. Designed around a *chowk*, the *haveli* is three storeys high, and is three bays wide and deep. The present occupants are a nuclear family comprising Kunj Behari Gopa, his wife and two children. Kunj Behari Gopa works in the local council, and has inherited the property from his father Hari Vallabh Gopa.



Being a small family, the extensive *haveli* is presently largely unoccupied. Large numbers of rooms are kept locked, and only opened to accommodate visiting relatives and occasional guests.

### *Planform and Spatial Organisation*

A wide *ota* at the threshold extends the social space of the *haveli* to the street outside (fig. 209). The front elevation is solid and forbidding except for a pair of richly carved wooden doors in the centre. The entrance door located in the centre of this five bay wide *haveli* leads to a one bay deep *moda*, which is used to receive guests. A toilet has been built in the fifth bay along the width. The *moda* opens up to the *chowk*, which has a staircase to the left, in the second bay along the depth. There is a one bay deep *pathiyal*-like space to the rear of the *chowk* and immediately on its right. This has been screened from public view with a wooden trellis, as it is meant exclusively for the women to spend time within. A part of this screened space is the kitchen, on the right of the *chowk*. Such spaces meant exclusively for women and screened adequately from public gaze are known in local terminology as *katkar*.

The *khambhas* in the four ranges around the *chowk* are octagonal in profile with an unusual bulging capital carved with acanthus leaves (fig. 212). A pair of *Mughlai todis* arranged back to back is placed atop the capital, picking up the load from the lintel above, in an essentially trabeate structural system. The profile of the *todis* creates an unusual truncated pyramidal profile to the openings. The octagonal columns with the acanthus capital is a very unusual element rarely observed in the *havelis* in general, in Jaisalmer. Crude versions of it may be seen in some *havelis* built in the eighteenth century, such as Salim Singh ki Haveli (the ranges around the main *chowk* on the ground floor have similar columns). Stylistically, as will be discussed later, this *haveli* is in the *Mughlai Shaili* and as such belongs between mid and late-nineteenth century, so it is a surprise not to see elaborate *margol* or *surangdar khambhas* around the *chowk* on the ground floor. The *chowk* has been paved in stone in a black and white chequered pattern, by the present owners, and seems to be the most actively used part of the house; as a spillover for the kitchen, as an area for washing and drying clothes, for drying condiments, and for social interaction.

Beyond the one bay deep *katkar* is the *kotha*, with a pair of doors in the centre, leading to it from the *katkar*. A second staircase occurs in the extreme left bay, and by virtue of its containment within the private areas of the *haveli*, was exclusively meant for private use (probably for the *zenana/rawala*). The ceilings in the *moda*, *katkar* and *kotha* comprise timber planks supported on timber beams laid cross-wise along the shorter span.

On the first floor, there are two reception rooms to the front and rear of the *chowk*, spread over the entire width of all five bays. A notable feature about the first floor is the absence of a gallery around the perimeter of the *chowk* providing access to the ranges around. The individual rooms around the *chowk* are mutually accessible from one another. There are *baris* and *jharokhas* positioned in the centre of the ranges around the *chowk* (fig. 210, 211, 212). Internally these are linked with various rooms arranged around the *chowk*.

The second floor layout is similar to the floor below, except the rear of the *haveli*, where a *chandni* occurs in the fifth bay, adjacent to the *chowk* (fig. 213, 214). The *chandni* is three bays wide, equal to the extent of the *chowk*. It is linked with *pathiyal*-like spaces, on its rear and two sides, the boundary between the spaces marked with chunky *surangdar khambhas* and richly carved *margol*. The *pathiyal*-like space to the rear corresponds with the sixth bay

along the depth, and the short *pathiyal*-like spaces on either side correspond with the first and fifth bays along the width. The two corners in the rear bay are walled in as square chambers with access through the *pathiyal*. A *bari* projection provides additional space to the *pathiyal* on the right of the *chandni* (fig. 214). To the *pathiyal* on the left, a *tibari jharokha* is attached accessed from it through a doorway. The treatment of planes in the *pathiyal*-like spaces around the *chandni* is delightful, and creates a range of intimate spaces, wonderfully appropriate for the sensual pleasures of outdoor living. In the *pathiyal* to the right of the *chandni* (fig. 214), the structural plane is framed by a pair of *halali* cusped brackets on *surangdar pilasters*. The structural plane of the external wall has been divided into three bays with *surangdar khambhas* spanned by *margol*. Beyond this plane, the *bari* projects out to create a tiny and intimate balcony-like space, made more effective by two *takiya* panels in the plane of the *surangdar khambhas*, separating it from the *pathiyal*. Views of the street below may be enjoyed from the central *bari*, or the two tiny peepholes on either side. A similar spatial relationship occurs in the *pathiyal* to the left of the *chandni* (fig. 213), however, the transition between the *pathiyal* and the *jharokha* being less subtly defined, with access to the *jharokha* being through a door in a solid wall. The junction between the *chandni* and the main *chowk* is particularly noteworthy. Within the thickness of the wall, three bays have been created, corresponding with three structural bays from the floors below, each with adequate depth for sitting comfortably within shade. The *dasa* raised a few inches above the floor of the *chandni* creates the plane of the seat. In the central bay, a *tibari jharokha* projects over the central *chowk*, thus creating a fairly generous space for a small group of people to sit within it. The spatial experience of the observer sitting in this space is even more dramatic; he is precariously perched above the main *chowk*, protected by the tiny *takiya* panels of the *jharokha*, is physically linked with the space of the *chandni*, yet subtly segregated, and has glimpses of the outside through the *jharokhas* and *baris* on the external walls, and a generous view of the sky, through the open roof of the *chandni*. It takes a mere flight of fancy to imagine the pleasure of inhabiting a space such as this, during the monsoons; of being able to watch the rains, from a sheltered, yet permeable space.

### *Composition of the Elevations*

The ground floor on all four sides, on the outside is primarily solid and unarticulated. The formal articulation of the facade, through a series of recesses and projections, starts on the first floor. If we first look at the *chowk* (fig. 211, 212), the external walls on the four ranges are aligned with the line of the structure, except in the central bays in the four ranges (fig. 210). There is a *tibari jharokha* each, in the ranges to the front and rear of the *chowk*. On the two sides is a single *jharokha*, and a projected *bari* with a peephole. The architectural style is decidedly *Mughlai*. Panellised bays framed with pilasters, inset with *margol*, *jharokhas* with *surangdar khambhas* spanned by *margol*, with *takiya* panels carved in typical vegetal patterns, supported on *Mughlai todis*, with a string of *sehrabandi* running along the base of the floor slab of the *jharokha*. The blind infill wall panels are also provided with *takiya* panels. A continuous string of *chajja* runs along the inner perimeter of the *chowk*.

In the external elevations, the manner and degree of projections in the four respective facades are distinctly different. The front facade, on the first floor, through richly carved, is essentially flat, with only one generously projected *jharokha* in the middle bay. The first, second, fourth and fifth bays have feeble *bari* projections which depends on the density of decorative carving for their visual impact (fig. 215). On the second floor, there are feeble *bari* projections in the first and fifth bays along the width. The central projection has a *tibari*

*jharokha* which corresponds with the profile of the *jharokha* on the first floor. The second and fourth bays are flat and blind.

The rear facade is primarily solid and flushed with the line of structure, with no opening whatsoever, except for a peephole in the middle bay of the first floor (fig. 217). On the second floor, a prominent *jharokha* with *kakshasana takiya* projects out from the central bay. This *jharokha* extends the space of the *pathiyal* linked with the *chandni* on the second floor to the outside.

The two sides elevations of the *haveli* have an interesting range of projections, and are visually distinct from each other due to the treatment of the infill wall panels. The elevations facing the street are essentially plain, relieved only by carvings on the *margol* and the *takiya* panels (fig. 216, 215). The elevation facing the public *chowk* has richly carved wall panels, which impart to it a rich porous appearance (fig. 219, 220).

The external wall facing the street, on the first floor, is primarily aligned with the line of the structure in the first, second, third and fourth bays along the depth relieved by *jharokhas* in the first and third bays (fig. 216, 218). A pair of blind *bari* projections projected marginally from the wall surface with peepholes occur in the second and fourth bays. The fifth and sixth bays project out from the line of structure supported on a row of *todis*. The projection in the fifth bay has a *bari* in the centre flanked by peepholes, while the sixth bay projection is primarily blind, relieved by peepholes (fig. 216). On the second floor, the profile of the facade is similar to the floor below, except that the entire facade steps out marginally from the line of the structure in the first, second, third and fourth bays (fig. 216, 218). A projection in the third bay corresponding to the *jharokha* below has a *nokwali bari* with a *khursi* inserted in the middle. The profile of the remaining bays does not change from the floor below.

In analysing the elevation facing the public *chowk*, we begin by looking at the first floor (fig. 209). The first bay from the right is aligned with the line of structure, relieved only by peepholes (fig. 219). The second and third bays detach themselves from the line of the structure into *bari* projections, supported on *todis* (fig. 220). The formal treatment of these two bays in the *bari* is an anomaly. From the outside it is divided into three panels, with the *bari* in the central panel flanked by two blind panels. The *bari* in the centre corresponds to the line of a column, and is clearly in non-abeyance of the formal discipline of articulation of bays. This one example stands out as an exception, amongst buildings surveyed by me in the course of the study, in that the design of a part of the external facade is not co-ordinated with the structural layout. A generously projected *tibari jharokha* with plain *sakh*, in the fifth bay spanned by cusped *margol*, is the most porous element on this elevation. There are small *bari* projections with peepholes in the fourth and sixth bays. On the second floor, the arrangement of *baris* and *jharokhas* is the same as on the floor below, except in some of the details. The first bay, along the depth, has a *nokwali bari* with *surangdar* pilasters in the centre (fig. 219, 209). The fourth and sixth bays have similar *nokwali baris*. These are, however blind, with peepholes in the centre. The *tibari jharokha* in the fifth bay has *surangdar khambhas* spanned by cusped *margols*.

This *haveli* is a late example of the *Mughlai shaili*. Forms are attenuated and appear to have lost their plasticity and vigour. The facades are almost flattened and box-like, occasionally relieved by *jharokhas*. The front facade is almost flat, except for the central *jharokha* on the first floor. The *bari* projections are so feeble, that they appear as surface modelling in the front facade. The row of *sehrabandhi* at the bottom of the floor slab of each *bari*, appears as

an afterthought, to make them appear more like *jharokhas*. The carving is dense, and covers every panel, but it does not help relieve the monotony of massing. The second floor is even blander, devoid of the surface carving. A row of balustrades carved in the *takiya* panels along the length of the elevation is a decidedly Western Classical influence. The two side elevations are more satisfactory in terms of massing. However, the profiles on the first and second floors are aligned, and there are no dramatic projections from the line of the structure on any of these two elevations. The rear elevation is essentially a solid wall, relieved only by panellised bays, corresponding to the structural lines behind, carved in relief. A continuous string of *chajjas* run along the first and second floor roof lines on the front and the two side elevations. There are virtually no double *chajjas* except for the curved *chajjas* over the *nokwali baris*. Panellisation of wall surfaces corresponding with the lines of structure, with inset *margol* and *takiya* panels carved in relief is carried through consistently on all elevations including the ranges around the central *chowk*, in a typical *Mughlai* fashion. The architectural elements are all *Mughlai*, with virtually no trace of the hands of *Sompuriya* craftsman. The side elevation facing the public *chowk* is perhaps the most successful, in its playful combination of *baris* and inset miniature *baris*, the projected *jharokha*, and the rich infill carving in the wall panels.

## 5.6 Suraj Haveli

This *haveli* is located in Vyaspara within the fort. It originally belonged to a diwan, easily identifiable from the *diwankhana*, adjacent to the street. It is a five bay *haveli*, two floors high, with a third floor built over the rear of the *haveli*.

### Planform and Spatial Organisation

The set of *pidhakiyas* accessing the *diwankhana* from the street is set parallel to the street, with a *takiya* panel along the length of the landing (fig. 221). The *diwankhana* is one bay deep, with the entrance door set in the central bay, along the width. Through the entrance door, one is usually led to a one bay deep range, known as the *moda*, with the *chowk* beyond. In this *haveli*, there are two bays adjacent to each other, which creates a rather deep space, before one accesses the *chowk*. The second bay, adjacent to the *chowk* is known as *pankhasal*. The staircase to the upper floors is accessible from the *pankhasal*. The *chowk* is three bays wide and three bays deep. The three bays are not equal; the central one is wider than the two flanking ones. The bay to the left of the *chowk*, is sealed from the *chowk* with a wall, and forms the kitchen space (fig. 232). The central bay has a punched *bari* in the middle, with a punched *kangra* frieze above. Pierced *taraphul* patterns are arrayed in the wall panels. The bay to the right of the *chowk* is a *pathiyal*-like space with an array of display niches built into the thickness of the wall (fig. 231). Beyond the *chowk* is a one bay deep *pathiyal* with the *kotha* beyond separated by a wall. Doors connecting the two spaces occur in the first and third bays.

On the first floor, in the front part of the *haveli*, the first two bays along the depth are combined to form a room along the length of the five bays across the width of the *haveli*. The external facade steps out considerably from the line of structure and produces a deep gallery along the front edge of the *haveli*. A look at the front elevation reveals why the gallery is unusually deep (fig. 230). Supported on two successive rows of *todis*, the facade projects out by two steps within one floor. The central *jharokha* projects out by a further one step, by virtue of a deep *khursi* positioned at the point of springing out of the *jharokha* from the wall. *Tibari jharokhas* project out from the centres of the four ranges around the *chowk* (fig. 224,



225, 226). To the rear of the *chowk*, on the first floor, is a gallery over the *pathiyal* accessing three rooms built over the *kotha*; the central room occupying the three bays in the centre flanked by two rooms each one bay wide. The rear facade too steps out from the line of structure. *Baris* and built-in storage units are designed into the depth of the projections.

The second floor is porous, comprising a terrace in a large section in the middle part of the *haveli*, and a *chandni* at the rear (fig. 223). The second and third bays along the depth from the front is a terrace, which extends over the bay on the right of the *chowk* (fig. 226, 227). The staircase and a covered gallery providing access to the room in front occupies the left bay. There is an extensive use of *surangdar khambhas* on this floor of the house, both in the front part and the rear *chandni*. The rest of the *haveli* has plain rectangular *khambhas* which are used even in the *tibari jharokhas*, around the *chowk* and in the front elevation.

The front bay along the entire length of the *haveli* is built as a large hall connected with a small room at the far end (fig. 233). The central three bays and the first bay from the left comprise the hall, while the last bay comprises the small room at the end. The two spaces are separated by a wall, with a doorway through the middle. This room has an unusual arrangement of the external wall stepped out from the line of structure, both on the outside face as well as the inside face, adjacent to the terrace. The line of structure in the room, is defined by *surangdar khambhas* spanned by *margol*. The wall adjacent to the terrace is located away from the line of *surangdar khambhas*, in a manner similar to the front facade. The obvious difference between the two is that while the projection on the external facade is supported on *todis*, the internal one simply rests on the floor, transmitting its load directly to it. As on the floor below, the depth of the gallery between the line of *surangdar khambhas* and the external wall along the front facade is substantial. A *nokwali bari* with *takiya* is located in the third bay of the wall between the front wall and the terrace, creating a framed vista of the terrace from the hall (fig. 227). Above the hall, and the adjacent *pathiyal*, the railing is a continuous inclined *takiya* panel carved with large flowers set in quadratic panels.

To the rear of the *chowk*, there is a one bay deep *chandni*, immediately adjacent to the *chowk*, occupying the central three bays along the width (fig. 223, 228). *Pathiyal*-like spaces are arrayed, to its rear and to its two sides. The corner two bays, along the rear are built as rooms, with access from the *pathiyal*-like space. The ranges around the *chandni* have been insensitively treated in the random partitions, and doors erected to create rooms for tourist accommodation. This ruins the original spatial quality of the design. It is, however, not difficult to appreciate the range of spaces, and views generated from this networking of spaces around the *chandni*. The *chandni* is visually linked with the main *chowk* below with a *tibari jharokha* in the middle bay (fig. 226, 229). A gallery is woven in along this edge, by introducing an arcade of *surangdar khambhas* stepping into the area of the *chandni*, about a foot away from the line of the wall. This creates an intimate *verandah* like space with an advantageous location of being simultaneously adjacent to the *chandni* and the *chowk*. The gallery also creates a walkway on the terrace above connecting the two opposite ranges. The stone basin kept in the gallery, was originally used for bathing purposes, most probably in the *chandni*. The *khambhas* around the *chandni*, are not true *surangdar khambhas*. They comprise four segments of *surangdar khambhas* projected cardinally from a square *khambha* (fig. 229). The *jharokha* with the adjacent gallery at the edge of the *chandni* presents a good illustration of the termination of different planes with different profiles, creating a visually complex array of shapes when seen together. The line of the *surangdar khambhas* are spanned by cusped *margol*, beyond which the overall opening of the *jharokha* on the line of the wall is spanned by a pair of cusped *halali* brackets. At the farthest end is the plane of the projected *jharokha*

with three equal bays, each spanned by a cusped *margol*. The two shorter edges of the *chandni* have been divided into three equal bays with *surangdar khambhas* and *margol*. The three bay wide *pathiyal* space to the rear facade is flanked by built-in storage spaces and display niches housed within the thickness of the wall. An elaborate system of *khambhas* surmounted by *Mughlai todis* is used to support deep timber beams and planks forming the roof. The doors to the square rooms at the two farthest ends of the *pathiyal* are richly carved, with a wide door head flanked by wooden horse heads or *todiyas*.

### *Composition of the Elevations*

We begin by looking at the elevations around the main *chowk* (fig. 222). The ranges around the *chowk* on the ground floor are curiously trabeate, with plain *khambhas* capped with *Mughlai todis*, supporting the timber beams of the roof (fig. 224, 231). Secondary *todis* stepping out perpendicular to the main *todis*, support a horizontal stone beam, which supports the *chajja*. This creates greater depth for the *chajja*, than it being simply anchored into the wall with the *galat* moulding below. The walls on the first floor are panellised with plain pilasters, with the blind panels punched with peepholes. A horizontal frame has been introduced at lintel height (fig. 225) all along the length of the four ranges, creating small rectangular panels at the top ends of every panel. This has imparted an uncharacteristic short and stubby proportion to the *margol* openings in the *tibari jharokhas*. Both these panels and the *takiya* panels have been left plain and look unfamiliar. Probably the decorative infill carving originally meant to be done was never executed. The upper panels in some of the ranges have an unusual horizontal punched opening. The railings in the terrace on the second floor overlooking the *chowk* comprise a network of *ballis* capped by *mundis*.

We look at the front elevation next. The front elevation is a symmetrical composition (fig. 230). The *khambhas* of the *diwankhana* on the ground floor are plain, spanned by *margol* richly decorated with vegetal ornament. *Diyasalais* are positioned at the springing point of *margol* in each *khambha*. The first floor elevation, as discussed previously, is projected out by two steps in one go, on two successive rows of twin *todis*. The rear panels in between the *todis* are infill with geometrical patterns. Delicate rows of *sehrabandhi* run along the edge of the *dasa*, along the line of stepping out *todis*. There is a projected *jharokha* with plain *sakh* and cusped *margol* in the middle bay. It is flanked by two small *nokwali baris* with *ravati* in the second and fourth bays. There is a *tibari* each in the first and fifth bays. The width of the four structural columns corresponding with the second, third and fourth bays is visually represented as a blind wall panel in a typical *Mughlai* manner. The line of *takiya* panels is continuous, with each *takiya* panel infill with a different geometrical pattern. All structural members are covered with decorative carving; the *dasa* with *chadabandhi*, the *sakh* with *bajrangi*, and the *margol* spandrel panels with vegetal patterns. A single continuous *chajja* runs across the top.

The facade on the second floor is aligned with the profile on the first floor, except the localised projection of the central *jharokha*. A *nokwala jharokha* with a *kakshasana takiya*, with *surangdar khambhas* spanned by trisegmental *margol* on the front and tiny cusped *margol* on the two sides, is placed in the middle bay. This projects out further from the line of the projected *jharokha* on the floor below, by a further two steps, on a double row of *todis*. A continuous frieze of the *kangra* further inset with foliage decoration and surmounted by a *chaap* runs as a continuous frieze above the first floor *chajja* along the length of the elevation. This introduces a strong horizontal element in the otherwise extensive network of vertical panels and lines. The central *jharokha* is flanked by *nokwali baris* in the second and

fourth bays, but here they are both blind. Larger *nokwali baris*, without a *khursi* are located in the first and fifth bays. The panellisation of the wall is achieved with *surangdar* pilasters on this floor. Between the *dasa* and the *chaap* below, the area of the wall surface corresponding with the thickness of the floor build up is divided into panels corresponding with the rhythm of wall panels. Each panel is then filled in with geometrical designs. The *takiya* panels in the wall are continuous and filled in with decorative carving. A continuous horizontal band runs at the height of the *chajja* of the larger *nokwali baris*, creating small panels above it, in each of the framed panels. Each panel is then carved. The *chajja* is continuous above and fused with the *chajja* of the central *nokwala jharokha*.

Stylistically, all these elements demonstrate specific traits of the mature *Mughlai* style, which is seen in the *Patuon ki haveli*. This might suggest it was built in the first half of the nineteenth century.

### 5.7 Haveli in Jethapara

This *haveli* is located in Jethapara within the city outside the fort. It is a relatively small *haveli*, three bays wide and five bays deep. The front part of the *haveli* is two storeys high and the rear is three storeys.

#### *Planform and Spatial Organisation*

Wide *otas* flank the *pidhakiyas* leading up to the entrance door in the middle of the solid external wall (fig. 234). The central door is flanked by two miniature blind *baris* carved in relief in the first and third bays (fig. 237). Beyond the entrance door, the *moda* is one bay deep, with a toilet built in the third bay. The square *chowk* next, is two bays wide and two bays deep, with the kitchen occupying one bay to its left. The *chowk* has an underground water tank with access in the third bay closer to the edge of the *moda*. Steps leading up occur in the left bay. The *pathiyal* beyond is two bays deep, and occupies the full three bays of the width. Beyond the *pathiyal*, the *kotha* is one bay deep, with doors in the first and second bays.

On the first floor, a room occurs over the entire length of the three bays in the front part of the *haveli*. Along the external facade, there is a *jharokha* in the central bay, flanked by two blind *bari* projections in the first and third bays. The left bay over the kitchen becomes a *chandni*, with a high wall screening it from the *chowk* below. A staircase leading up to the floors above is cantilevered from this wall. The terrace gives access to a two bay deep *pathiyal*-like space, to the rear of the *haveli* beyond which is the *kotha*. A *jharokha* in the middle bay visually connects the *pathiyal*-like space on the first floor with the *chowk* below. A blind *bari* projection occurs in the third bay. The staircase cantilevered from the stone wall provides access to the terrace over the front part of the *haveli* while a gallery provides access from the landing of the staircase to the ranges at the rear of the *haveli*.

On the second floor, the ranges at the rear comprise a *pathiyal*-like space built over the second and third bays along the width, and the third and fourth bays along the depth. The first bay along the width is an open terrace, with a staircase cantilevered from the side wall providing access to the terrace above. A continuous *kotha* is built at the farthest end, along the entire width of the *haveli*. Like the floor below, a *jharokha* occurs in the second bay and a blind *bari* in the third bay in the facade overlooking the main *chowk*.

### Composition of the Elevations

Stylistically, this *haveli* demonstrates an immature *Mughlai* style in the inner ranges, while the front facade is in a matured confident *Mughlai* style. The *khambhas* on the ground floor are chunky and square, with large bulky primitive brackets. The facade to the front of the *chowk* has two blind *bari* projections (fig. 236). Both are square and chunky, rather similar in spirit to *Sompuriya baris*. A continuous *paanel dasa* marks the floorline, with the projecting floor slab supported on *todis*. These *todis* are decorated with the acanthus motif curled back along the soffit, with a pendant at the apex. Unlike the mature *Mughlai todis*, however where the pendant visually grows out of the acanthus leaves, here they are stuck at the apex. The *baris* are framed with plain *sakh* punched with the *chagola* pattern. Inset within the frame in the left *bari* is a *margol* in profile on *surangdar khambhas*. The decoration with the peacock crest, and the splattered flowers indicate an early *Mughlai* style. The other *bari* in the second bay has a miniature *nokwali bari* inset in the middle. The *baris* though close to each other have separate, heavy *chajjas* which clash at their junction. In a mature *Mughlai* style, the *chajjas* would certainly have been integrated into one streamlined form. The rear wall below the floor slab of the *baris*, shows traces of the tendency to create panels and inset them with decorative carving.

The rear elevation to the *chowk* displays similar stylistic traits (fig. 235). *Surangdar khambhas* are, however, used more extensively in this elevation; in the *jharokha* on the first floor and the *baris* on the first and second floors. Supporting the *bari* in the third bay, we see an early version of the *Mughlai todi* without the pendant, with just the acanthus decoration. The zones below the *dasa*, in the *baris* and *jharokha* and carved in panels with decorative patterns. The massing is *Sompuriya* in spirit. The *chajjas* clash and the background wall surface is not integrated visually with the aedicules. On the second floor, between the *jharokha* and the *bari*, we, however, see attempts at panellisation, and filling them with pattern.

The front facade is most certainly a later addition, and characterizes the mature *Mughlai* style of the early to middle nineteenth century (fig. 237). The central *jharokha* has an inclined *kakshasana takiya* pierced with a rare interlocking pendant design, of which there is another example in the south facade of the *haveli* of Bahadurmalji. This further suggests that it is most likely co-eval with the Patuon ki *haveli*. The opening in the *jharokha* is spanned by a pair of richly carved cusped *halali* brackets, supported on *surangdar khambhas*. The *baris* in the first and third bays have plain *sakh* carved with the *bajrangi* pattern. The wall panel is clothed with dense geometrical filigree carving with miniature *nokwali baris* inset in the middle. The *baris* are spaced from the central *jharokha* and from the two external edges of the building with narrow panels. It may fairly confidently be assumed that these panels correspond with the width of the structural columns, as in the matured *Mughlai* style. The lines of the *takiya* are not extended through the length of the elevation, and the base of the spacing panels unusually has a *khursi* each. The *chajja* above is emphatic and continuous, with a continuous *kangra* moulding on top. The *todis* supporting the *jharokhas* are the matured *Mughlai* pendant type, with a row of *sehrabandhi*. All the surfaces, in the facade on the first floor are covered with filigree carving, giving it a delicate porous appearance. There are three *gokhdas* with *kakshasana takiyas* projecting from the three bays at terrace level.

### 5.8 Haveli of Kanhaiyalal Vyas



Located in the *Vyaspara* area within the fort, this house is currently owned by Kanhaiyalal Vyas. The problem of dating is specially acute in this building. Of the two primary facades the larger one facing a public *chowk* displays a mix of *Mughlai* elements in different stages of stylistic development. The other facade facing the street is *Sompuriya* in massing and detail. The interiors are very primitive employing thick masonry walls, stubby columns and large chunky brackets, typical of the early *Sompuriya shaili*.

### *Planform and Spatial Organisation*

The house is two bays wide on the shorter side and three bays deep (*fig. 238*). The ground floor is primarily solid, with only doors in the two bays on the shorter side. Entrance is through the larger door in the left bay. On entry, a straight flight of stairs takes one up to the first floor level, to a room at the far end, built over the third bay along the depth. The second bay along the width is built as a room, with doors providing access to it from the landing of the stairs. Just below this room, there is a similar room on the ground floor, with access to it provided by the shorter pair of doors in the street facade (*fig. 240*).

The elevation facing the public *chowk* on the ground floor is solid and primarily acts as the supporting wall, along which the staircase is supported. On the first floor, aedicules are positioned in the centre of all the bays, both along the facade to the street and to the public *chowk*. The original aedicular composition of the facade on the first floor overlooking the public *chowk* has been mutilated by later additions and alterations. However, it is not difficult to decipher the original composition from the aedicular components still embedded to the wall. This will be discussed later.

The stairs leading up to the second floor, follow a rather circuitous route, coming out of the building in the first bay, wrapping around the external wall and re-entering in the next bay and making ninety degree turn to take a flight of stairs leading up to the terrace on the second floor. This route is most certainly a modification of the original scheme, evident from the open walkway devised along the external facade; by sticking floor slabs randomly on *todis*, salvaged from dismantling *baris* that formed part of the original scheme in the first and second bays along the depth. It is likely that the *haveli* was originally only two floors high. When the second floor was built, this route was devised to connect the flight of stairs in the second bay leading to the terrace above, with the stairs connected directly with the street below. The connection between the two stairs was achieved by creating an open walkway along the external facade. The staircase leads up to a terrace on the second floor, built over the second bay along the width, and occupying the first and second bays along the depth.

On the second floor, ranges are built to the left and to the front of the terrace, thus screening it from the public *chowk*. The range to the front of the terrace is one bay wide and one bay deep, with a door in the centre providing access to it from the terrace. A blind *bari* projects out over the street elevation and a *jharokha*, over the public *chowk* (*fig. 242, 244*). From the regular and sharp coursing pattern of the stonework in this range, it is likely that it was built later. The crisp lines of the *galat* moulding above the door and the lightness of the timber panelled door contrasts heavily with the heavy ribbed *chajja* and the crude outline of the cusped *halali* bracket framing the entrance in the left bay (*fig. 239*), suggesting that the latter was built much earlier. Also the *jharokha* overlooking the public *chowk* from this range, as will be discussed later, is built in a confident *Mughlai* style.

The range to the left of the terrace is built across the entire width of the house. It has an entrance door framed by cusped *halali* brackets supported on *surangdar* pilasters. This treatment of the *surangdar khambha*, in conjunction with its use in the *tibari*, on the facade of this range overlooking the chowk (fig. 244), are in my opinion one of the earliest attempts at depicting the *surangdar khambha* in Jaisalmer. In the doorway, it occurs as two quarter segments on either side of the door frame (fig. 239). The outline is crude and the treatment of petals in the capital and base of the column is heavy. Its awkward use as two quarter segments is a far cry from its later glorious form and confident use. Its use in the *bari* is even more awkward. Here the *surangdar khambha* is depicted two dimensionally with a faint hint of modeling on the front face with a virtually flat rear face, seen from the room (fig. 241, 244). They are stunted and perched atop an oversized *takiya* panel. It is very likely that they were copied from two dimensional illustrations of the *surangdar khambha*, in stone and as such represents possibly the earliest efforts of craftsmen at integrating a new form in their vocabulary. This rear range has thick square pilasters with large and chunky *Sompuriya todis* supporting a timber roof. Built-in storage spaces and niches are incorporated within the thickness of the wall. The *tibari* at the end of the room has an adjoining raised window seat (fig. 241). A niche on the back wall adjacent to it is a perfect example of *Sompuriya* handiwork. Supported on a base of staggered pilasters, with stunted polygonal columns supporting a *kapota* eave, this niche might have been used as a shrine. The other niche at the rear end of the room, opposite the *bari*, is an early version of the *ala* (fig. 243). A central shelf is flanked by two fixed timber panels with storage space behind them accessed from the central area. These fixed panels are beautifully carved with exquisite filigree patterns, and suggests the hand of *Sompuriya* craftsmen. The terrace outside has an open staircase along the boundary wall leading up to the L shaped terrace above. The parapet is carved in a typical *Sompuriya* design: row of chunky flowers set within short stubby columns, with carved horizontal rails at top and bottom.

### *Composition of the Elevations*

The front elevation facing the street is *Sompuriya* in form and in the spirit of the massing (fig. 240, 242). The ground floor is solid, pierced only by the entrance doors. *Todiyas* flank the door heads, with lamp niches in the wall above the door head. A thick coat of lime plaster on the external facade worked all the way up to a string course at the first floor slab level has peeled off in parts, revealing masonry comprising very small pieces of stone, often randomly coursed. The *bari* in the left bay on the first floor is divided into quadratic panels with mullions. Each panel is filled in with a decorative design (fig. 242). The *todis* supporting the *dasa*, and the heavy ribbed *chajja* are all *Sompuriya*.

The *jharokha* in the right bay is trabeate with a heavy ribbed *chajja* supported on *Sompuriya todis* on polygonal columns engaged to the wall (fig. 240). The inclined *takiya* has a row of punched flowers set between stubby columns. The serpentine brackets with pendants supporting the projected *dasa* with a frieze of staggered pilasters on the rear wall are typically *Sompuriya*. The soffit of the *dasa* is decorated with three sun-roundel motifs, with a hanging pendant in the centre. The random heights of the *bari* and *jharokha*, with clashing *chajjas*, are consistent with the spirit of the *Sompuriya Shaili*.

On the second floor, the blind *bari* in the first bay is *Mughlai*, in its proportion and details such as the *todi* and the confident wide *chajja*. A *gokhda* projects out in the second bay, centred on the *jharokha* below.

The order in the facade overlooking the public *chowk* is difficult to decipher, in the plethora of forms arrayed in the seemingly random composition. It is however, fairly easy to decipher that there are three bays: the one on the left with a *jharokha* on the first floor and *tibari* on the second floor, a narrow bay in the middle corresponding with the blind *bari* on the second floor and a third bay to the right with the *jharokha* on the second floor. The aedicules in the middle and right bays on the first floor have been mutilated, with the original fabric dismantled and used as railing for the open walkway. The central bay was originally a *bari* with a peephole punched in the middle. The *chajja* and surmounting *ravati* exist, but the front panel can be seen dismantled below in the walkway. Similarly the bay to its right was originally a *Sompuriya bari*, similar to the *bari* on the street elevation. The front panel has been sliced into two and used as railing for the walkway. The ribbed *chajja* and *todis* supporting it still exist in their original position.

To summarise, the composition involves, on first floor; an early *Mughlai jharokha* with an inclined *takiya* in the left bay, an early *Mughlai bari* in the middle bay and a *Sompuriya bari* in the third bay. On second floor, there is a very crude early *Mughlai tibari* in the left bay, an early *Mughlai bari* in the second bay and a mature *Mughlai jharokha* in the third with an inclined *takiya*.

On all the floors, the floor line is marked by a continuous *dasa*, but the heights of the *jharokhas* and *baris* are random with no visual relation to each other. The *Sompuriya bari* has a short and ribbed *chajja*, and the early *Mughlai baris* have short *chajjas*. The matured *Mughlai jharokhas* have wide confident *chajjas*. These *chajjas* clash awkwardly with each other and with neighbouring forms. It is as if each individual element was carved in isolation. Here the *Sompuriya* aesthetic of lack of visual integration of elements is compounded with the structural accretions over time to create an appearance of near anarchy. The *todis* used to support the *jharokhas* are early versions of the *Mughlai* type with pendants. The *Sompuriya bari* on the first floor is surmounted by the battlement freize, and the wall behind is spattered with sun-roundels. The *Mughlai jharokhas* and *baris* are surmounted with the *kangra* and *chaap*. The *jharokha* on the second floor, with the trisegmental *margol* unusually has a semi-circular *margol* on the line of the wall. The wall surfaces are splattered with the sun-roundel motif, with an arbitrary miniature *nokwali bari* carved in relief on the second floor to the right edge of the facade. The panels below *baris* and *jharokhas* and the spandrel panel in the *margol* of the *tibari* are carved with vegetal patterns. These patterns are similar to *Mughlai* organic decorative designs but are large and heavy and suggests the hands of *Sompuriya* craftsmen.

### 5.9 Salim Singh Ki Haveli

One of the largest and most unusual *havelis* in Jaisalmer, it appears at first glance as an agglomeration of different *havelis*. There are two large masses of building on either side of the entrance in the middle. The tower to the left of the entrance rises to a full five floors from the entrance level, with a string of *bagaliyas* arranged on all four sides on the fourth floor. The present inhabitants are descendants of Mehta Suroop Singh, a bania of Jain faith, who was minister to Rawal Moolraj, who ascended throne in 1762. The current owner Kamal Singh suggested that the original foundation was laid by Suroop Singh in 1764, while the upper parts were primarily built by his son Salim Singh. Salim Singh succeeded as minister to Moolraj, after the murder of his father Suroop Singh, and continued in his post after the death of Moolraj in 1820, as minister to Gaj Singh. Historians generally ascribe 1815 as the date of

construction of the *haveli*.<sup>40</sup> Parts of the *haveli* such as the main *chowk* and the ranges around the secondary *chowk* are built in a crudely primitive *Mughlai* style, which may be attributed to Suroop Singh. The upper floors of the tower are built in the matured *Mughlai Shaili*. The three storey ranges to the right of the *chowk* are built in a late flagging *Mughlai* style. These may be attributed to Salim Singh, having been built incrementally, over his long tenure as minister well into the middle of the nineteenth century. This discussion of the design is based on the left half of the *haveli*, including the main *chowk* which was accessible for survey. The right half is discussed only on the basis of the external features.

### *Planform and Spatial Organisation*

There are two *chowks* in the scheme, which for the purpose of discussion are designated as *Chowk A* and *Chowk B* (figs. 245, 246, 247). The main *chowk*, positioned axially with respect to the entrance is *Chowk A*. It is square in plan, being three bays wide and three bays deep. The *khambhas* around *Chowk A* are octagonal in profile with a flaring capital and *paggi* (fig. 249, 250). There are five bays comprising rooms, *chowks* and *chandnis* on either side of the central *chowk*, along the overall length of the *haveli*. Along the depth, there are five bays, of which three correspond with the *Chowks A* and *B*. Entrance is through an impressive flight of *pidhakiyas* with a wide *ota* at the level of entrance (fig. 266). The *ota* widens up either side of the entrance as pedestals to a pair of stone elephants, marking the fact that the *haveli* belongs to the chief minister of the Maharawal.

The ground floor is solid and forbidding with the entrance door located in a projected block in the centre corresponding with the middle bay of the *chowk*. A pair of *todiyas* mark either end of the lintel over the doorway. The entrance door leads to a vestibule which provides access to *Chowk A* behind, and the staircase to the left. The staircase occupies the first two bays from the edge of the *chowk*, along the length, and is one bay deep. A second *chowk* is located in the third bay, from the edge of *Chowk A*, and is three bays deep, occupying the second, third and fourth bays along the depth. This *chowk* is called *Chowk B* (fig. 247). Octagonal columns similar to those around the *Chowk A* occur along the two longer edges providing access to *pathiyal*-like spaces on either side (fig. 254). The two shorter edges are walled with a door in the middle of each bay (fig. 255, 256).

We look at the first floor plan next. The staircase towards the front of the *haveli* provides access to the *mol* above the entrance vestibule, on the first floor (fig. 251). The *mol* is spread over the three bays of the *chowk*, with a projecting *tibari* in the central bay (fig. 252). Along the front facade, the profile of the external wall is generally solid relieved by nominal *bari* projections in the second and fourth bays from the edge of the *chowk* on either side (fig. 245). A pair of *tibari jharokhas* are positioned symmetrically about the centre of the front facade in the fifth bay on either side of the *Chowk A* (fig. 262, 265). The solid mass of the ground floor steps out in the fifth bay on the right of the *chowk* providing a solid base for the porous *tibari jharokha* (fig. 265). The centres of all bays are visually indicated on the facade with framed panels inset with peepholes. The two imposing building masses to the left and right of the *chowk* assert their presence from the second floor upwards, as they are detached from surrounding masses with terraces. To the left of the *Chowk A*, the two bays corresponding to the staircase and its adjacent bay only are built (fig. 261), while the remaining bays along the front facade are terraces.

<sup>40</sup> R.A Aggarwal, p. 51.



The central part of the *haveli* is underplayed, with the focus on the two imposing towers on either side, which increase in richness of articulation on the upper floors, climaxing in the row of *bagalias* crowning the left tower. The bay to the rear of *Chowk A* is built as a room (fig. 258) accessible from the terrace on the right of the chowk. A *tibari jharokha* in the middle of the room projects into the main *chowk* (fig. 249). The terraces to the right and to the front of *Chowk A* are screened from it with high walls. A continuous wide stone slab held on brackets is strung along the periphery of the terraces formed along the front facade overlooking the street, like a *gokhda*. A tulsi shrine is located in this slab, on the fourth bay, to the left of *Chowk A*, above the projected *jharokha* on the first floor (fig. 262). The terrace in the fourth bay, is fairly deep including the second, third and fourth bays along the depth, adjacent to *Chowk B* (fig. 253). The ranges built adjacent to this terrace to the rear and to its left most probably served as rooms for worship as is suggested by icons of Hindu deities and markings of auspicious Hindu symbols on the walls inside. To the rear of the *haveli*, there are a series of interconnected rooms, with a *chandni* occupying two bays (fig. 257), positioned between *Chowk A* and *B*. This *chandni* is linked simultaneously to the string of rooms in the rear of the *haveli* and the room sandwiched between *Chowk A* and *B*. Another tulsi shrine in this *chandni* testifies to the *Vaishnava* affiliation of the Bhattis. The columns used in the second floor, especially in the ranges adjacent to the terrace in the fourth bay, are octagonal with *todi* brackets on top, similar to those around *Chowk A* and *B*. The terraces are all surrounded by rooms or high walls, so they feel more like rooms without roofs. Views into the two main *chowks* on the ground floor are through tiny peepholes in the parapet walls, and adjacent walls which heightens the sense of spatial discovery.

Adjacent to the terrace in the fifth bay from the edge of *Chowk A*, along the front is a tiny toilet. Located on the terrace is a stone bathing tray, used for bathing in the open air. The location of the shrine rooms, the tulsi shrines, the screened *chandnis*, and the open bathing terrace suggests that this part of the *haveli* might have been used as the *zenana*.

### *Composition of the Elevations*

The treatment of the tower block comprising the staircase is fairly bland, both on the front facade and the facade overlooking the inner *chowk*. The continuous parapet comprising framed panels between vertical *ballis* running across the length of the facade at the terrace level on the second floor, suggests that the tower block was added at a later date and the junction between the wall and the parapet was not resolved (fig. 261). The same is true of the facade overlooking the inner *chowk* (fig. 255). The lower part of the facade comprises three bays with vertical pilasters infill with stone planks punched with peepholes. This treatment echoes the treatment of the walls on the two longer sides of *Chowk B* (fig. 253, 254), one of which screens a terrace. It is very likely this wall also served the same function. The proof for this explanation is provided by horizontal lintel running across the top of the wall, as a terminating piece in the screening wall (fig. 255). This lintel is carried through on the wall of the staircase block and the range on the other side. If these ranges were built in one go, it is more logical that they were built in full height stone planks as elsewhere. The piling of stone blocks above the lintel level is clumsy and random, and the coursing pattern is different from the floors below. The coursing pattern above the parapet comprises alternate rows of wide and narrow blocks of stone while the lower floors have a fairly consistent coursing pattern. The need for external cement pointing, in the upper floors, which accentuates the pattern of coursing, suggests that it might have been put up in a hurry. The ground and first floor are comparatively much more well-built. The staircase tower as suggested previously, comprises the staircase and a room to its left built over the third bay from the edge of *Chowk A*. A large

trabeate opening, with the lintel supported on a pair of *todis*, flanked by two small rectangular openings occurs in the centre of this bay, on the front facade (fig. 261). Of the two bays comprising the staircase, one has a rectangular opening on the external wall.

On the third floor, the plan arrangement of the tower block remains the same, but the treatment of the external walls become more showy (fig. 248). A generous *Sompuriya jharokha* supported on *todis* marks the centre of the third bay (fig. 261), while the first bay has three punched peepholes surmounted by a *chajja*. Overlooking the inner *chowk*, the room opens up to another *Sompuriya jharokha* (fig. 255, 260), also positioned in the third bay, through less showy than the front facade. On the two shorter sides, there are *Mughlai jharokhas* (fig. 259, 263) with inclined *kakshasana takiyas*, with *surangdar khambhas* and supported on *Mughlai todis*.

The fourth floor is the most showy and ostentatious part of the *haveli* (fig. 248). A continuous gallery is added on all four sides of the tower, supported on *todis* (fig. 260). Each of the three bays comprising the tower is treated differently. The first bay from the right is an open terrace (fig. 267), the second bay is further divided into three bays along the depth, accommodating a pavilion with octagonal arcaded ends in the centre (fig. 268). The third bay is a square chamber with openings on three sides, to the peripheral gallery (fig. 269). The staircase adjacent to the pavilion in the second bay leads up to a pavilion built above the second bay (fig. 268).

We discuss the design of the peripheral gallery in detail. The gallery is comprised of a string of cupolas, supported on *surangdar khambhas*, each cupola with individual *nokwala chajjas* surmounted by miniature domes. In local terminology, such cupolas strung together linearly are known as *bagaliyas*. Such stringing together of *cupolas*, and enveloping the building facade is seen in later buildings such as the facade of Gaj Vilas (1820-46) facing *Dussehra chowk*, and in the celebrated *tazia* tower of Badal Vilas (1864-91) built for Maharawal Bairiasal. If the intention of minister Salim Singh was to proclaim his power through the symbolic gesture of building this landmark feature, he was certainly successful. Here however the design is most dramatic and successful, as compared with similar applications in the other buildings. It is firstly a towering composition, almost menacing when seen from the street below. From a distance, it is striking in profile and perhaps the most dominant element in the skyline. Moreover, the solid rustic base of the tower block is a perfect foil for this sensual rich composition above, which is all the more accentuated in contrast with the blandness of its base. When it first appeared, it must have certainly been the most striking landmark in the city of Jaisalmer so as to have deserved emulation by the royalty in their own buildings.

Striking the edifice certainly is, but it also shows signs of a flagging architectural style. The string of *sehrabandhi* along the projected *dasa* of the *bagaliyas* is oversized and too close to each other (fig. 260, 263). There are three rows of them: one row at the base of the *todis*, the other at the level of the pendant of the *todis*, and the third just below the *dasa* of the gallery. The shorter sides are even busier. An additional row of *sehrabandhi* is introduced at the lower end of the *todis*, thus producing an almost choking richness. The rear wall in between the *todis* is carved with motif of a pair of peacocks, which has been extensively used later in parts of Jawahar Vilas (1890) built by Maharawal Jawahar Singh.

The same choking richness is noticed in the cusped *margol* of the *cupolas*. Here the cusps are almost lost in the string of pendants on the soffit of the *margol*, so as to resemble a semi-

circle. The *sitaphal* pendants on the soffits of the *nokwala chajjas* are oversized in comparison with the tiny *chajjas*, and so are the peacock crests at the corners on the base of the domes. The architectural style here is completely *Mughlai*, including all the decorative infill patterns and the geometrical *jali* designs of the *takiya* panels. While the lower floors show a degree of syncretic mix of styles, suggesting the role of *Sompuriya* craftsmen, here the style is avowedly *Mughlai*. The square chamber inside is decorated with mirror-work (fig. 269), which covers the walls and the ceiling, similar to the *mol* on the first floor. Here however, one notices a completely new architectural feature; a semi-circular arch. Most likely a colonial influence, the arch is used in conjunction with the *nokwala chajja* surmounted by a *ravati*, supported on *surangdar khambhas*. This ensemble is used to frame all door openings on this floor including those to the open terrace from the gallery (fig. 267). The square mirrored chamber is unrestful. The ceiling is too low, and the *nokwala chajjas* craving for space and attention in an already cramped room is visually disturbing. The two shorter edges of the terrace on the first bay are each divided into three parts. The central part is the access archway, flanked on two sides by panels with decorative trellises. The design in these trellises is vegetal similar to *Mughlai* designs used in *takiyas* and spandrel panels of *margol*. Here however, they are oversized and chunky and have lost all their delicacy and vigour. They are too large and seem inappropriate in the tiny terrace space they screen.

The *cupola* surmounting the composition, in the fifth floor, is built over the second bay of the tower block, and has a string of five bays along the two longer edges supported on twin *surangdar khambhas* (fig. 268). The shorter edge is one bay wide, and all the openings are spanned by tri-segmental *margol*.

The ranges to the right of the *chowk* employ a range of architectural elements. The third bay on the second floor is divided into three bays with three chunky columns surmounted by *todis* (fig. 264, 265, 245). The continuous parapet running along the base of the second floor and the change in stone coursing pattern suggests that the upper parts were built later. The fourth bay has a *tibari jharokha*, with the central bay stepped out on double *todis*, and is surmounted by a *nokwala jharokha* (fig. 265). It is built in a *Mughlai* style, and is a rare instance of the use of the cusped *margol* on the front facade. The fifth bay has a half octagonal *nokwala jharokha*, flanked by miniature *nokwali baris*. Only the third floor over the front part of the second bay is built. It is provided with *Sompuriya baris* and *jharokhas*.

Salim Singh's *haveli* is probably one of the most syncretic building in Jaisalmer stylistically. The ground and first floor present a unified appearance and is surmounted by a continuous *chajja* that runs along the entire periphery. The unified treatment of *jharokhas* with rectangular *sakh* crowned by brackets with curved profiles is followed consistently on the external facade and the inner *chowks*. Though *Mughlai* features are observed, in the treatment of individual parts and architectural elements, the overall style is decidedly austere, and ambiguous. There is no panellisation of the wall surface and integration of various architectural elements such as the *baris* and *jharokhas* as in the *Mughlai* style. Instead they stand out as objects in contrast with the bland stonework of the walls, as in the *Sompuriya* style. The inside of the *mol* is avowedly *Mughlai*, in the ostentatious decorative mirrorwork and applied decoration as in the square chamber on the fourth floor in the tower block. The second and third floors are built in the rugged *Sompuriya* style: the walls are made of blocks of stone uncoordinated with the key levels in the *jharokhas*, the *jharokhas* are largely trabeate, *chajjas* are localised over *baris* and *jharokhas* and stop abruptly midway on the facade. There is even a splatter of the sun-roundel motif to the left of the *jharokha* on the external facade, on the third floor. The top two floors are ostentatious examples of a late

flagging *Mughlai* style, with hints of colonial influence. The ranges around the inner *chowks* of the *haveli* too are bland and rugged and largely trabeate. From the absence of a unified design in the overall composition, to syncretic combination of elements and styles, bland exteriors, contrasting with some sumptuous interiors, *Salim Singh's Haveli* is unique in the *haveli* tradition of Jaisalmer.

## Chapter 6 DETAILED CASE STUDIES

In this section of the chapter, we analyse two *havelis* in detail, beginning with the spatial organisation and moving on to the detailed analysis of form and architectural expression. Both these *havelis* belong to the *Patuon ki Haveli* group, comprising five *havelis* built in the first half of the nineteenth century. The discussion on formal syntax and architectural expression is based on the external elevations of the *haveli*, and of various internal rooms and



other spaces. The discussion illustrates the creativity employed in the design of spaces and forms using the relatively simple palette of architectural components, as illustrated previously. The discussion on formal syntax relies primarily on detailed surveys of two *havelis* made by me on site: *Jorawarmalji Haveli* and *Bahadurmalji Haveli*. The documentation and discussion help in explaining the nature of creativity in the tradition. It also leads to the observation that the documentation in this thesis is only a brief sample of a potentially much broader range of creative application.

The *Patuon ki Haveli* group comprise a total of five *havelis*, built by a merchant called Guman Chand Bafna of the Oswal Jain community. The title, '*Patua*' was based on the family trade dealing with gold and silver threads used for tying ornaments. The *havelis* were built by the *seth* for his five sons, and are named after them: Bahadurmal, Sawai Ram, Mangi Ram, Jorawarmal and Pratap Chand. The *havelis* range in height from ground plus two to ground plus three storeys, with each of them provided with basement storeys, extending partially over the extent of the floor plan. These basements are generally two storeys deep. The five *havelis* are built as terrace houses, sharing common party walls and accessed from a public street. Four of the *havelis* are built in a row along the northern edge of the street, and the fifth lies across on the southern edge of the street. The location of the two *havelis* selected for the detailed case study is indicated in *fig. 174*.

The spatial design of the *havelis* are based on the theme of the introverted central *chowk* or courtyard and open to sky terraces or *chandnis*, that characterise virtually all residential architecture in the city. The theme of networking of open and built spaces, and the relationship between them, however, is taken to unprecedented levels of richness and sophistication, made possible greatly by the ambitious scale and grandeur of these buildings. The grandeur of the *Patuon ki havelis* is a visible departure from the relative simplicity and unpretentiousness of *haveli* architecture in Jaisalmer before the nineteenth century. Each *haveli* is designed about an internal open to sky *chowk*, as a principle. However, the disposition of form and space are so inventively handled that no two *havelis* feel alike. To avoid potential confusion in relating the text with a relatively large number of visuals, especially while describing individual spaces, a numerical referencing system has been adopted. Individual rooms and open spaces (*chandnis* and terraces) are indicated in the body of the text with a numerical reference which may be related back to the floor plans (to understand their location) and to the relevant visuals.

## 6.1 Jorawarmalji Haveli

### *Planform and Spatial Organisation*

The last *haveli* in the northern row, the *haveli* of Jorawarmalji, is spatially perhaps the most ingenious amongst the group of the five *Patuon ki havelis*. The spatial interrelationships are particularly interesting in the conception of the upper floors, achieved in the relatively simple format of a five by five bay central *chowk*, with three bays to the front and two bays to the back of the *chowk*.

*Ground Floor:* The long flight of the *pidhakiyas* from the street leads one up to the *diwankhana*, in front of the entrance door, located in the centre of the symmetrical elevation (*fig.270*). The raised floor of the *diwankhana*, is especially high in the *Patuon ki havelis*, housing below at street level, a series of store rooms, built partially within the depth of the *diwankhana*, accessible at street level. These store rooms are accessed through doors housed

within an arcade comprised of *halali* brackets, on stubby *khambhas*, positioned marginally away from the line of structure. There is no view of the interior of the *haveli* from the street, except glimpses through the central entrance door and the two subsidiary doors to rooms in the first and seventh bays, from the *diwankhana*.

The *haveli* is amongst the higher ones in the group, at ground plus three upper floors on a raised basement floor. As it is the last *haveli* terminating the northern row of *havelis*, it has two visible sides from the street; the front facade and the strip side elevation on the right.

The *moda* is double height providing a view of the ceiling over the *mol* on the first floor. The space originally, however, does not seem to have been a double height space. The ceiling of the *diwankhana* most likely continued inside as the ceiling of the *moda*. The most obvious clue is provided by the large *todis* anchored on the two long walls of the *moda*, aligned on the structural *khambhas* (fig. 271). The *todis* have been positioned obviously to support some structural element above. From their similar positioning in other spaces, it is certain that they were meant to take the load of timber beams, which comprised the main structure of the ceiling, with shorter planks laid cross-wise spanning the distance between the paralalled beams (fig. 272).

The *mol* above has rooms above the bays flanking the *moda* at either end, with door openings connecting them with the double height space. The front part of the *mol* and these side rooms, on the first floor was possibly accessed through this strip of missing floor, covering the *moda*, which has since disappeared.

The *moda* is one bay deep, and five bays wide, equal in extent to the width of the *chowk*. There are chambers one bay deep on the two short edges of the *moda*. The access to the *chowk* from the *moda* is indirect. On entering, through the main door, one is merely provided a glimpse of the *chowk*, through a *bari*, positioned in the middle of the central bay on the rear wall of the *moda*. The *bari* is flanked by narrow panels, infill with *jali* screens. Access to the *chowk*, is provided through two bays, to the right of the central bay (fig. 273). Doors in this position, indicate that it was a second line of defence, within the *haveli*. It also meant that private life in the *haveli* could be cut off from the more public activities restricted to the front parts, at will. A one bay wide narrow *pankhasal* occurs to the north of the *moda*, adjacent to the *chowk*. The *pankhasal* gives access to a staircase (more public) to the right. The central bay of the *pankhasal* is articulated in a special manner – it is walled on two sides, and is accessible from the *chowk*, forming a secluded cell like space (fig. 274, 275). It is provided with a seat and back rest, which appears as the *takiya* of the *bari* seen from the *moda*. This little space is a delightful vantage point for the inhabitants to look at the street outside, and to check all callers, from the security of the inner *chowk*.

The *chowk* itself, though five bays wide and five bays deep, is rectangular; longer along the width than along the depth. The central bay along the width is wider than the remaining four bays. To the north of the *chowk* is a one bay deep *pathiyal* spread in length along the entire width of the *haveli*; the five bays of the *chowk* plus the two additional bays on either side of the *chowk*. On the arcade between the *pathiyal* and the *chowk* a pair of seats with inclined *takiyas*, occur in the first and fifth bays at either end of the *chowk* (fig. 276). Accessible from the *pathiyal*, these seats, provided the ideal location to witness activities taking place in the *chowk*. The ranges on the two shorter sides of the *chowk* are one bay deep. They are both *pathiyal*-like spaces, with an arcade of cusped *margol* on plain *khambhas* defining the junction with the *chowk*. The range to the left of the *chowk* comprises a one bay wide storeroom in addition to a three bay wide *pathiyal*. Full height *jali* screens in alternate bays in

this range, impart to it a distinctive appearance. A seat with inclined *takiya*, similar to those to the rear of the *chowk* occurs in the bay to the extreme south of the range, and the bay on the extreme north houses a staircase meant for private use of the inmates.

To the north of the *pathiyal*, is a one bay deep *kotha*. The *kotha* is divided into three rooms; the central one three bays wide and the two end ones, two bays wide each. The wall dividing the *kotha* from the *pathiyal* is particularly noteworthy, in the regular rhythm of *ala* and doors in alternate bays. This will be discussed in detail later, in the context of internal room elevations. Housed within the width of the seventh bay is a staircase providing access to the toilet block on the right. The toilet block is a two bay wide finger that is appended to the seventh bay at the rear of the *haveli*. Similar to other large *havelis*, there is a refuse collection chamber at the ground level, accessed from the street at the rear, the contents of which were cleaned regularly by *bhangis* (sweepers).

**First Floor.** The first floor (fig.277) has a gallery overlooking the *chowk* supported on *todis* skirting its perimeter. The gallery provides additional floor area to the *haveli*, and is the means to access the ranges around the *chowk* (fig. 278). This is a feature which distinguishes the *Patuon ki haveli* from the other large *havelis* we have discussed previously in chapter 5. In large *havelis*, such as those of *Hari Vallabh Gopa*, *Sri Nath* and *Suraj*, there is no separate external gallery providing access to rooms around the *chowk*. There the rooms are accessed internally from one another, and any projections in the floor area, into the *chowk*, is subsumed within the area of the adjacent room. The gallery is not a regular feature in all the five *Patuon ki haveli* either. The second *haveli*, (*Sawai Ramji's Haveli*) for instance, has no gallery, and the projections on the first floor are subsumed within the room areas. *Bahadurmalji's haveli* and *Jorawarmalji's haveli*, both of which are analysed in detail in this section, are provided with galleries. The galleries in the two *havelis* are distinct, however, in two ways: the treatment of the facade overlooking the *chowk*, and the structural design of the floor slab of the gallery projecting out from the line of structure.

We have seen in the first *haveli* (*Bahadurmalji haveli*) that the gallery is not provided with an arcade, but is open on all four sides. It is, however, provided with cover on top in the form of a stepped floor slab with a wide *chajja* appended. The floor slab steps out once more at the level of the gallery. The requisite depth of the gallery is thus obtained through the means of two consecutive steps in the floor slab.

In *Jorawarmalji's haveli*, however, the gallery steps out in one bold projection, supported on a row of *todis*. In addition, unlike *Bahadurmal's haveli*, the gallery is provided with an arcade of cusped *margol* supported on plain flat *khambhas*, positioned in line with the structural *khambhas* (fig. 312). The arcade is continuous on the first and second floors. Structural stability of the gallery is provided partially by the anchoring back of the arcade wall to the floor slab at first, second and third floor levels, but the major portion of the vertical load is transferred to the row of load bearing *todis* anchored back to the structure at the level of the first floor slab. The number of *todis*, is thus multiplied. Each bay is provided with two additional *todis*, in addition to the two peripheral ones, aligned with the structural *khambhas*.

The ranges around the *chowk* on the first floor in general follows the pattern of the ground floor. The room to the north of the *chowk*, is provided with a wall, with three door openings with cusped *halali* brackets in the central three bays. The range to the east of the *chowk*, has only one door in the central bay with the remaining bays blind. The ranges to the west and the south of the *chowk* are arcaded. To the south of the *chowk*, the arcade on the line of the



structural *khambhas* is distinct, comprised of stout *surangdar khambhas* with cusped *margol* (fig. 279). Unlike the ranges on the other three sides, there is neither a threshold in the floor or step in the ceiling level, on the line of this arcade. This creates a spacious *pathiyal*-like space to the north of the *mol*, by integrating the one bay depth corresponding with the *pankhasal* on the floor below with the depth of the projecting gallery.

The *mol* occupies the front two bays corresponding with the *diwankhana* and the *moda* below. In the absence of the floor in the rear bay, it is difficult to appreciate the full effect of this magnificent space. It comprises a large hall occupying the central five bays flanked by one bay deep ranges at either end, accessed from the hall. The front facade steps out from the line of the structural *khambhas*, creating a gallery between the arcade of *khambhas* and the facade. The stepping out of the facade is limited to the central five bays only. A *jharokha* is positioned in the central bay, and *bari* openings occur in the two bays flanking it on either side. The two single bays to the left and right of the *mol* have projecting *kanwals*. The *mol* is sumptuously decorated with painted surfaces and mirrorwork. The ceiling is decorated with an overlaid lattice comprising octagons and squares, painted and gilded. The decoration will be discussed in detail later in this section.

At the extreme north of the *haveli*, the facade along the entire length of the building detaches itself from the line of structure and projects out supported on *todis*. The central bay projects out more emphatically and is provided with a *bari*. From the inside, the entire depth of the projection is designed as a series of built in storage units; shelving niches and cupboards. Most of the external wall surfaces on this floor are therefore solid, relieved only by punched *taraphul jalis*, at upper ends of the wall panels (fig. 280, 281).

*Second Floor:* The structure begins to lighten up on the second floor (fig.282). Walls between bays are removed, and bays unified to create large halls. There is also the beginning of the removal of roofs over bays to create *chandnis*, which for all practical purposes are like rooms open to the sky. There is very clearly, a greater degree of design efforts made in spatial organisation, than the floors below. Subtle devices, involving the enclosure of open spaces, and relating them physically and visually to adjacent spaces, or to circulation routes, creates a dynamic visual relation of different spatial elements.

The most successful element on the second floor, in this regard is a modestly sized *chandni* located in the central three bays immediately to the south of the chowk. The *chandni* occupies one bay adjacent to the main *chowk*, also combining the depth of the projecting gallery. It is adjacent to a large hall built over the front two bays, corresponding with the *diwankhana* and *pathiyal* on the ground floor.

The *chandni* lies on a circulation route, as an extension of the gallery skirting the main *chowk* and is also like an entry court to the hall to the south. If one looks at the plan closely, one notices that there are two entrance doors to the hall, in the two peripheral bays, of the five bays that make the hall. These doors are not directly accessible from the gallery; a solid wall on the line of structural *khambhas*, in front of these doors not only block physical access, but also any view of the doors, otherwise possible from the gallery. Consequently the spectator is forced to turn at right angles to the wall, when proceeding in the direction of the hall from the gallery. This naturally leads him into the space of the *chandni*. Once in the *chandni*, they are presented with a number of vistas and movement options. The *chandni* is screened from the main *chowk* with a full height solid wall, however with a *tibari jharokha* in the central bay overlooking the main *chowk* (fig.283). The depth of the projection of the *jharokha* is used to



house a seat, with a *takiya*, accessible from the *chandni*. The seating alcove is defined by throwing a trisegmental arch across the inner face of the *jharokha*. The depth of the projection above the arch is used as a storage cupboard, accessible from the *chandni*. From the *chandni*, one gets a view of the *chowk* and the ranges across, through the three framed openings of the *jharokha* (fig. 284). One also gets a glimpse of the hall to the south, through a *bari* positioned in the central bay on the boundary wall of the hall (fig. 285). When within the space of the *chandni*, the spectator may choose to sit in the *jharokha* space, with a view of the ranges across to the north, the open sky above and the adjacent hall. Alternatively, he may choose to move across to the other side of the *chandni*, or proceed to enter the hall (Room 2.3, fig. 282). Whatever the decision, he absorbs the experience of being within the space of the *chandni*, and that is the critical design intent, in its location. On exit from the hall, he is once again forced to turn ninety degrees due to the position of the blind wall in front, and move into the *chandni*. The views from the hall of the *chandni* and ranges beyond through the *bari*, create a sense of belongingness of the *chandni* with the hall, almost as its extension.

On the two shorter sides of the *chowk* to the east and west, on the second floor, *jharokhas* project out from the centres of galleries overlooking the *chowk*. Beyond the galleries, are simple one bay deep ranges with niches and *alas* built into the thickness of the party walls. We look next at the spatial relationship of the *chowk* with the gallery and ranges to its north. The gallery to the north of the *chowk* has a *bari* equal in width to the central bay, which projects out from the face of the gallery (fig. 312). It sits abruptly in the middle of the gallery at the rear of the *chowk*, severing the connection between the gallery on the two sides of the *chowk* (fig. 286). The ranges to the north (Room 2.1, fig. 282) are provided with access doors in the two bays flanking the central bay. The spectator is forced to turn right angles into the room, when confronted with the solid side walls of the *bari*. From within the ranges, the *jharokha* is nothing special; it is simply a solid box, with a punched *bari* opening close to the floor level, corresponding with the inset *nokwali bari* on the outer elevation (fig. 288). A cusped *margol* is thrown across the inner face of the *jharokha*, so the space within the depth of the projection is treated like a niche. The room is thus brought into direct spatial and visual relationship with the main *chowk*, by locally obliterating the gallery space between itself and the main *chowk*.

The *bari* overlooking the *chowk* is striking in design, and very unusual in its relationship with the ranges behind. From the outside is a blind *nokwali bari* with another miniature *nokwali bari* inset in the middle. We will discuss later in this section, the design of this *bari* in detail.

In the ranges to the north (room 2.1, fig. 282) and the south (room 2.3, fig. 282) of the *chowk*, cross bracing walls between the two parallel bays are removed to create halls, which incorporate the two bays. The front facade is detached from the line of structure and projected out (fig. 287). The projection, however, does not extend further from the line of projection established in the floor below. The central bay has a *jharokha*, with *baris* in the two flanking bays on either side. The two bays flanking the central five bays of the hall, at either end comprise one bay wide rooms and have a projected *tibari* each. The ranges to the north of the *chowk*, have been divided into three large halls; the larger one in the middle combining the three central bays, with the two side ones combining the two peripheral bays on either side of the centre. The staircase flight leading up to the toilet is accommodated within the width of the peripheral bay on the right with the result that the hall to the east is smaller than the hall on the west.

The central hall is the only room where intermediary structural members are used (*Room 2.1, fig. 282*). While cross-bearing walls are removed, *surangdar khambhas* are located on the points of structure, braced with cusped *margol* at the upper ends (*fig. 288*). The building mass over this portion continues on the third floor above, and partially on the fourth floor, so the cross-bracing of the *khambhas* in this space is a structural requirement. The use of *surangdar khambhas* serves the function particularly well, without destroying the sense of space in the hall. The rear facade steps out further by a step, from the profile established on the floor below, to create a generous gallery like space beyond the line of structural *khambhas*. This space is treated as part of the hall, adding to its sense of space. The rear facade is primarily blind, relieved by a few *baris*.

The toilet block projecting out beyond the edge of the *haveli* on the east, is accesible from the central hall at the rear and via the flight of stairs from the floor below. Here it consists of two chambers: a bathing chamber in the first bay and a latrine enclosure in the second.

*Third Floor:* On this floor, the covered gallery skirting the *chowk* is removed to create a strip of open terrace providing access to the ranges around (*fig. 289, 312*). The bay to the east of the *chowk* is an open terrace, screened from the outside with a high wall. Only the staircase in the south-east corner comes up providing access to the terrace and carries on to the fourth floor. The area above the hall on the second floor in the front part of the house, becomes a large *chandni* (*Chandni 3.1, fig. 289*) with one bay wide ranges to the east and west (*fig. 290*). A curtain wall rises on the front facade, in line with the floor profile below, thus screening the *chandni*. On the points of the structural *khambhas*, are located twin *surangdar khambhas*, supporting a roof covering only the narrow gallery space between them and the facade. The facade is provided with a *jharokha* in the central bay and *baris* in the remaining four bays. When seen from the street below, these *bari* and the *jharokha* openings frame patches of the sky, in the absence of a roof covering over the *chandni*. This is one of the most inviting and potentially curious sights from the street below, for the spectator to see, what looks like a room from outside, framing patches of the sky within its openings. This *chandni* is rather large, comparable in size to the main *chowk*. It is screened from the ranges to the north with a full height wall, with doors for entry in the two bays at the extreme ends of the *chandni*. The ranges flanking the five bay wide *chandni* on the east and west are divided into two on the line of structure between the two parallel bays along the depth. The front half of both the ranges is treated as a *pathiyal* like space, with a three bay arcade on their line of junction with the *chandni*. The rear half of the two ranges is an enclosed room each, accessible from the *pathiyal* like space in front. Detailed elevational treatment of the ranges around the *chandni* illustrates some unusual features, which merits detailed discussion later in this section.

Abutting the wall screening the *chandni* from the ranges to the north is the cutout in the roof slab for the *chandni* below. A narrow gallery is woven in between the cut-out for the *chandni* below and the main *chowk*, taking advantage of the depth of the *jharokha* in the central bay, on the floor below. This gallery retains the continuity of circulation around the *chowk*. All the four sides, around the *chowk* have a parapet comprising a network of *ballis* crowned by *mundis*. Only in the centre of the facade to the north of the *chowk*, is placed a *jharokha* with a trisegmental *margol* supported on *surangdar khambhas* (*fig. 293*).

The ranges to the north of the *chowk* comprise two paralld bays along the depth (*Room 3.3, fig. 289*). Here too, like the ranges to the south, there is a drastic reduction in structural mass (*fig. 291*). The two paralld bays that comprise the ranges to the north are unified, to create

large column free halls. The central three bays in the centre comprise a hall, with a smaller hall comprising two bays to its west. The external wall steps out further from the outer profile on the lower floor, on a row of *todis*, thus adding to the width of the gallery between the structural *khambhas* and the facade. In the central hall, the depth within the gallery in the two end bays is designed as two storage alcoves, accessible from the central bay. The central bay has a *tibari* projection, unusually with trabeate openings. The three openings of the *tibari* are framed within a cusped *margol* thrown across the line of structural *khambhas* in the central bay. The ceiling of the hall is particularly noteworthy. We do not see the standard deep timber beams, with planks cross-laid. Here the structure is covered with a decorative ceiling supported on deep *bilati* mouldings skirting the inner perimeter of the hall. We will discuss the design of the ceiling in detail, with other decorative features, later in this chapter. The hall is two bays deep. In the front bay, on both the sides there are door openings, while in the rear bay, there is an *ala* built into the wall, in each of the bays. The doorway on the right side leads to *chandni*, which is built over two bays to the east of the hall, across the entire depth of the two bays to the rear.

This *chandni* (*chandni* 3.4, *fig.* 289) is similar in scale to that on the second floor, but totally different in character (*fig.* 292). For one it is more private, accessible only from the hall, and through a discreet doorway from the terrace in front. It is sealed with full height walls on all sides with no views of the outside, and also with no views of it from surrounding ranges. One has to walk into it to realise its presence. In the treatment of its side walls, it is similar to that of a room. Built-in niches and *alas* are worked into the thickness of the wall, with steel pegs shaped as peacock heads anchored into the wall to act as support for awnings. At the rear of the *chandni*, one notices two unequal bays, spanned by cusped *margol* supported on twin *surangdar khambhas*. The ensemble does look odd within the context of the *chandni*; one almost expects to see a symmetrical elevation, to the range. We have to appreciate the design from the logic of the structural layout. The twin *surangdar khambhas* are located on the points of the load bearing *khambhas*. Of the two bays that comprise its width, the smaller left bay belongs to the five bays comprising the *chowk*, while the wider right bay comprises the single bay to the right of the *chowk*. The covered gallery between the line of the *surangdar khambhas* and the outer facade corresponds to the depth of the projection of the facade from the line of structure as in other rooms.

*Fourth Floor:* The fourth floor is largely a terrace in the front part, with only stubs of the two staircase blocks sticking up. The terrace towards the south skirts around the periphery on the front three sides of the *haveli*, wherein one gets aerial views of the cellular formation of terraces and *chowks* at different levels (*fig.* 294, 295). Towards the northern edge of the *haveli* there is a gallery built along its entire length over the width of the projection of the facade from the line of structure (*fig.* 296). On the rear (northern) facade, only the central three bays are hollow, while the remaining bays are blind articulated with pilasters. On the side facing the terrace, this gallery is hollow throughout its length thus providing access from the terrace area in front. There is a room built over the two bays to the west of the rear bay (*fig.* 297). This probably provided temporary shelter in case of inclement weather, especially when the terrace was used for sleeping at night. An open stair made of slabs of stone cantilevered from the wall provides access to the terrace of this block. The railing to the terrace is provided by a network of horizontal and vertical *ballis* capped by *mundis*, with plain *takiya* panels at the base. The spacing of the vertical *ballis* is co-ordinated with the structural bays. Each structural bay is further divided into three equal divisions.

The terrace at the highest level is above the strip of gallery at the rear, connected with the terrace of the room at the north-western corner. It has a row of vertical *ballis* positioned above *khambhas* with *takiya* panels in between.

### *Composition of the Elevations*

The discussion on elevations will start with the external elevations, (in this case, the south (front) and north (rear) elevations, and the little strip elevation to the east, visible from the street at the front. The discussion will also include the elevations of the ranges around the *chowk* and the treatment of internal room elevations.

**South Elevation:** The south (front) elevation is a superb composition of *baris*, *jharokhas* and panellised wall surfaces, extensively sheathed in decorative carving (fig. 122, 123). The decoration is extensive, but not overwhelming. Flat plain surfaces are interwoven in the scheme to an extent to provide a perfect foil for the decorated surfaces. Equally at play is a superb massing composition, in the basic building form. The building, at four floors high with a substantial basement floor is an enormous facade, one of the highest in the *Patua* group of *Havelis*. What relieves such a large mass of facade from oppressiveness and monotony, given the fact that the structural *khambhas* on the front facade are arranged in one straight line, is the ingenious organisation of solids and voids. As we have discussed before, there are two primary aspects in the design of an elevation; the organisation of solids and voids in the facade in relation to the structural layout, and the detailed architectural language of the elevation in the use of *jharokhas*, *baris*, decorative carving, mouldings and so on.

The overall facade may be interpreted as a giant 'T' comprising three floors, projected from the surface of the facade, supported on *todis* (fig. 298). This rests on a porous *diwankhana* on the ground floor, with a porous basement floor below. The *diwankhana* is raised up considerably from the street level with a long flight of *pidhakiyas* in the centre. The facade is perfectly symmetrical about the centre. The 'T' comprises the five central bays on the first and second floors, and all the seven bays on the third floor which are projected out as one large mass from the surface of the facade. The ground floor has the *diwankhana* across the length of all the seven bays, but the two bays at either end are wider and treated differently to the central five bays. As a result, the central bays visually appear to be a continuation of the form above, thus accentuating the 'T' shape. The *khambhas* on the ground floor appear like stout vertical props, on which the giant 'T' shape rests. The central bay on the first, second, third floors steps out further from the surface of the 'T' right upto the level of the parapet. The basic massing is bold and simple and works wonderfully in combination with the rich array of *jharokha* and *baris*.

We now discuss the massing in relation to the structural layout. The position of the *khambhas* in the *diwankhana* on the ground floor adjacent to the street, is the plane of the structural *khambhas*. Each floor has structural *khambhas* pertaining to the position of each of these eight *khambhas*. The length of the facade comprises seven bays in all. There are five bays in the centre, all equidistant, except the central bay, which is a trifle wider. The two side bays are wider.

The building facade detaches itself from the line of *khambhas* in the central five bays, on the first floor. The stepped out facade is supported on a row of double *todis* (fig. 299). The central bay is a *jharokha* and steps out further from the plane of the stepped out facade. The



two bays at either end are flushed with the line of the *khambhas*. In the centre of each of these two bays, a *kanwal* is positioned

On the second floor, the central five bays are again detached from the line of *khambhas*, but they follow the profile of the stepped out facade on the first floor. The central bay is projected in line with the projected *jharokha* on the first floor. The two end bays are flush with the line of the *khambhas* but in the centre of each is a *tibari* projection, supported individually on rows of double *todis*. The central projection comprising five bays coupled with the two *tibari* projections at either end create a natural support for the third floor facade which is projected out along the length of the entire facade.

The facade on the third floor, projects out along its entire length, however, leaving two tiny strips of facade at either end. This as we shall see later corresponds to the width of the structural *khambhas*, as established on the ground floor.

The central bay is projected in line with the floor below, and in the centre is another *jharokha*. This double stepped profile in the central bay is carried to the parapet above.

Inserted into this basic scheme are *jharokhas* of diverse shapes, along the centre and the two peripheral bays. Bold horizontal *chajjas* cut across the facade at floor levels. There is the use of the double *chajja*, characteristic of the matured *Mughlai shaili*. The double *chajja* is used primarily as a compositional element; creating richer shadow patterns. Here it either runs across the entire facade or is localised over a number of bays or used in conjunction with individual architectural elements.

Visually, the sensual carving on the facade is the singular most overwhelming factor to an observer. However, one will notice that a strong design structure creates a framework of elements which is then embellished and infill with intricate decorative carving.

The *khambhas* abutting the street in the *diwankhana* are the composite type (fig. 139). The plain *sakh* in the centre has a distinct *paggi* carved with the acanthus leaf design. Along the shaft of the *sakh* runs a continuous tendril design set with a frame of *marwari*. A pair of *surangdar* pilasters occur on the two sides supporting the cusped *margol* above. At the junction of the plain *sakh* and the *surangdar* pilasters is an engaged colonette terminating in a stack of piled *marwaris* crowned by an emphatic volute. A *diyaslai*, carved in the image of a *nokwali bari* is located on the face of the *sakh* at the height of the *tant* of the *margol*. The central five bays have cusped *margol*, the central *margol* being wider than the other four. The two end bays are considerably wider and are spanned by cusped *halali* brackets (fig. 300). The bay to the right is screened with a wall, with a plain *bari* positioned in the centre.

Panellisation of external wall surfaces is seen here in all its glory. It is important to mention here again that the rhythm of panellisation is integrated with the structural layout. There is no need for this to be, from a structural point of view, as the external facade is totally detached from the structural *khambhas*. The fact that the panellisation and structure are visually co-ordinated, may be explained as a characteristic design trait, as has been explained previously in Principles of Design. The panellisation follows a very simple pattern. Each bay is divided into three vertical panels, with the central bay wider than the two side bays (fig. 122, 123). The width of the structural *khambha* is expressed as another vertical panel. This generates a rhythm of panels along the length of the facade. In the centres of all the bays, which comprises the wider bay in the rhythm of panels, aedicules such as *baris* or *jharokhas* are positioned. On the first floor, there is a *nokwali bari* placed in the centre of each of the five

central bays (fig. 302), except the centre, which has a *jharokha* with an inclined *takiya*. In the centre of each of the two peripheral bays is a *nokwala kanwal* with a *gumbad* (fig. 301).

In the design of the panels, there is a tendency to sub-divide the vertical panels into smaller units. There are horizontal bands running across, at the height of the *takiya* of the *jharokhas* and at the level of the *ravati* of the *nokwala baris*. The first floor has a double *chajja*. The lower *chajja* is an extension of the *chajja* over the central *jharokha* stretched across the projection over the central five bays. The upper *chajja* runs at ceiling level across the entire length of the facade. The line of the lower *chajja* is picked up with another horizontal band across the length of the facade. This network of vertical pilasters and horizontal bands creates smaller panels, each of which are then individually filled with decorative *jali* patterns (fig. 302). The two bays at either extremity of the facade are higher due to the absence of the lower *chajja*. It thus gets a row of additional panels above the level of the *chajja* (fig. 122, 303).

It is interesting to note the design of the double row of *todis* supporting the stepped out facade on the first floor. Here the *todis* follow the rhythm of the vertical pilasters above; each *todi* is placed vertically below a pilaster. Continuous strings of *sehrabandhi* occur along the line of the stepped floor. The rear panels between two *todis* are each infill with a different pattern, and the soffits of each bay between two *todis* is marked with a hanging pendant (fig. 302).

The network of vertical pilasters and horizontal bands is not left plain; they are covered uniformly in the *bajrangi* pattern set within a nominal frame (fig. 303). The infill panels within are covered with diverse decorative patterns such as *gadhakhori*, *chaufulia*, *teenjau*, *chaarjau*, and so on. Each pattern, however, is set within a frame. In each vertical panel the central longer part is treated visually as a structural bay, with a *margol* carved at the upper end.

Of all the floors, the first floor is the most densely carved of all the floors (fig. 122, 302, 304). It is also the most extensively seen floor, being closest to the street below. The ground floor is porous, with very little surface area to display decorative carving. The *khambhas* on the ground floor are virtual showpieces of design, having been lavished the greatest attention on the ground floor facade, due to their proximity with the street.

The dense striation with panels and pilasters on the first floor is counterbalanced at the level of the *chajja*, with strong horizontal elements. The horizontality of the *chajja* is compounded with two distinctive friezes (fig. 304). The lower frieze occurs between the two *chajjas*, just above the *kane*. It is the *kangra* enriched visually with a superimposed layer of interconnected foliage and flower design (fig. 307). This is surmounted by another broad horizontal frieze above the continuous *chajja* which runs along the entire facade. This frieze comprises a row of acanthus leaves, carved with delicate three dimensional modelling). The acanthus leaf design has been a part of the vocabulary of the *surangdar khambha*, in the expression of its base and *sira*, and in the surmounted *paan* as has been illustrated in section 3.3 (Architectural Components and their Details) of chapter 3.. Here, however, we see the design, transformed from being a subsidiary moulding, to a prime architectural form in itself. We see similar applications of the acanthus leaf design, in buildings of the matured *Mughlai* phase. Here however the application is singularly the grandest. It has also been used in a painted version in the *bilati*, in various parts of the interiors of the haveli, as will be illustrated as part of the discussion on internal elevations. The acanthus frieze is probably the

most emphatic horizontal element in the facade together with the *chajjas*. It is effective primarily due to its bold vegetal nature and sinuous profile, which contrast with the dense linear structuring of panels and pilasters and the filigree geometrical carving.

The panelisation on the second floor is simpler and less dense (fig. 304). The simplification begins by clubbing the strip panels as on the first floor together to create wide panels. In the projected facade, comprising the five central bays, one notices a wide panel between the first two and last two bays with *nokwali baris* (fig. 122, 123). These wide panels correspond to the combined width of three strip panels from the floor below; a central panel corresponding to the width of the *khambha*, and two panels on either side, each a part of the tripartite division of each bay as explained before. Here these strip panels are combined together to create a large wide panel. The *nokwali baris* continue to be located on the centres of each structural bay as the floor below. The projected bay in the centre of the elevation has a *nokwala jharokha* with a *gumbad* (fig. 305). The inclined *takiya* is carved with the acanthus leaf design, as in the frieze immediately below. The *jharokha* is supported on a pair of *todis* projected at an angle to the facade. The *todis* overlap the acanthus frieze and rest on a *pavdi*, breaking the horizontal lines of the *dasa* and subsidiary mouldings. The level of the *chajja* of the central *jharokha* is picked up with a continuous *chajja* along the facade. This forms the lower level *chajja* in relation to the upper level *chajja* which runs at ceiling level above, also along the entire facade. *Mughlai chajjas* are more like fins, thin and sharp, quite in contrast with the heavy ribbed *Sompuriya chajjas*. In the matured *Mughlai* phase, their streamlined appearance is most emphatic. They almost appear to float above the wide masses of shadow they create below.

At the two extremities of the facade, the two bays have a *tibari* each (fig. 304). The *tibaris* occupy the entire width of the bays. They leave narrow strips of flat wall surface at either end, each of which correspond in width to the structural *khambha* as established on the ground floor. The *tibaris* are supported on double rows of *todis* with string *sehrabandhi* and suspending pendants. The *khambhas* are *surangdar* and spanned by cusped *margol*. The *bari* is provided with timber shutters, with the frame worked within the profile of the opening. Within the arched opening above each shutter is a decorative timber panel, carved with variations of decorative foliage designs found elsewhere. The horizontal banding of the panels on this floor is far less dense than the floor below. Only the level of *takiya* of the *jharokha* and *baris* is picked up as a continuous band, creating visual equivalents of *takiyas* in each panel. At the top ends of the panels, one notices the cusped *margol*, delineated in profile. The density of carving on the panels is sparser as compared with the first floor, restricted to the *takiya*-equivalent panels, and the framework of pilasters. The central part of each panel is left plain. The *bajrangi* pattern is typically used to fill the surface of vertical pilasters, but the geometrical designs of the *takiya* panels are comparatively larger and bolder. The reduced carving on this floor is effective, in adding variety to the facade. Moreover, tedious carving on the same scale as the first floor would have been lost from the distance of the street below. The space between the two *chajjas* above the second floor, is infill with another horizontal frieze, consisting of the *kangra* with inserted *chaufulias*. There is another *kangra* frieze directly below the third floor *dasa* above.

The decorative design gradually becomes bolder and simpler on upper floors. The third floor is the plainest in terms of decorative carving. The rhythm of pilasters continues, as on the floor below. Here, however, there is no double *chajja*. A single continuous *chajja* hovers above at ceiling level. This creates a substantially tall wall surface. The potentially disproportionately tall panels are broken by three horizontal bands (fig. 122, 123). The lowest

band corresponds to the *takiya* of the *jharokha*, the second band to the level of the *chajja* of the central *jharokha*, and the third to the level of the *chaap* of the central *jharokha* (fig. 305). The central *jharokha* itself is plain with an inclined *takiya*. It is cantilevered from the facade, with no supporting *todis*. Plain *baris* are positioned in the centres of all the bays except the central one. The *takiya*-equivalent panels are carved with bold eight petalled flower designs, which do not lose their legibility when viewed from a distance. It may be recollected that the central five bays on this floor comprise a *chandni*. Patches of sky are framed within the openings of the *jharokhas* and *baris*, when viewed from the street below (fig. 305). It appears as if the building has woven in parts of the blue sky into its fabric.

The design of the parapet above comprises a network of vertical *ballis*, crowned by *mundis* following the rhythm of the vertical pilasters in the wall panels. The *takiya* at the base is plain with two parallel *ballis* above.

*Strip Elevation on East:* The strip elevation (fig. 306) to the east corresponds to the single bay of the *diwankhana*, beyond which is a blank party wall. In terms of massing, the entire elevation is flat, flushed with the surface of the *khambhas* on the ground floor. The ground floor has a central opening spanned by a pair of *todis* with a *takiya* below. The panellisation of the walls on the floors above follows the pattern on the front facade; the bay is divided into three panels, with a wider central panel. The *khambha* to the left is expressed as a panel-equivalent. In the wider central panel is located a *bari* in each of the three floors; *nokwali baris* on the first and second floors and a plain *bari* on the third floor. The *chajjas* on the front facade continue and wrap around the strip elevation in an identical manner to the front facade. It is single on the ground, first and third floors and double on the second floor.

*North (Rear) Elevation:* The rear elevation (fig. 308) is primarily solid and bland. The ground floor is solid throughout. The first floor facade steps out supported on a single row of *todis*. The second floor steps out further from the profile of the first floor, supported on a single row of *todis*. The facade on subsequent floors carries on straight following the profile of the second floor. The central bay is projected throughout the full height of the elevation. The gallery on the terrace above has a solid wall to the rear facade, except the central three bays. The projecting bay in the centre has a *tibari* opening, flanked symmetrically with a bay spanned by cusped *margol* on either side.

The wall surface is extensively panellised in a tedious repetitive monotony. There is no attempt at massing in the basic form or in creating variety by combining panels, as in the front elevation. *Baris* are positioned in the central projection and some panels on the side, in the first and second floors. These constitute virtually the only attempts at breaking the solidity of the composition. The central projection on the third floor is a trabeate *tibari* with double *chajjas*.

Pierced *taraphul* designs at the upper end of the wall panels on the first floor add a degree of richness to the facade on that floor. Throughout the facade, the *chajjas* are emphatic and continuous.

*Elevations to the Chowk:* The elevations of the ranges around the chowk, in the extent they are seen from the *chowk* on the ground floor are three floors high. The ground floor comprises load bearing *khambhas*, forming five bays along each of the two sides of the *chowk*. The first and second floor facade is effectively a two storey gallery, hung from the



body of the main building, providing access to the ranges around the *chowk* (fig.312). The facades of this gallery are porous on all four sides. As explained before, there are two ways in which this gallery is supported; structural connection with the floor slabs, at floor levels and support provided by the *todis* anchored to the line of structural *khambhas*, at the level of the first floor slab. The support system of the gallery floor slab at first floor level is worth noting. The main load bearing pendant *todis*, four in number in each bay, are not the sole load bearing members (fig. 309). There is a stacking of three miniature *todis*; two in opposite directions, supported on a third *todi* at right angles to the two, directly below the pendant *todis* holding a flat band of stone above. The pendant *todis* are anchored back to the wall, but also distribute a part of the vertical load through this network of miniature *todis* to the *khambhas*. The load that is difficult to transfer by a single row of *todis* is achieved by this combination.

The ground floor has five bays, each spanned by a cusped *margol* (fig. 276). The *khambhas* are plain with plain *paggis*. There is a *diyaslai* positioned on each *khambha* at the level of the *tant* of the *margol*. In the north facade the *chowk*, the two bays at either end have a seat with an inclined *takiya*, accessible from the *pathiyal*. There is no *chajja* on the ground floor. The projected slab of the gallery effectively functions as a *chajja*.

The facade on the first floor also has five bays. The gallery consists of plain *khambhas* positioned in line with the structural *khambhas*. The two end bays are narrow, having lost more than half their width in accomodating the gallery. The bays are spanned by cusped *margol* with *takiyas* at the lower level.

The second floor follows the pattern of the first floor, however with a notable difference. In the central bay, in all the four ranges is a projecting *bari* or *jharokha*, overlooking the *chowk* (fig. 310, 311). The central projection in the rear facade is a blind *nokwali tibari* with an inset miniature *nokwali bari* (fig. 325, 286). It is lavishly decorated in the upper parts, with vegetal and bird motifs. The *bari* is unusual, in that it is not connected with the gallery, but with the room beyond. The design of this unusual *bari* will be discussed in detail later in this section.

The range to the south of the *chowk* has a *tibari jharokha* in the central bay (fig. 310). This *tibari jharokha* is connected with the *chandni* (Chandni2.2, fig. 282) on the second floor as discussed before. It is provided with a localised double *chajja* and strangely with a double row of *takiyas* piled atop each other. The lower *takiya* corresponds with the continuous level of the gallery *takiya*. The upper *takiya* is inserted as backrest for the raised seat housed within the thickness of the *jharokha* accessible from the *chandni*. The remaining facade on this floor is blind, screening the *chandni* behind.

The gallery breaks into a flat terrace on the third floor, providing access to the ranges, terraces and *chandnis* arranged around the *chowk*. A network of *ballis* and crowned *mundis* with decorated *takiya* panels forms the protective railing around the *chowk*. In the centre of the range to the rear, is positioned a plain *jharokha* with a trifoliate *margol* supported on *surangdar khambhas*. It has a localised *chajja*, with a second continuous *chajja* above (fig. 293).

Decorative carving in the gallery is of a vegetal nature, and limited to the spandrel panels of *margol*, *takiyas* and in the horizontal band above the *chajja*, between the *kane* and the *dasa* of the floor above.

We conclude by discussing the visual effect of different planes of wall surfaces with differently profiled openings positioned in close proximity. The porous nature of the gallery enables the spectator to simultaneously view the different planes that lie behind it. This layering of planes is a good demonstration of the concept of partial views of planes framed within the openings in the planes in front. On the ground floor, the plane of the structural *khambhas* has five bays defined by cusped *margol*. Through these openings the spectator has a view of the elevation of the *kotha* wall at the rear of the *pathiyal* (fig. 312, 314). One sees this elevation only partially. On getting closer, and entering the *pathiyal* space, one sees the elevation in its entirety. This elevation is essentially a rhythm of *alas* and doorways arranged in alternate bays. The key levels in the two planes are virtually independent of each other. The heights of doorways or the level of *dasa* in the *alas* have no relation to the *margol* or *khambhas* in the front plane. Each plane is complete within itself and designed virtually on its own independent terms. It is a matter of co-incidence that the spectator sees them simultaneously; for they are not intended to be seen as a co-ordinated whole. This approach in another way refers back to the aesthetic of appreciating form as a unitary element, in an incremental sort of way, as discussed previously. Just as the structural bays are treated individually, as symmetrical balanced entities put together to create the fabric of the building, individually complete planes are assembled in succession.

The first floor similarly has a framed view of the doorways with cusped *halali* brackets of the ranges behind framed between the cusped *margol* bay openings in the gallery (fig. 312, 313). The wall panels in the bays at the two ends covered with a *jali* of miniature *margol* are seen framed within the gallery openings. On the second floor, a pair of door openings are framed through openings in the gallery spanned by cusped *margol* (figs. 312, 315).

**Internal Elevations:** The internal elevations rarely involve blank walls. Built in storage spaces, niches and *alas* articulate most internal walls, providing much needed storage space. These storage elements are visually integrated in the scheme of the structural *khambhas*. The most extensively used storage element is the *ala* (fig. 148). As explained in section 3.3 (Architectural Components and their Details) of chapter 3, the *ala* comprises a deep box supported at mid wall height on *todis*, with a niche above and below it. In its most simple format, each *ala* is independently positioned between two *khambhas*. An elevation with a number of bays would have an *ala* in each of the bays. Most party walls on the two longer sides of the *haveli* are articulated in this way (fig. 316).

In case *alas* are used in walls dividing two spaces, they are used in conjunction with doorways, positioned in successive bays in different rhythms. An example is the *kotha* wall to the north of the *chowki* on the ground and first floors. Here a regular rhythm of alternating doorways and *ala* articulate the wall (fig. 317).

Subtle variations are exercised in the design of this element, mainly in the expression of its parts. The *dasa* at the base of the *ala* and the *galat* moulding above are sometimes continued along the length of the entire elevation cutting across the surface of the *khambhas* (fig. 318). Sometimes, the *galat* moulding above is replaced with a deep *beel* which creates additional shelving space above (fig. 319). The niche space below the *ala* is sometimes further subdivided with subsidiary shelving (320). An interesting variation occurs when the niche is subdivided into six or nine smaller niches, each niche opening framed with a *margol* (321).

The floors of most rooms are plastered mud. A raised *dasa* marks the base of all the walls in a room thus permitting easy plastering of the clay floor without getting the walls dirty (fig. 317, 322). The roofs are either spanned by stone planks, in which case they are supported on deep

stone cornices known as *bilati*. The *bilati* either rest directly on the wall or on *todis* perched atop *khambhas*. The *pathiyal* spaces mostly have timber ceilings (fig. 272). The deep timber beams are supported on elaborate *todis* perched on top of *khambhas*. These *todis* are always represented as three; the main structural *todi* in the middle flanked by images of *todis* spanning laterally on either side, carved in relief on the wall surface. The two side *todis* have no structural purposes and are merely images of *todis* (fig. 322).

Internal doorways are typically contained within a narrow frame (fig. 322). A strip of *galat* moulding sits atop the door head terminating the composition. The framed panel above the *galat*, is non standard in its proportions. It is mostly pierced with *taraphul* designs. The actual doorway opening is framed at the upper end with a pair of cusped *halali* brackets.

Blind wall panels, when used are not left plain. This is especially so when they occur in the more public parts of the *haveli*. The two short side walls in the *moda* on the ground floor have a door in the centre with blind panels on either side. A *dasa* is introduced about a metre above the floor level defining a dado like plane in the wall. The wall surface above this level has a cusped *margol* set within a frame carved in relief. At the centre of the panel is inset another decorative motif; a framed miniature *margol* flanked by peacock heads entwined with foliage and terminating in a flower bud above. The motif is arrayed at top and bottom, and the two sides with large flowers. This motif is ubiquitous in the articulation of blind wall panels, used with equal frequency in internal and external wall surfaces.

We conclude the discussion on this *haveli* by looking at some special architectural features.

**Entrance Door:** The entrance doorway (fig. 323) is set within a wide architrave covered with a mesh of *bajrangi*. Engaged circular colonettes run along the edge of the architrave at the two extremities. The *paggi* of the architrave is a showpiece of *Mughlai* design (fig. 324). It rests on a flaring base called *kumbhi* with a ribbed *kane* moulding in between the two. The *dasa* below has a row of *chagola* carved on it.

*Diyaslais* in the form of miniature *baris* sit at the upper ends of the architrave. A strip of *galat* terminates the composition at the top. Miniature *surangdar khambhas* are used as colonettes supporting a string of overlapping buds which skirt the inner perimeter of the architrave.

The door has a threshold covered with punched brass sheets. The richly carved door frame consists of a wide head with a niche housing an icon of Ganesha. The door is panelled consisting of alternating wide and narrow panels. Intertwined bird and foliage designs infill the panels. The panels and struts are secured with decorative steel rivets. The door is decorated extensively with organic designs, of a character different to the *Mughlai* vegetal designs in the stonework. The designs show similarities with Gujarati wooden carving.

**Nokwali Bari in Chowk:** The *nokwali bari* on the second floor in the *chowk* is a striking object which deserves special attention (fig. 325). The *bari*, as discussed previously, is nothing but a blind box from the room within. The relatively large surface of wall area has been treated to exquisite decorative carving. In design, it is unusual; one normally sees a *nokwali bari* with a single bay and spanned either by a cusped or trifoliate *margol*. Here, the facade is divided into three bays with pilasters. The most unusual feature is the horizontal pilaster that divides the facade into two creating three arched panels above. This also creates the convenience of having three *margol* in the panels below, rising to the same height. In the

absence of this element there would have been the potentially problematic issue of having to design *margol* at different heights, in the three bays, with each of them rising individually to meet the curved profile of the frame above.

The blind panels above have been used as the perfect location for decorative carving. The central panel has a symmetrical radiating foliage design. The two side panels have peacocks and foliage. The *kane & kangra* above the curved *chajja* follow the profile of the *chajja*. Peacock crests supported on pendants are placed above the *kane*, at either end, at an angle. The central panel is inset with a miniature *nokwali bari* and the left and right panels interestingly have a punched moon and sun at the upper ends. The entire ensemble is supported on *todis*, with a string of *sehrabandhi* along the edge of the *dasa*.

*The Ceilings:* The ceilings over the *mol* on the first floor and the hall to the north of the *chowk*, on the third floor are made of decorative panelling. The design of the ceiling in the *mol* is set within a wide frame of inset squares. Tiny flowers made of ivory are positioned within each of these squares (fig. 327, 328). The main design comprises octagons and squares enmeshed in a network of diagonals. The design is made of tiny strips of profiled timber assembled together to form the geometrical design. This is then nailed to the board which forms the base. At the centre of the design, an eightpointed star is inserted with a suspended ivory pendant. The ceiling is richly painted with a background of red, with gold and black in the geometrical overlay.

The ceiling in the hall on the third floor is made of squares composed of tiny rectangular strips (fig. 326, 329). These squares are turned on their vertices and joined to each other on their vertices. The diamond left between two rows is filled in by the same pattern turned ninety degrees about its vertex. The design is enmeshed in a diagonal network of squares inset with tiny ivory flowers. The geometrical overlay is composed of tiny profiled timber strips, as in the *mol*, assembled and nailed to the base board. The base colour is blue, with a red, and gold overlay design.

## 6.2 Bahadurmaji Haveli

The *haveli* of Bahadurmaji lies in a unique location with respect to the remaining four *havelis*. It terminates the row at the western edge, where it sits adjacent to a large public *chowk*. The main entrance to the *haveli* is from the street along its southern edge, as in the other *havelis* of the group. Unlike the other *havelis*, however, the wall along the western edge is not a party wall between two terrace houses, but a prime facade overlooking a public *chowk*. This *haveli* thus has three sides open, unlike the other *havelis* which are open only on two sides (front and rear). Another departure in the design of this *haveli* is a gateway that is appended along its south western corner. The gateway faces a public *chowk* on the west, and primarily provides definition to the street that provides access to the five *havelis*. The gateway, however, provides public access only on the ground floor. On the upper two floors, it becomes an extension of the main *haveli*, over a public street, providing additional living space.

### *Planform and Spatial Organisation*

*Ground Floor:* The main *chowk* is rectangular, comprising five structural bays, both along its width and depth (fig. 330). The *chowk* is wrapped around with parallel bays, on all four sides; two to the north and west, three to the south and one to the east. Three parallel bays; a wider



central bay flanked by two narrow bays are appended to the south west corner of the *haveli*, in line with the two bays along the western edge of the *haveli*. These three appended bays form a gateway to the street along which the five Patuon ki *havelis* are located. The wider central bay forms the main passageway for the gateway while the narrow flanking bay to the south houses a single flight of stairs from the street directly to the floors above. This three-side-open *haveli* has access from two sides: the main entrance is from the street to the south, and subsidiary access is positioned from the public *chowk* to the west. As in the other Patuon ki *havelis*, the *ota* is considerably raised from the street level with a long flight of *pidhakiyas* leading up to the front of the entrance door. The *diwankhana* is one bay deep and runs across the entire width of the *haveli*, incorporating all its eight bays (fig. 331). On the south western corner, where the gateway is appended to the *haveli*, the floor of the *diwankhana* extends into the gateway incorporating its narrow bay. This widening of space within the *diwankhana*, has the effect of naturally leading one to the south-western corner, providing a view of the wide passageway of the gate, while being perched above the street level. A solid wall separates the *diwankhana* from the *haveli* spaces to its north. The main entrance door is located centrally, with subsidiary doors from the *diwankhana* leading to rooms on either side of the central door. Through the main door, one is led into the one bay deep *moda*. The northern wall of the *moda* displays an alternating rhythm of *baris* and *jali* panels (fig. 332). Of the five bays, the central bay has a *nokwali bari* flanked by two narrow *jali* panels. The two bays at either end comprise plain blind *baris*. Access to the *chowk* is through the bay adjacent to the central bay. From the present state of insensitive modifications to the original structure, due to the conversion of the ground floor into a shop for antiques, it is difficult to appreciate the effect of the original design. Similar to the *haveli* of Jorawarmalji, the central *nokwali bari* in the rear wall of the *moda*, was most likely a framed opening, with a *takiya*, providing a framed glimpse of the *chowk* from the entrance. This has now been sealed (fig. 322). The physical access to the *chowk*, however, is non-axial. The *chowk* is rectangular in shape, wider along the northern and southern edges. However, both the length and width comprise five bays each. Of the five bays along the length (edges along north and south), the central bay is a trifle wider than the rest (fig. 334), while along the width (edges along east and west) all the bays are equal (fig. 333). The *chowk* provides access to two sets of staircases; one in the south-eastern part of the *haveli* occupying one bay along its width and the other in the north-western part of the *haveli* also occupying one bay along its width. The staircase in the north-western part which also provides access to two floors of basement below is also accessible from the public *chowk* outside to the west of the *haveli*. The ranges around the *chowk* comprise a one bay deep *pathiyal*-like space, along all the four sides. The space is a narrow gallery-like space to the south, while to the north, east and west, it is substantial. Along the west, the *pathiyal* combines two parallel bays. There is a wide flight of stairs leading directly to the basement in the *pathiyal* range to the east of the *chowk*. The corners in the north east and north west comprise rooms accessible from the *pathiyal* to the north of the *chowk*. At the northern edge of the *haveli*, corresponding to a narrow bay, is a linear *kotha* accessible from the *pathiyal*.

*First Floor:* The most noteworthy aspect of the first floor plan is the arrangement of projections in the external facades within the framework of structural bays (fig. 335). Around the *chowk*, there is a continuous gallery projected out from the line of the *khambhas*, supported on *todis* (fig. 363). The stepping out of the gallery is ingeniously designed as two gradual projections, and will be illustrated in detail later in the section on massing. There is an attempt in this *haveli*, to spatially create openness in the plan from the first floor onwards, while in most *havelis*, this happens only on the uppermost floors. Cross walls running

between the load-bearing columns and cross-bracing, them thus creating a network of small dark spaces is atypically absent, especially along the ranges to the north and south of the *chowk*. This might possibly be due to the lesser number of floors (ground plus two) in the superstructure, hence the reduced load that the *khambhas* have to support. All the three parallel bays have been combined along the depth to create large halls, in the ranges to the north and south of the *chowk*. The halls combine all the five bays along the width of the *chowk*. In the hall to the south of the *chowk* (Room 1.1, fig. 335), there has been an attempt to create a large central space by eliminating two intermediate columns about the central bay. The resultant space is a large central hall wrapped by narrow arcades along three sides (fig. 336). Only *khambhas* remain in their established locations braced at their upper ends with different *margol* types; cusped and *halali*. Along the southern edge of the hall, corresponding with the line of the load bearing *khambhas*, projected galleries have been appended, which considerably aid in increasing the sense of space within the hall. The central bay opens out to a *jharokha* through full height doors, positioned on the line of the external wall. The hall immediately to the south of the *chowk* has been furnished by the present owners as a *baithak* space (fig. 336). This gives an idea of the nature of furnishings used originally to furnish living spaces: mattresses with bolsters covered in brightly coloured textiles are laid on red sheets spread directly on the floor. Low lacquered tables, *hookas* and some paintings adorn the room. It is highly unlikely that traditionally a room was reserved exclusively for one function. As suggested previously, the minimal and movable nature of furnishings supported a lifestyle that involved appropriating a particular space for a specific function, at a given time and context. The hall housing the *baithak* is not accessed from the side of the *chowk*, but from the linear gallery adjacent to it on the west. There is only a visual link between it and the *chowk*, through a *bari* in the central bay. A one bay wide room, spread across the depth of two bay occurs to the east of the hall, accessible directly from it.

The hall to the north of the *chowk* (Room 1.2, fig. 335) is accessed through a doorway from the gallery around the *chowk*. This hall has been furnished as the bed room (fig. 337). Here too, as in the *baithak* hall, two intermediate columns in the centre have been eliminated to create a wide central space. This is flanked by one bay deep arcades on either side. Projecting galleries extend the space of the room, along the northern edge of the room. The projecting gallery space corresponding with the two flanking bays has been designed as storage space, and is provided by built in shelves and niches. A one bay wide storage room lies to the east of the hall, and is accessible from it.

The gallery space around the *chowk* connects with a narrow passageway that winds along the eastern edge of the *haveli*, leading on to the toilet at the rear. A continuous chute terminates in a collection chamber directly below on the ground floor, from where it is accessible from the street at the rear.

The range to the east of the *chowk* is a simple one bay deep *pathiyal*-like space (Room 1.3, fig. 335), with a rhythm of *alas* built into the party wall, coordinated with the position of the *khambhas* (fig. 338). To the west of the *chowk*, occurs a combination of a *pathiyal*-like space and enclosed rooms. The *pathiyal*-like space (Gallery 1.4, fig. 335) functions as the prime interconnecting space, providing access to various rooms adjacent to it (fig. 339). It is one bay deep and six bays long. There is a cutout with a steel grille, over a part of the roof, which opens into a *chandni* located directly above. As a result, the space has a degree of an open to sky feel to it. To the west of this space, lies a one bay deep hall with a projecting gallery space appended along the external edge along its length. To the south, the *pathiyal*-like space leads to a large hall (Room 1.5, fig. 335) built directly above the public street below. Similar

to other halls in the *haveli*, the typology of the hall is that of a wide central space flanked by narrow galleries on all four sides (fig. 340). The galleries to the east and west are formed from the projections in the external facade, from the line of structure. A one bay deep room currently in use as shrine is carved out from the long hall to the north. The narrow bay to the south of the hall accommodates the staircase leading from the street below to the floors above. The hall space itself doubles up as the landing for the staircase.

The facade detaches itself from the line of structure from the first floor upwards in a scheme of projected and recessed bays, in accordance with the logic of the massing. It is useful here to note the rhythm of projections and recesses in the external facade along the north, south, west and a small stretch on the east. The rhythm is integrated with the system of structural bays. However, here we see two different themes, in the intended treatment of the overall facade; symmetry with a hierarchy of the centre (as in the northern and southern elevations and in the east and west elevations of the gateway structure), symmetry but with no clear central focus (the western facade). The composition the facade will be elaborated later.

*Second Floor:* The second floor plan illustrates a substantial departure from the lower two floors in the degree of porosity of the built form (fig. 341). In addition to the open central *chowk*, there are on this floor, two additional open spaces in the form of *chandnis* to the west of the *chowk*. Similar to the floor below, there is a gallery around the perimeter of the *chowk*. However, on this floor, one bay wide *jharokhas* are projected out from the gallery, on all four sides overlooking the *chowk* below (fig. 363). The halls to the north (Room 2.2, fig. 341, fig. 342) and south (Room 2.1, fig. 341, fig. 343) of the *chowk*, similar to those on the floor below are two and three bays deep respectively, and are accessed from the gallery around the *chowk*. However, there are two notable differences in these halls from those below. One is the depth of the projecting galleries along the external facade. These are almost double the depth of those on the floor below, as a result of which the halls on the second floor feel more spacious. This, as will be explained in detail in the section on massing is due to projections of the external facade successively in stages on the first and second floors. The second notable difference is the presence of fairly large *chandnis* adjacent to the halls on the west. In the formation of these two bay wide *chandnis*, one bay corresponding with the main *chowk* has been subsumed. This means that there is effectively a one bay overlap of the *chandnis* with the main *chowk*. Interestingly, this one bay is sealed with a wall, like the other bays to the north and south of the *chowk*, so its visual integrity is not disrupted. Also, as a result, neither of the two *chandnis* are visible from the *chowk* space, and come as a surprise when they are discovered. Access to the two *chandnis* at the front and rear is through a one bay deep *pathiyal*-like space (fig. 346) to the west of the *chowk* with the staircase off it. Both the *chandnis* on this floor comprise two unequal bays along each edge.

The *chandni* to the north-west of the *chowk* (Chandni 2.3, fig. 341, fig. 344) provides access to ranges immediately on its east and west. The northern edge of the *chandni* corresponds with the external wall of the *haveli*. Instead of a simple wall, a covered gallery corresponding in width to the projection in the external facade, marks this edge. The four elevations to the *chandni* displays a system of visual proliferation of bays, based on the disposition of structural bays. As mentioned before, each elevation comprises two unequal bays. The wider bay has been sub-divided into three equal parts, with the result that each elevation is comprised of four bays. The centre of the wider bay is marked out, however, with doorways on the east and west elevations, and a *bari* on the north elevation. At roof level, the composition is crowned by a continuous *chajja* and an inclined *takiya* which also functions as a parapet from the roof.

The *chandni* to the south of the *chowk* (*Chandni* 2.4, fig. 341, fig. 345) lies on a circulation route from the *chowk* to the ranges built over the gateway at the south-western corner. It also provides light and ventilation to the *chandni* on the floor below, through a cut-out in the floor covered with a metal grille. Unlike the other *chandni*, this *chandni* does not provide physical access to the adjacent ranges, but affords glimpses from adjacent ranges through low level *baris*. This *chandni* also comprises two unequal bays along its length and width. Here, however, the bays are not sub-divided; each bay is crowned with a trisegmental *margol* supported on pendants. To the south of the *chandni*, a one-bay deep *pathiyal*-like space provides access to the halls to its east and south.

A long one bay deep gallery-like space (*Gallery* 2.5, fig. 341, fig. 346) occurs to the west of the *chandni* and connects with the hall to the south built over the street. This hall is similar to that below, in that a wide central space is wrapped around with narrow bays on all four sides (fig. 347). The peripheral bays to the east and west are, however, considerably wider than the floor below, due to a second step in the projection of the external facade.

The ranges to the north-west of the *chowk*, adjacent to the *chandni* and accessible from it, in all probability formed the kitchen in the original scheme (*Room* 2.7, fig. 341 and fig. 348, 349). This may be inferred from the soot-covered walls and the remains of a hearth on the floor. The ranges to the north-east corner comprise the toilets accessed through a narrow passageway, from the gallery around the *chowk*.

To the east of the *chowk* is a one bay deep *pathiyal*-like space with a series of *alas* built into the thickness of the wall. The three staircases, in the north-western, south-eastern corner and southern edge of the gateway structure lead to the terrace above. The terrace is primarily flat with outcrops of mummy structures over the three staircases, and is provided with cutouts over the main *chowk* and the two second floor *chandnis*, with protective railings (fig. 350).

### *Composition of the Elevations*

The composition of the three elevations (north, south and west) of *Bahadurmalji's haveli* displays a variety of arrangements of projected and recessed planes, within the grid of structural *khambhas*. The elevations of the *haveli* on the north, south and west are distinctly varied in character. Though conceived in the matured *Mughlai* idiom, they individually represent varied degrees of formal plasticity and richness. The front elevation on the south is avowedly the most elaborate as is the strip elevation of the gateway facing the east. The west elevation is composed of two parts; the northern part is relatively bland, and the part on the south, facing the gateway displays the same degree of elaborateness as the strip facing the east. The north elevation is flat and bland.

*The South Elevation:* The south (front) elevation is overlapped substantially in the left half with the form of the gateway structure appended to the main *haveli*. In spite of this, it is not difficult to decipher the symmetrical design of the elevation (fig. 351). The ground floor is an arcade of seven bays, with the five central bays corresponding with the extent of the *chowk*. On the first floor, the central three bays are projected out flanked with recessed single bays with a projecting *kanwal* each (fig. 352). The bays to the extreme right projects out to a similar degree as the three central bays. It is important to point here to the fact that the massing arrangement on the elevation is coordinated with the geometrical centre of the plan-form: the *chowk*. The hierarchically emphasized centre of the elevation tallies with the centre



of the *chowk*. It is implied that the symmetry is mirrored to the left half of the elevation which cannot be seen due to the mass of the gateway structure appended to the *haveli* at that point. Though this seems as the obvious massing solution, it might possibly have been abandoned for a more unconventional arrangement of projecting and recessed bays as we have seen examples of, in other *havelis*, in accordance with the principle of symmetry in the unitary bay.

On the second floor, the pattern of projections is the same as that of the first floor with the difference that the third bay from the centre is devoid of the projecting *kanwal* as on the floor below. The entire building facade steps out further on this floor, from the line of the first floor facade, supported on a double row of *todis*. The massing theme on the front elevation may be summarised as vertical projecting bays separated by recessed bays, arranged symmetrically about the centre of the *haveli*.

The south elevation is a composition of seven bays. The *diwankhana* on the ground floor comprises an arcade of cusped *margol* with composite *khambhas*, supported on a *paanel dasa*. The two bays at the two edges of the facade; the eastern edge and the western edge, has a pair of *halali* brackets each bracing the upper ends of the opening, and a decorative *takiya* at floor level (fig. 364). A continuous *chajja* terminates the ground floor ensemble. The projections in the facade on the first and second floors are supported on double rows of *todis*, with a string of *sehrabandhi* along the soffit of the *dasa* (fig. 365). There are decorative pendants suspended from the soffit of the projecting floor slabs. The projection in the facade in the centre, comprising the three central bays, is almost identical on the first and second floors. In the central bay is a *jharokha* with a trisegmental arch thrown across the front supported on *surangdar khambhas* (fig. 366). The *takiya* is inclined and the emphatic *chajja* is flat. The *jharokha* is surmounted with a *ravati* which almost chokes in the small gap between the two *chajjas*. The two bays flanking the central *jharokha* have a *nokwali bari* each, inset within the panellised wall surface. The facade employs a virtually continuous double *chajja*, both on the first and second floors, imparting strong horizontal breaks at the roof levels of both floors (fig. 367). The central projection comprising the three central bays is flanked by *kanwals*, with a flat *chajja*, each surmounted by a *gumbad* (fig. 352). The *chajja* of the *kanwal* does not pick up the line of the continuous *chajja* on the elevation, but is set a few inches below it. The *kanwal* itself is solid, without any *baris* openings or *jalis*. It is thus merely a form on the elevation, positioned for compositional purposes. It creates an alcove from within. Externally, the form is articulated with *surangdar* pilasters at the vertices, with panels sheathed in decorative carving set in between. Set at the level of the *chaap*, at the springing point of the *gumbad*, is a row of curved petals. The projecting *dasa* is supported on two rows of radially arranged *todis*, terminating in a foliate pendant at the base.

The projecting bay to the right edge is divided into three parts with framed panels set within pilasters. A *nokwali bari* is positioned in the centre of the ensemble (fig. 368). The *khambhas* on the ground floor are represented on the first and second floors by their panel equivalents. The vertical panels on the facade are divided into smaller panels with horizontal pilasters picking up the level of the *takiya* and *chajja* of the inset *baris* and *jharokhas*. Along the length of the entire facade, the horizontal band between the double *chajjas* is carved with a continuous *kangra* frieze, interrupted only by the overlapping *ravati* and *gumbad* of the inset *jharokha* and *kanwal*. The framed panels in the facade on the first floor are entirely carved with minute geometrical patterns (fig. 368), as also the pilasters employed to frame the panels.

The facade on the second floor, as mentioned before, is projected out further, from the line of the first floor (fig. 352). From the street below, the cascading forms of the facade are overwhelming. Their visual impact is heightened by the visibility of the soffits of the projecting bays and *jharokhas*, with rows of *todis* and *sehrabandhi* tassels strung across the length of the facade. The horizontally layered appearance of the facade when seen from the street, is primarily due to the visibility of the soffits of the successively projected planes and architectural elements of the facade, as also those of the emphatic double *chajjas*.

The aedicular composition on the second floor comprises a *jharokha* with an inclined *takiya* in the central bay, with *nokwali baris* flanking it, in the two adjacent bays (fig. 369). The bay to the right edge of the facade is divided into three bays inset with a plain *bari* in the middle (fig. 352). The two bays on this floor corresponding with those with the *kanwals* on the first floor are left plain, inset with a miniature *margol* carved in relief (fig. 352). All along the facade, the density of carving in the framed panels is sparser and bolder than the first floor, and is restricted to the bottom *takiya* panels and spandrel panels of inscribed *margol* (fig. 369). The parapet at roof level follows the cascading profile of the facade, with a rhythm of vertical *vallis* picking up the rhythm of the pilasters on the main facade. Interestingly the parapet is conceived as a miniature floor, with a projecting *chajja* along the upper edge (fig. 370). It is high enough to create a sense of enclosure within the terrace area, so it imparts a feel of an open to sky room.

*The North Elevation:* The similar theme of a hierarchically emphasized centre is illustrated in the much blander north (rear) elevation (fig. 354). The ground floor in the north elevation is a plain solid wall with no articulation whatsoever, except some tiny stone *jalis* towards the upper end.

On the first floor, all the seven bays about the centre line are projected out, with the three central bays projected out most emphatically (fig. 353). There are no *jharokha* projections further from the line of the facade. The profile of the massing on the second floor replicates the profile on the floor below, except that the facade steps out further supported on a continuous row of *todis*.

The north facade, when viewed only from the outside, without seeing the plan and understanding the structural logic therein, presents a curiously asymmetric composition. The two-storey projected part of the facade, which corresponds with the three central bays of the internal *chowk* is not located in the actual centre of the facade. It is located closer to the eastern edge. This central projected mass is flanked symmetrically by a stretch of facade. To the western edge is an additional stretch of facade, which is delineated from the rest of the facade by being recessed from it. The facade when analysed in relation to the plan form, reveals the logic of the massing. The arrangement of bays to the east and west of the *chowk* is not symmetrical. Seven bays comprise the *chowk*. There are two parallel bays to the west of the *chowk* and only one bay to the east. This additional bay, which appears as the recessed bay to the western edge seems to disrupt the potential symmetry in the facade. The emphasis is clearly in expressing the logic of the structural bays and expressing it individually as a symmetrical entity. The overall form of the facade, visually, is a result of the process of arranging together a number of these bay-units.

The rear (north) elevation is primarily flat, relieved by very minor changes in plane. The projected facade on the first and second floors displays a dense vertical striation with pilasters (fig. 353). The rhythm of pilasters is picked up in the supporting *todis*. Inset aedicules include



*Fig. 154 Craftsmen in Liyaqat Ali's workshop, Jaisalmer*



*Fig. 155 Craftsman using prakar (compass), and gaj (scale) in the layout of surangdar khambha*



*Fig. 156 Craftsman using gaj (scale)*



*Fig. 157 Carving of eight petalled flower in progress*



*Fig. 158 Metal stencils used to transfer vegetal designs to stone slabs, using red clay dust*

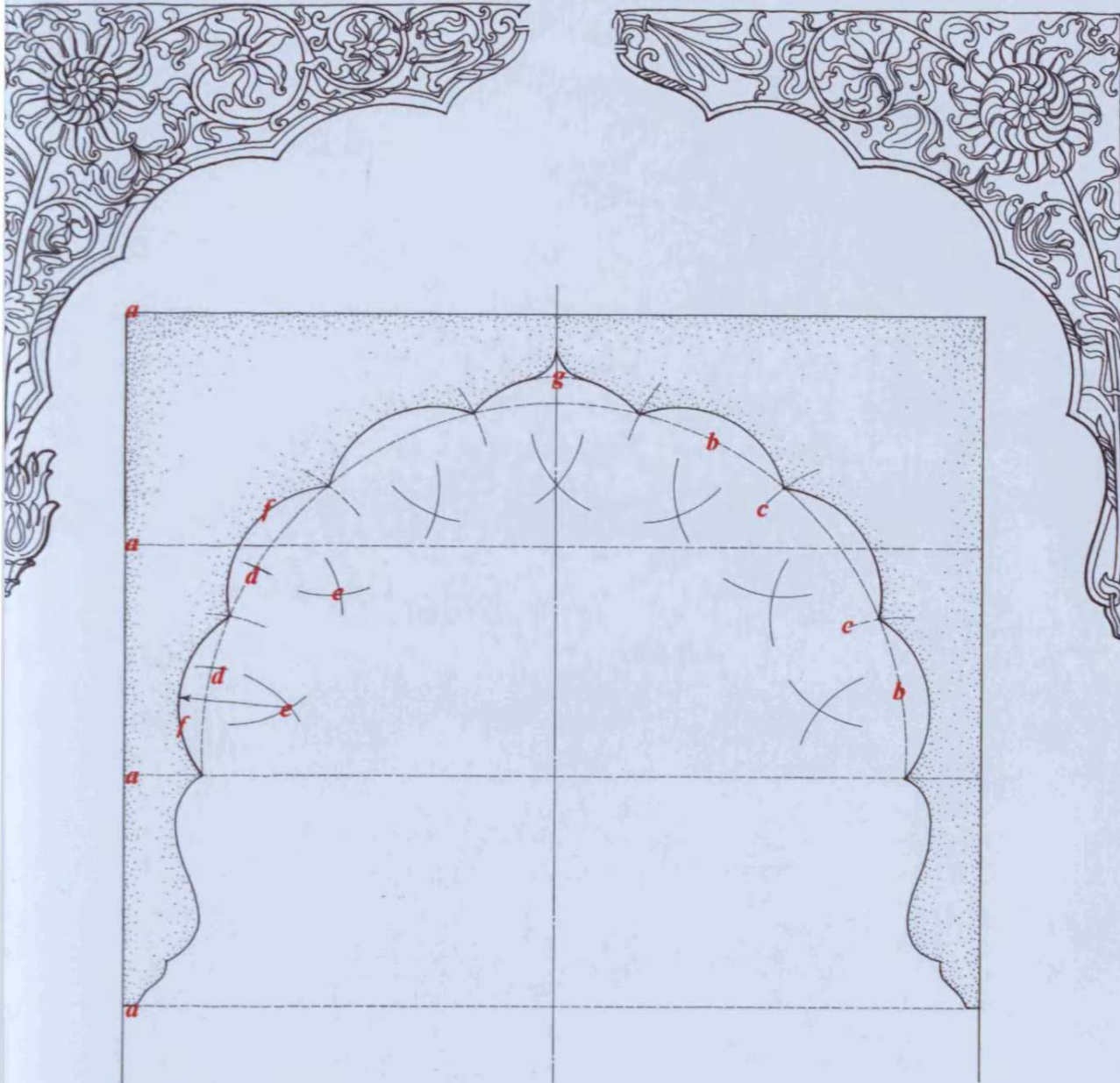


*Fig. 159 Metal stencil for 'paanel' dasa*



*Fig. 160 Tools used for carving*





- a: overall height divided into three parts
- b: curve drawn in the two upper parts
- c: number of cusp divisions marked on circumference
- d: two consecutive cusp divisions divided into three equal parts
- e: arcs drawn using cusp divisions as vertex, to get centre of cusp

- f: cusps drawn
- g: cusp at apex given ogee profile

Fig. 161 Layout of the cusped margol. From the springing point to the first cusp or balan is one-third the overall height of arch. This part is called 'tant', or 'marwari eka'. Spandrel panels are carved with decorative designs as illustrated above

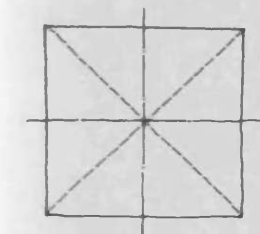


Fig. 162 Craftsman laying out margol on stone slab

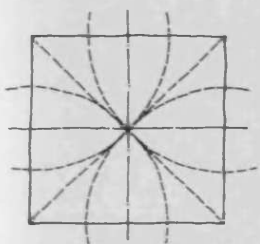


Fig. 163 Margol made in two parts. The joint between the two parts in the apex is known as bhenti

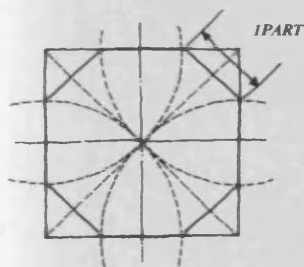




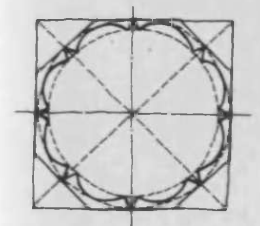
a: drawing of chauras (square)



b: arcs drawn with half diagonals as radius



c: drawing of ashtakon (octagon)



d: kane (v-shaped ribs) alternating with convex curves positioned along circumference

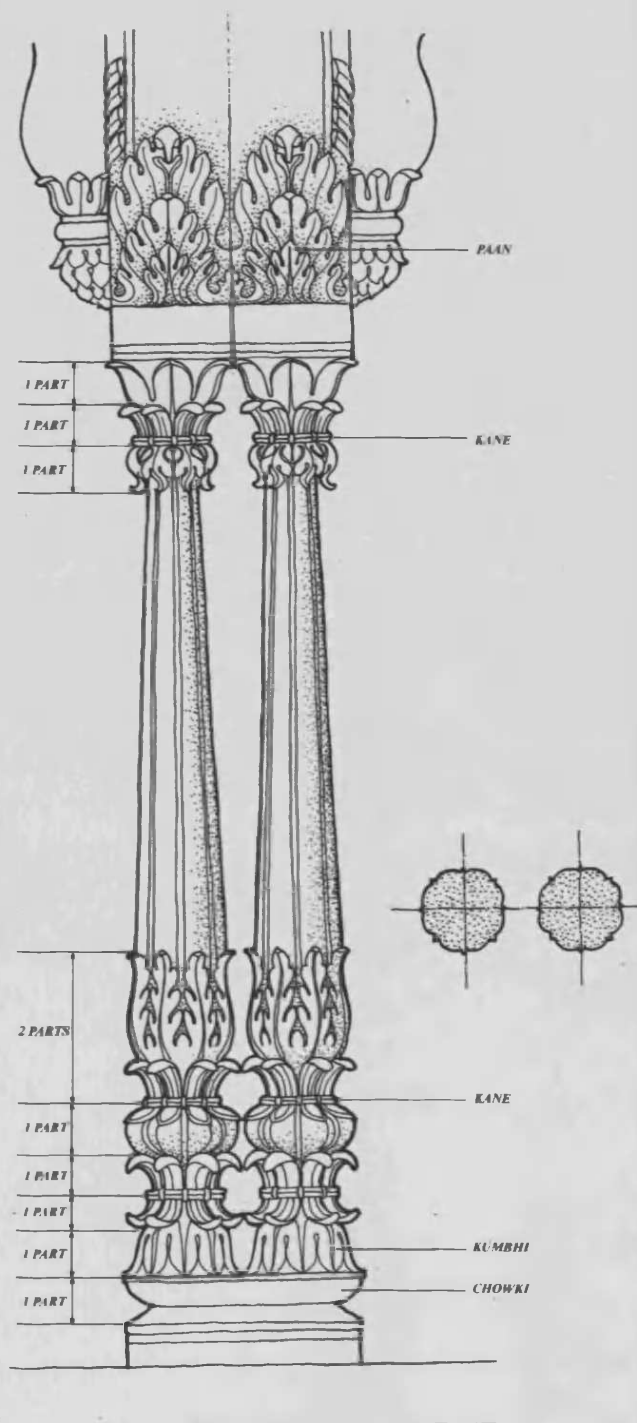
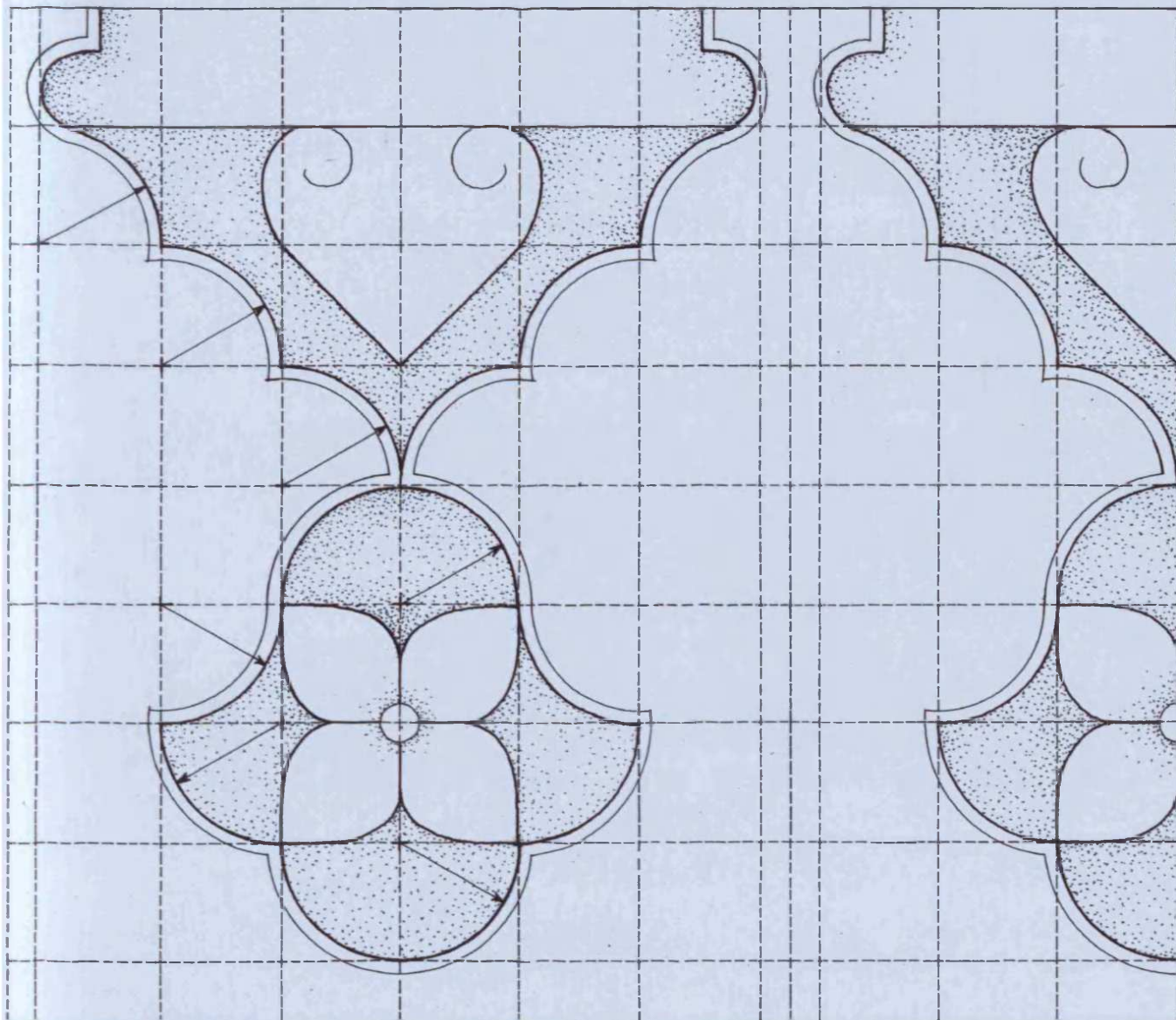


Fig. 164 Layout of Surangdar khambha



*Fig. 165 Layout of Kangra (sulat)*



*Fig. 166 The kangra with vegetal infill designs, in various stages of carving*



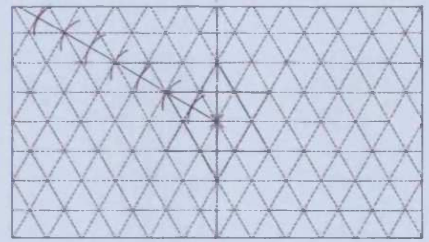
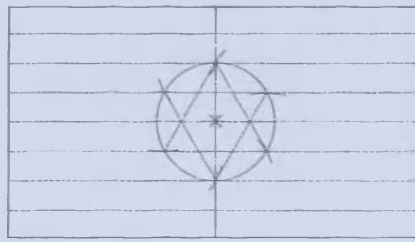
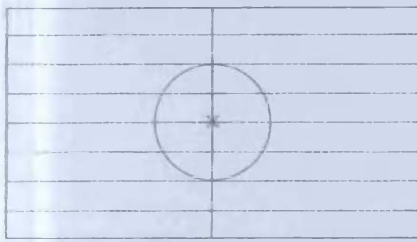
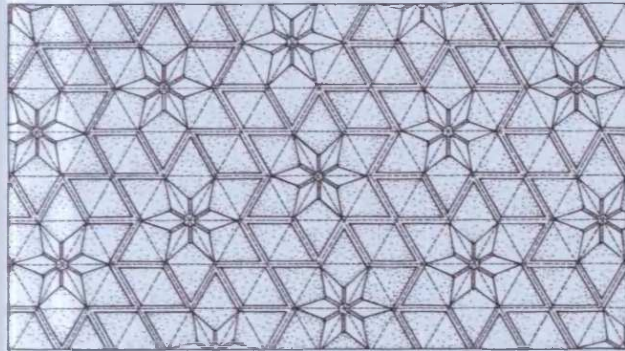
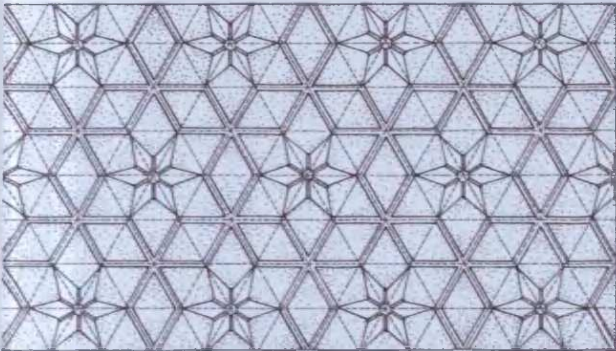


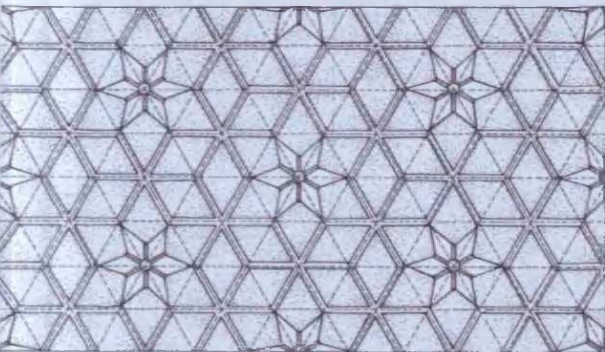
Fig. 167 Layout of the hexagonal grid or 'chiyaas chiraayta'



A: Do Jau

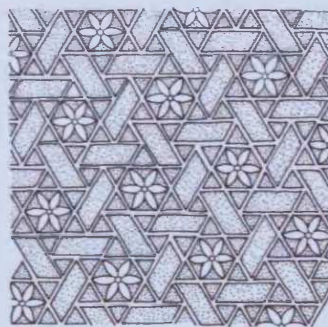
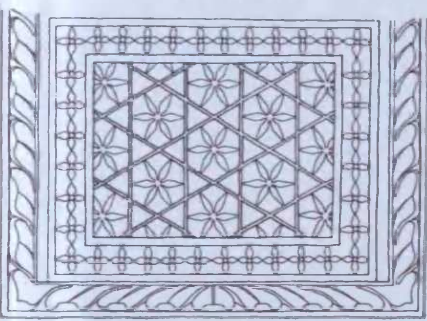


B: Teen Jau



C: Chaar Jau

Fig. 168 The 'jau series' derived from the 'chiyaas chiraayta'



tarichanvas

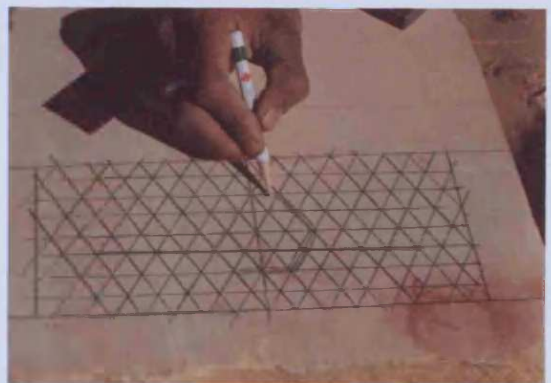
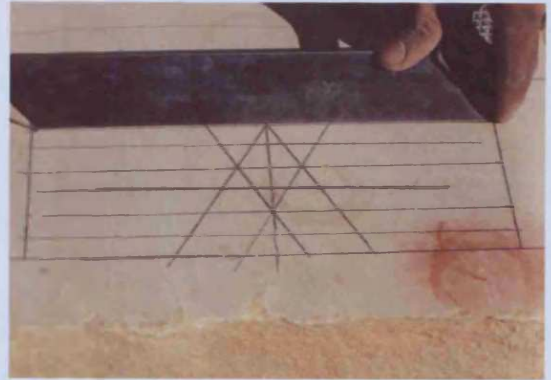


Fig. 169 Marking the 'chiraayta' on stone, and generating the design

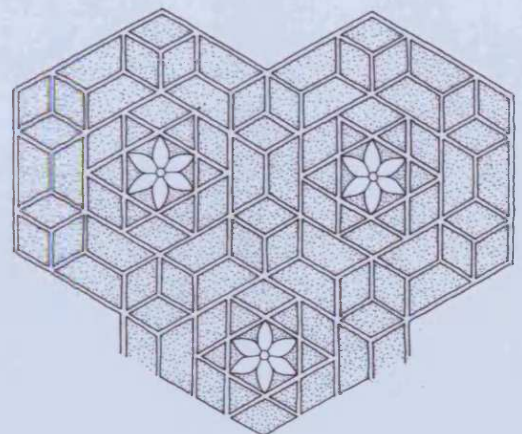


Fig. 170 Different designs based on the 'chiyaas chiraayta'



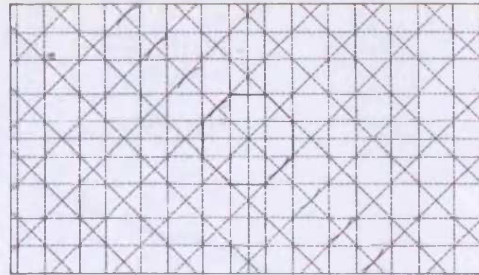
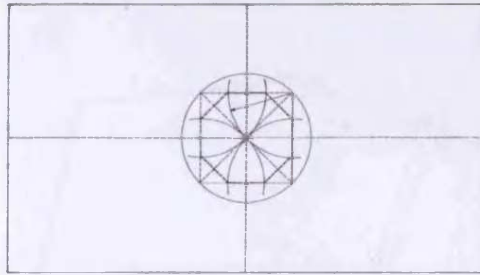
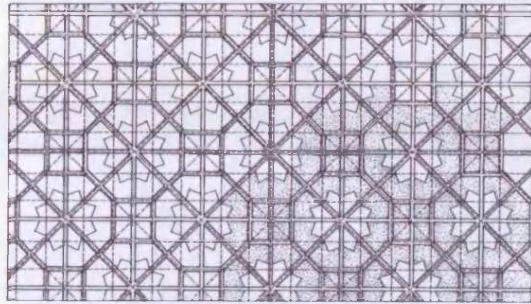
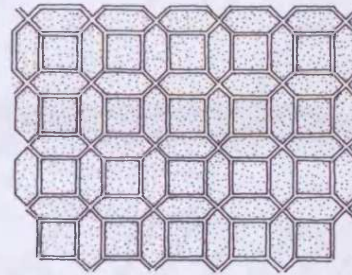


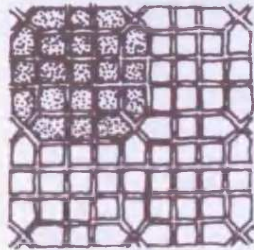
Fig. 171 Layout of the octagonal grid or 'athaas chiraayta'



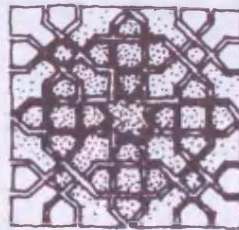
A: Gulathaas



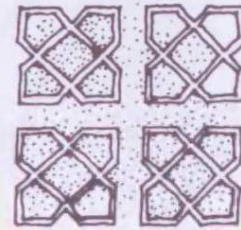
B: Athaas



C: Gaj Athaas

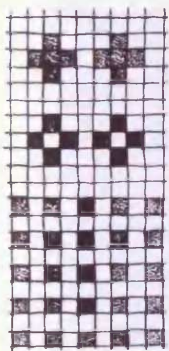


D: Bhavra Athaas

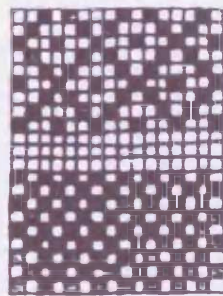


E: Kharaliya Athaas

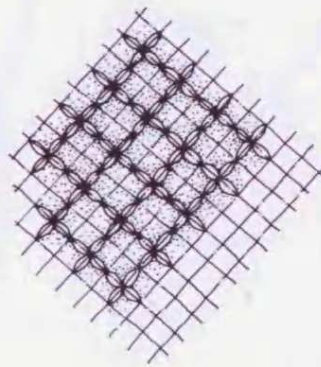
Fig. 172 Different designs based on the 'athaas chiraayta'



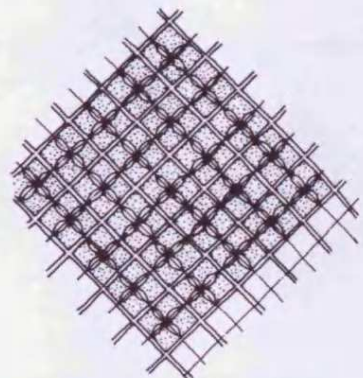
A: Chadabandhi-variants



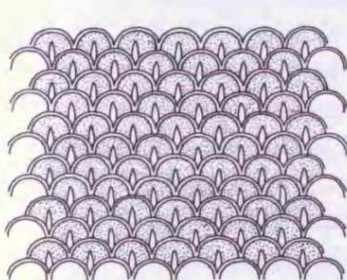
B: Khatarva Chaufulia



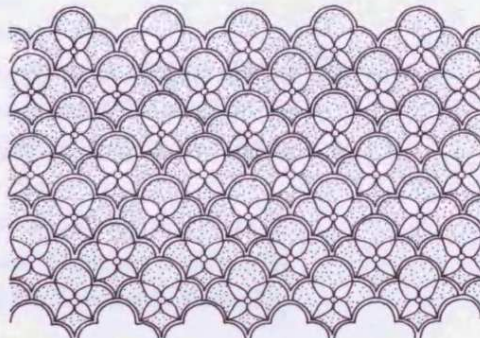
C: Gaj chauras with chaufulias



D: Gadakhori



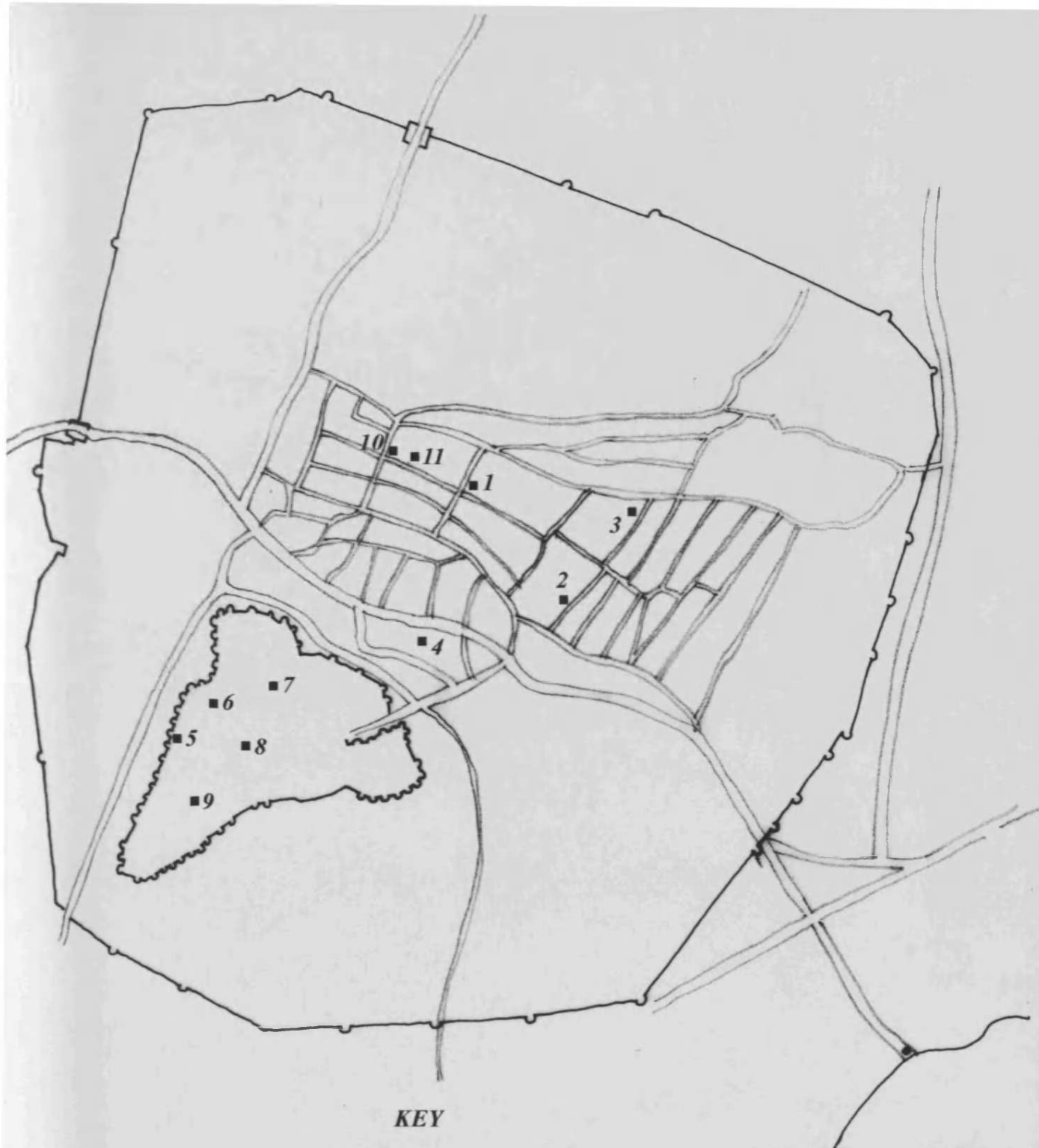
E: Khatarva chaufulia-variant



F: Bajrangi

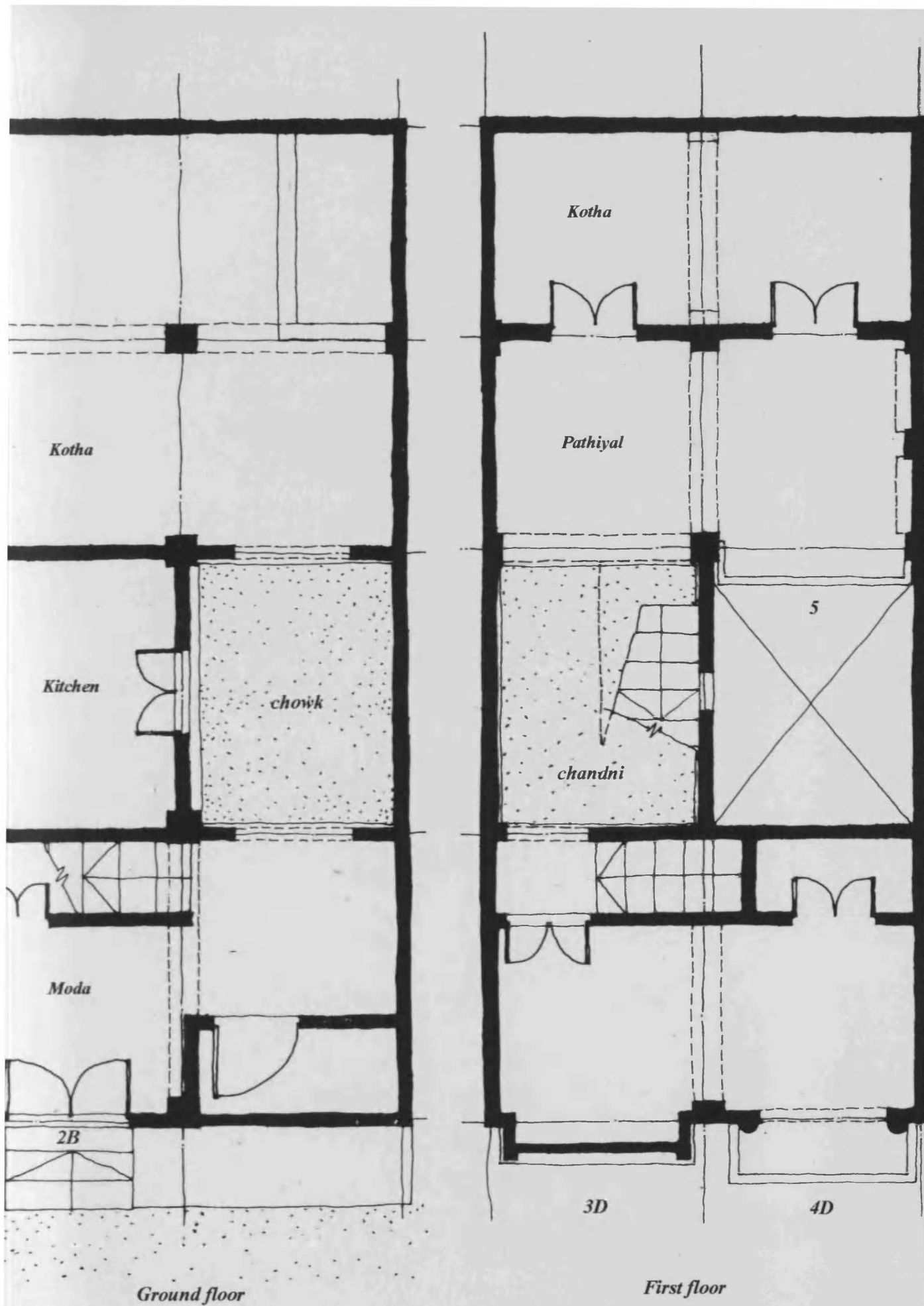
Fig. 173 Different designs based on the square grid or 'chaubla chiraayta'

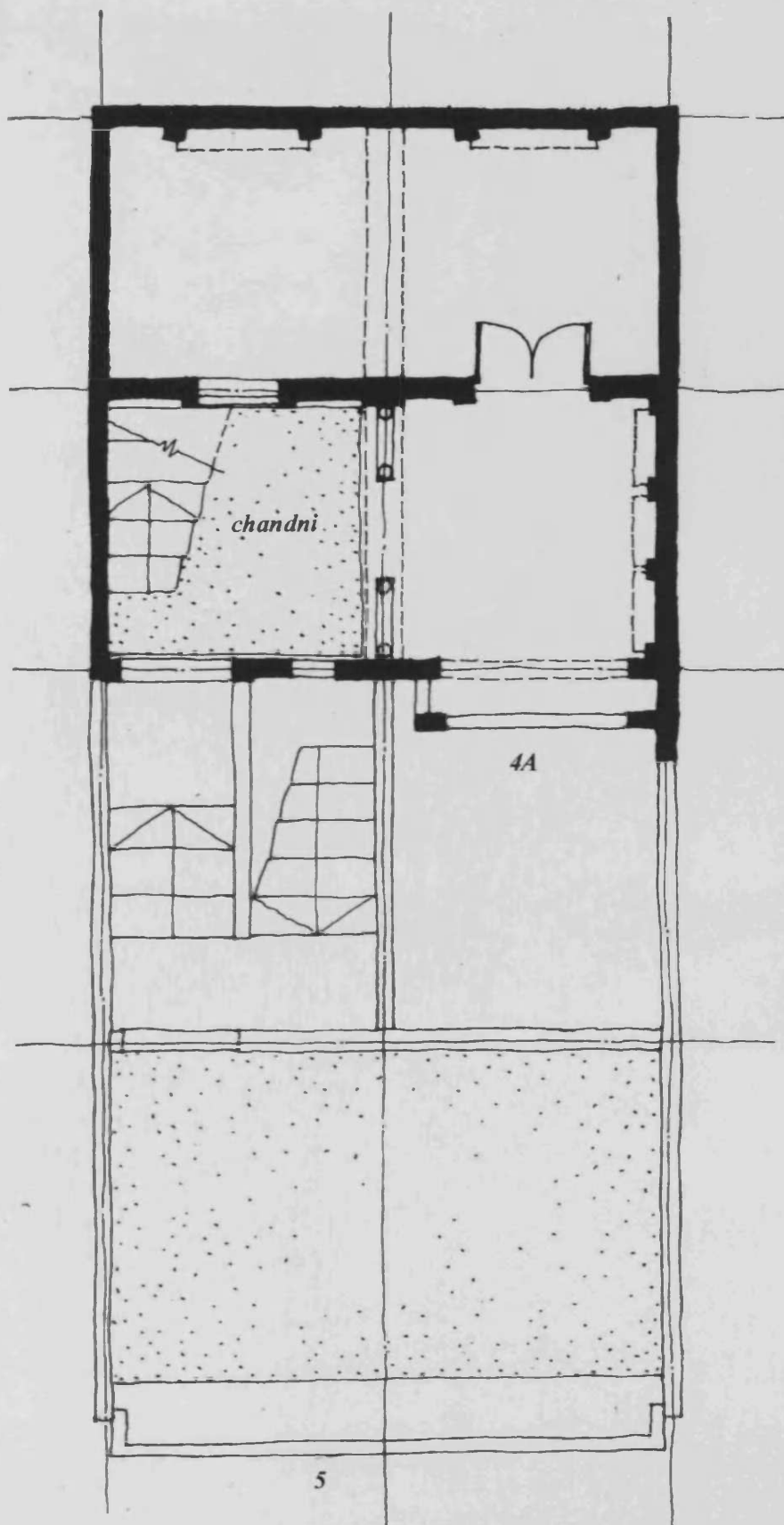




- KEY**
- 1 Haveli in Malpani Para
  - 2 Kevliya Niwas, Gangan Para
  - 3 Haveli in Jetha Para
  - 4 Salim Singh ki Haveli
  - 5 Haveli in Vyas Para (Desert Haveli Guest House)
  - 6 Haveli in Vyas Para (Hotel Sri Nath)
  - 7 Haveli of Hari Vallabh Gopa, Kund Para
  - 8 Suraj Haveli, Vyas Para
  - 9 Haveli in Vyas Para (Kanhaiyalal Vyas)
  - 10 Bahadurmalji Haveli (Patuon ki Haveli)
  - 11 Jorawarmalji Haveli (Patuon ki Haveli)

*Fig. 174 Location of havelis selected for Case Studies*





*Second floor*

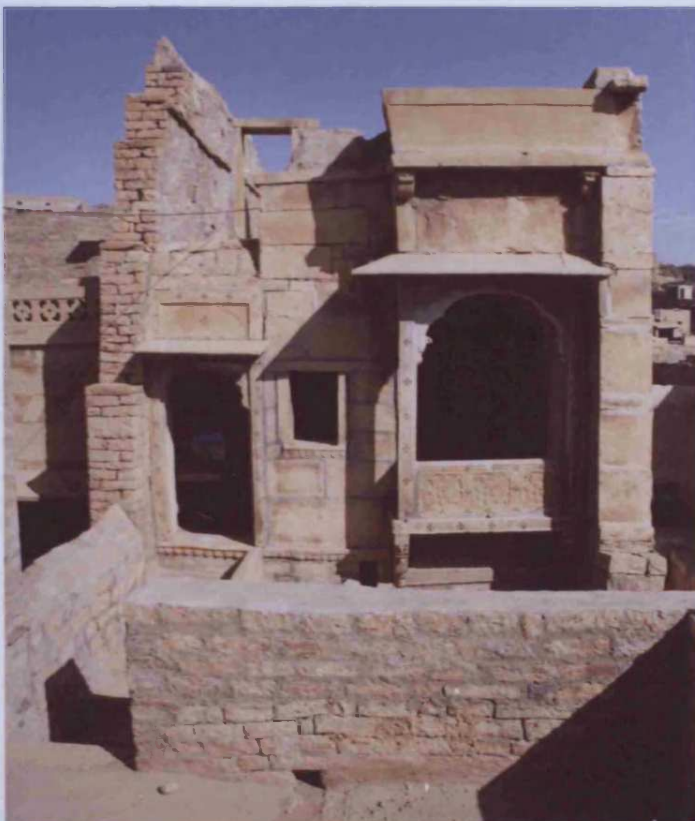
*Fig. 176 Haveli in Malpani Para, floor plan*



*Fig. 177 Pathiyal-like space at rear of haveli, second floor*

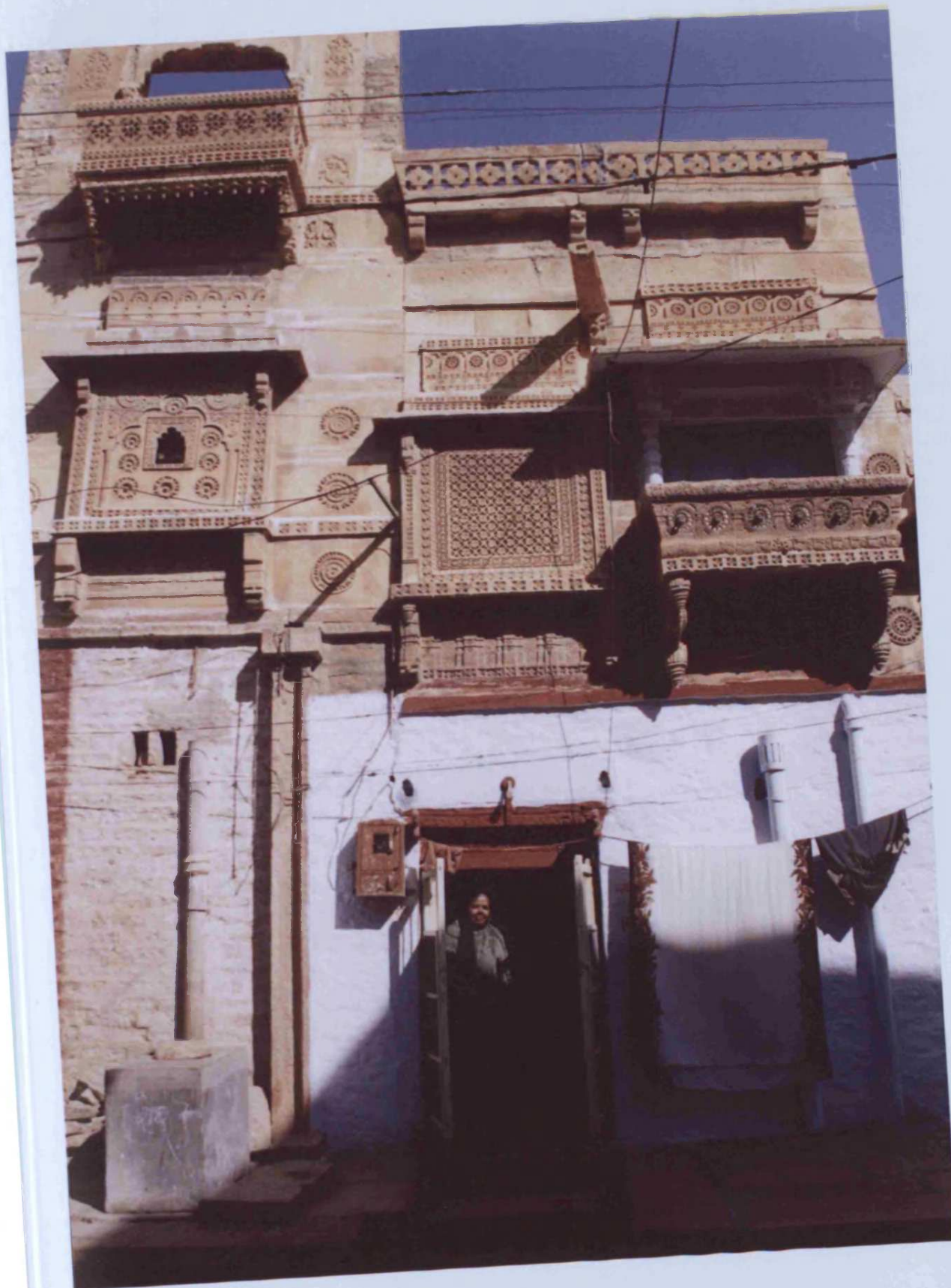


*Fig. 178 Ceiling over pathiyal-like space to rear of chowk, first floor*

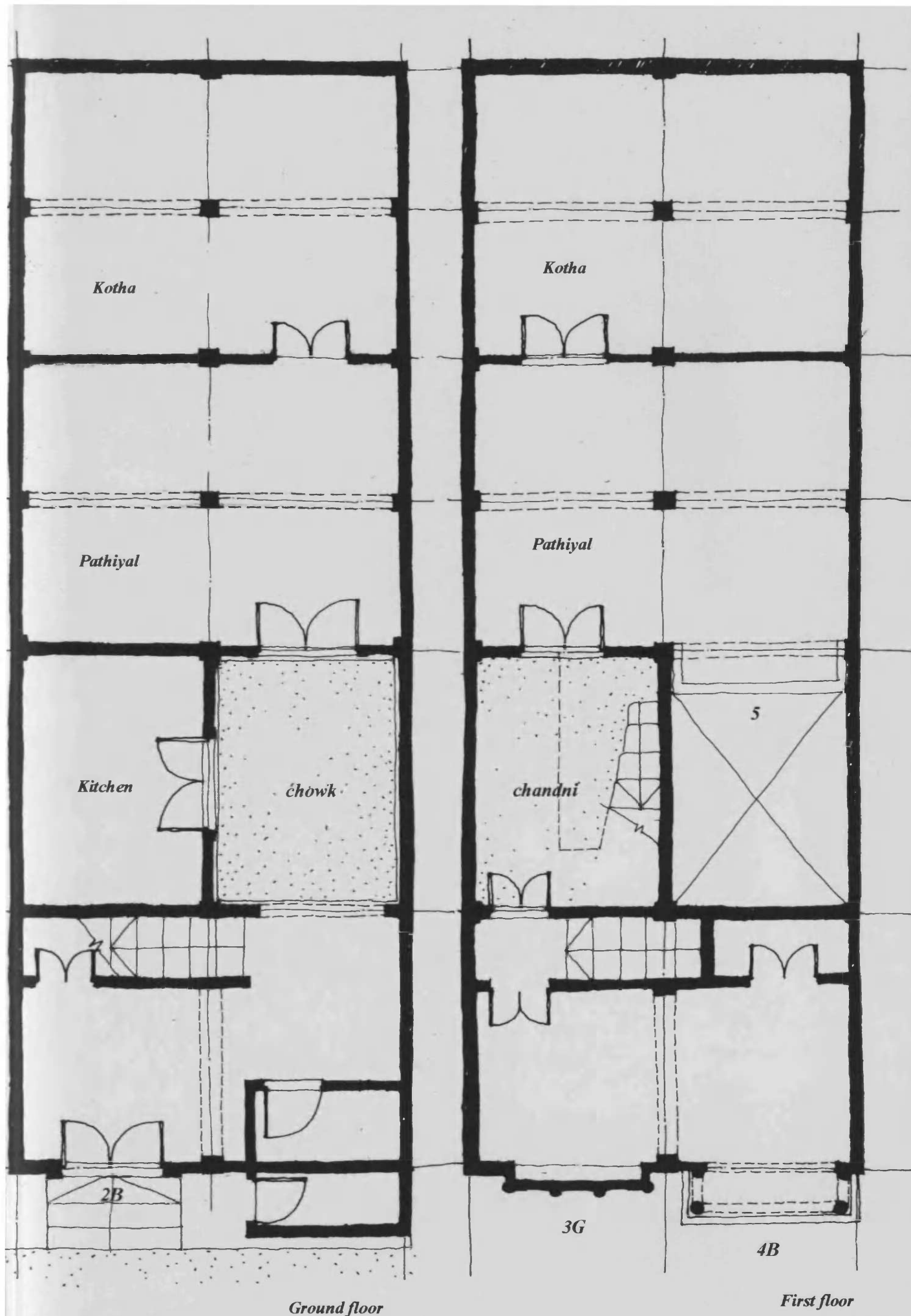


*Fig. 179 Jharokha with tri-segmental arch on second floor, overlooking chowk below*





*fig. 180 Front elevation, haveli in Malpani Para*



g. 181 Kevliya Niwas, floor plans

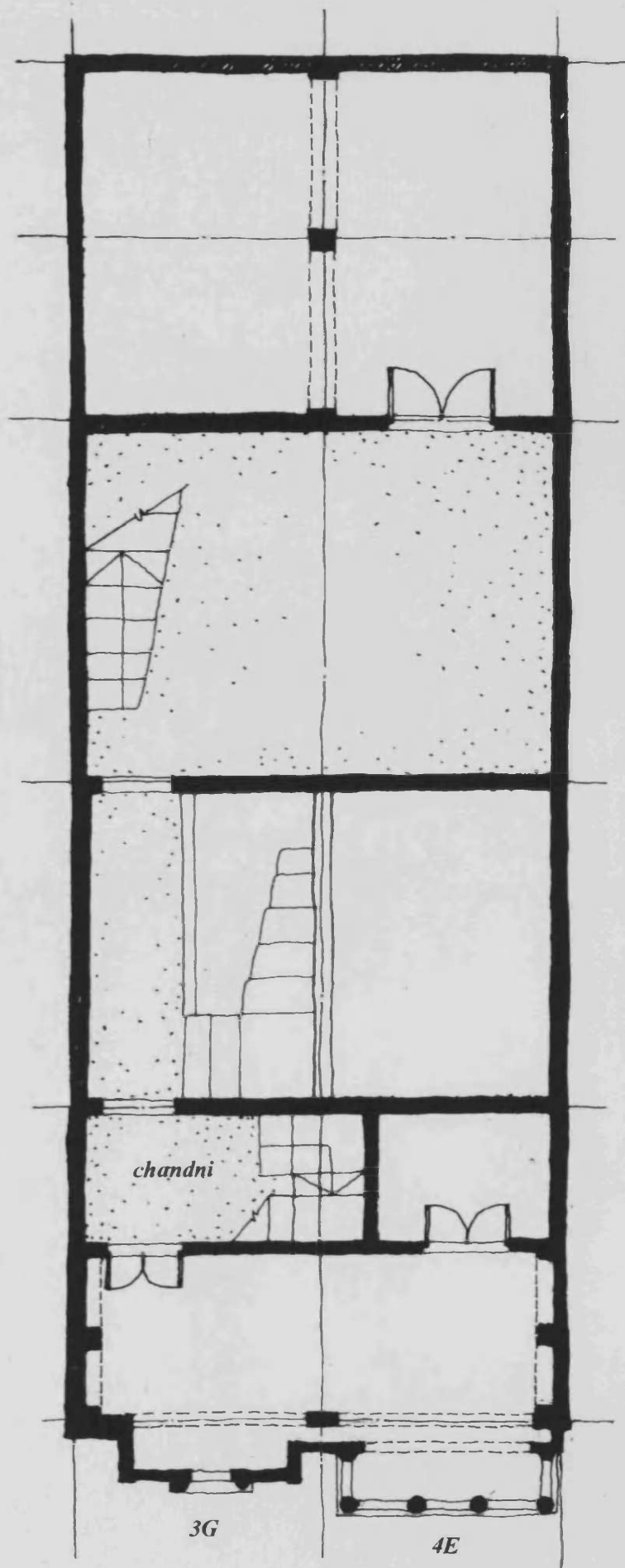


Fig. 182 Kevliya Niwas, second floor plan





*Fig. 183 Terrace to rear of haveli, second floor*



*Fig. 184 Room built over entire frontage of haveli, second floor (left)*



*Fig. 185 Front elevation*



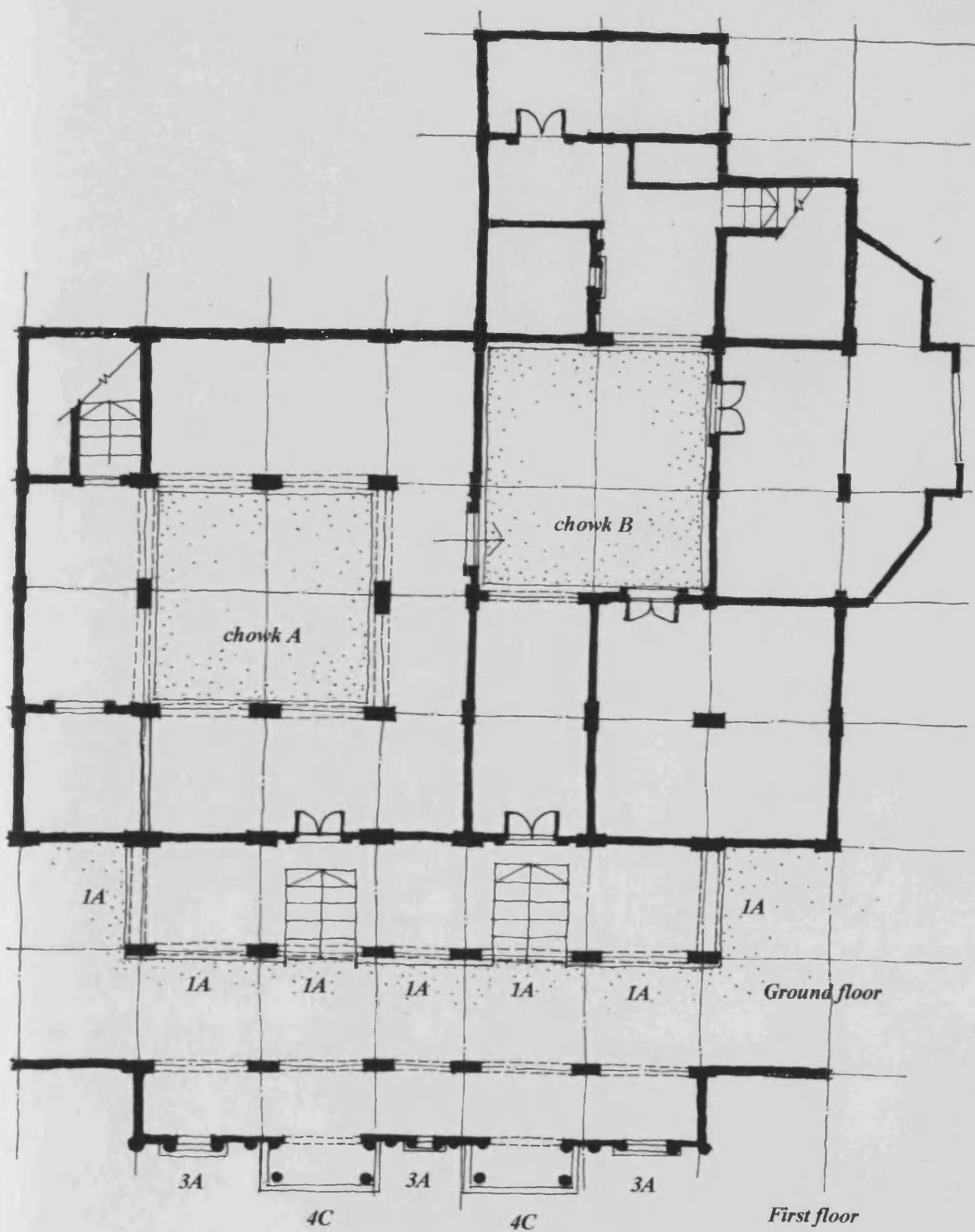
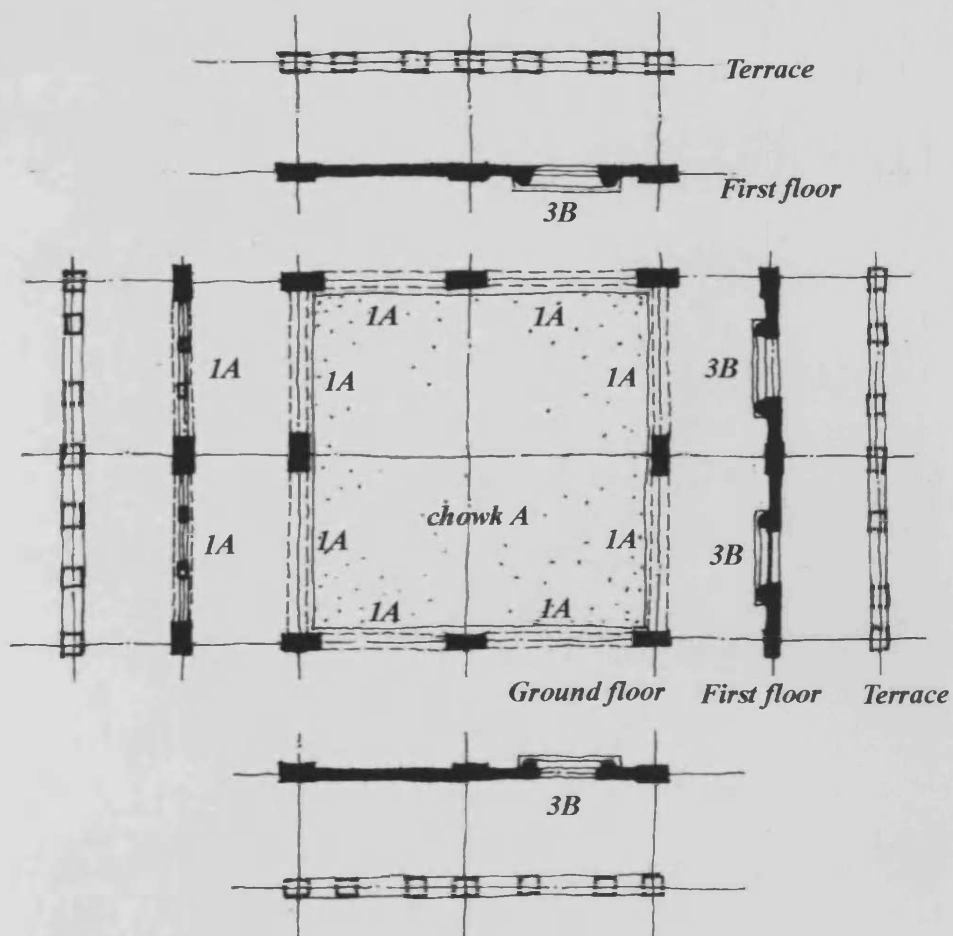
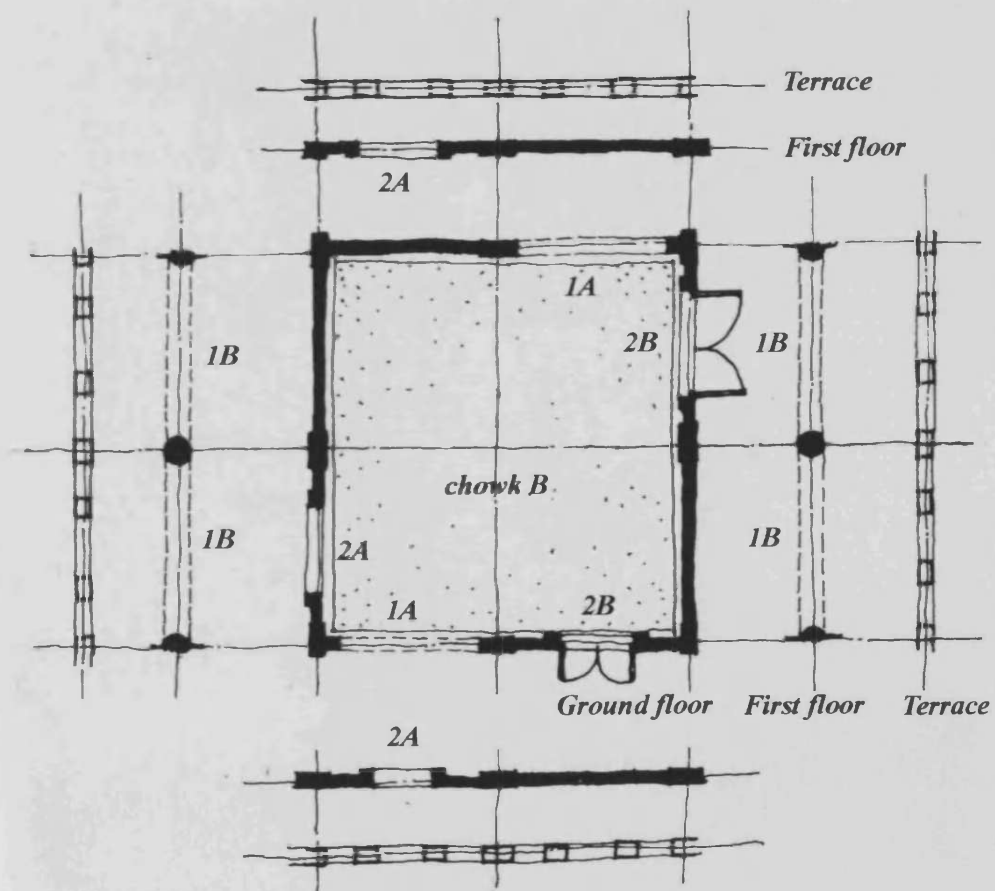


Fig. 186 Haveli in Vyaspara (Desert Haveli)



*Chowk A: plans*



*Chowk B: plans*



188 Diwankhana on ground floor, as seen from street

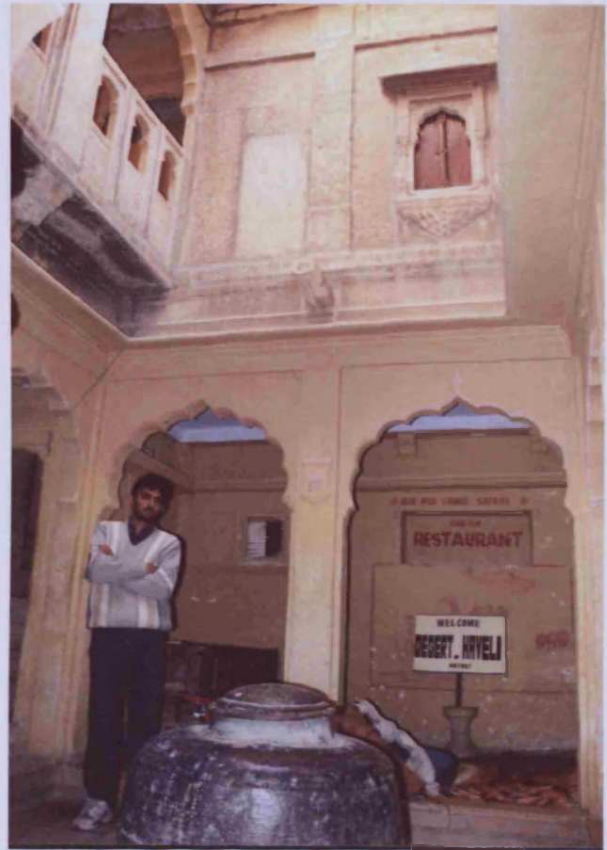


Fig. 189 Chowk A seen from adjacent pathiyal

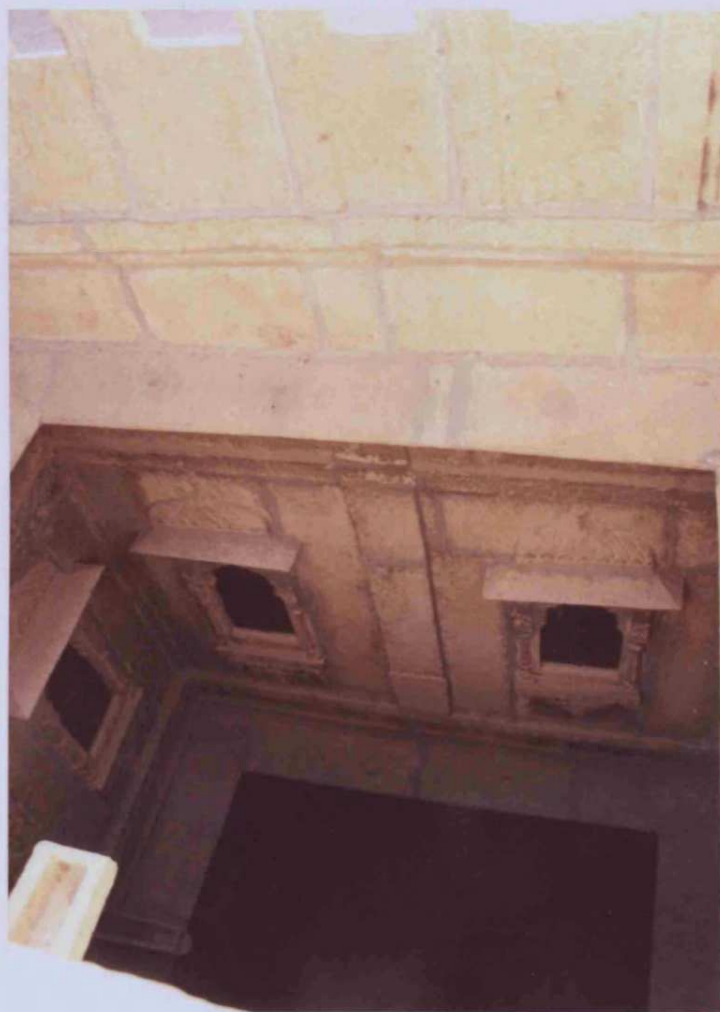


190 Main elevation showing first floor and terrace





*Range to the front of Chowk A with single bari in left bay,*



*Fig. 192 Range to right of Chowk A (opposite to gallery), first floor*



*Fig. 193 Gallery on first floor overlooking Chowk A*





*Fig. 194 Gallery along front facade of haveli, seen from within mol (above)*

*Fig. 195 Range to right of Chowk B, with surangdar khambhas, first floor (left)*



*Fig. 196 Ranges to rear and left of Chowk B, first floor*



*Fig. 197 Rear wall of mol with baris, niches and doorways positioned in the centre of bays*



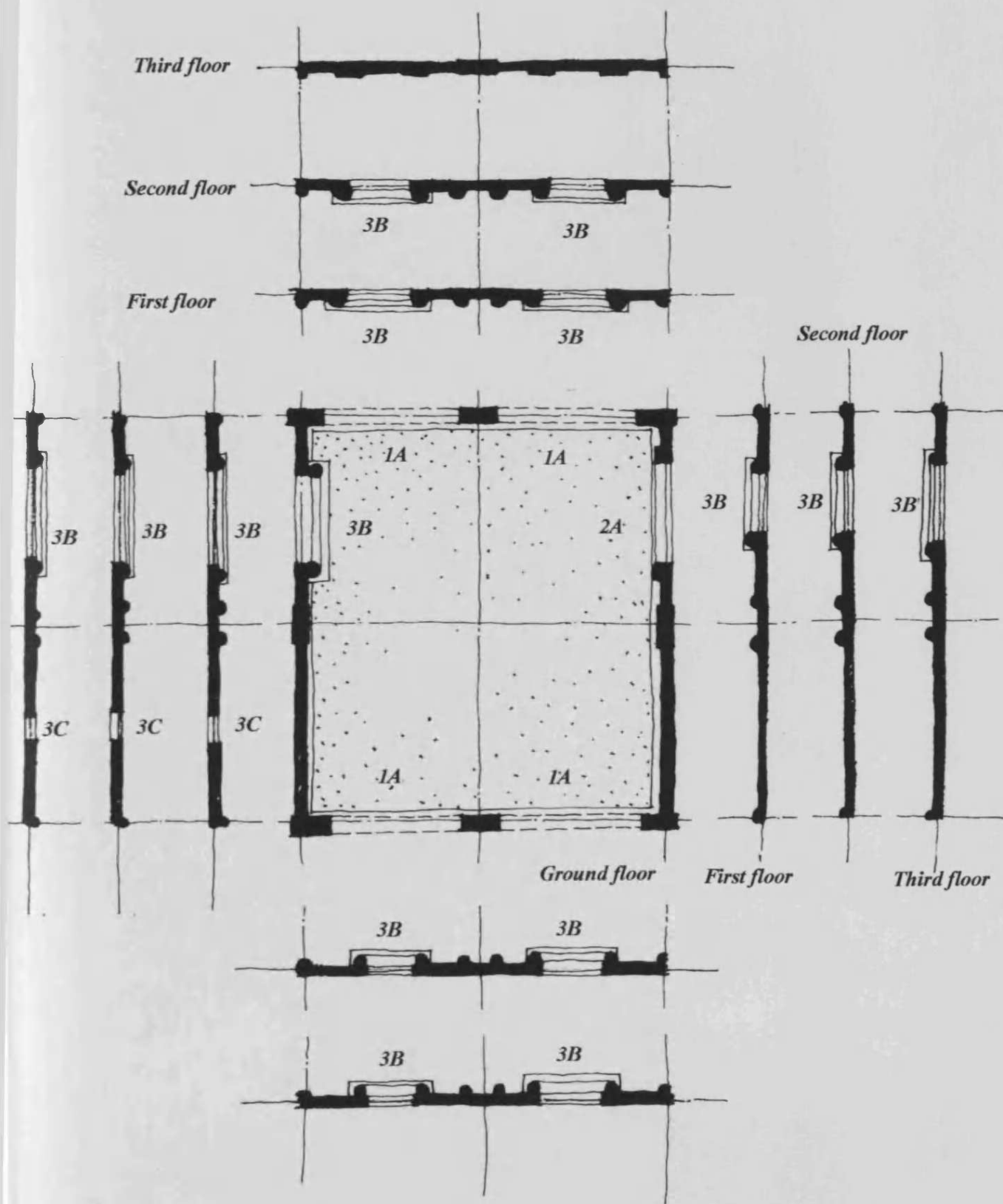


Fig. 199 Haveli in Vyaspara (Hotel Shri Nath)





Fig. 200 Two bay facade to chowk



Fig. 201 Chandni to rear of chowk, third floor

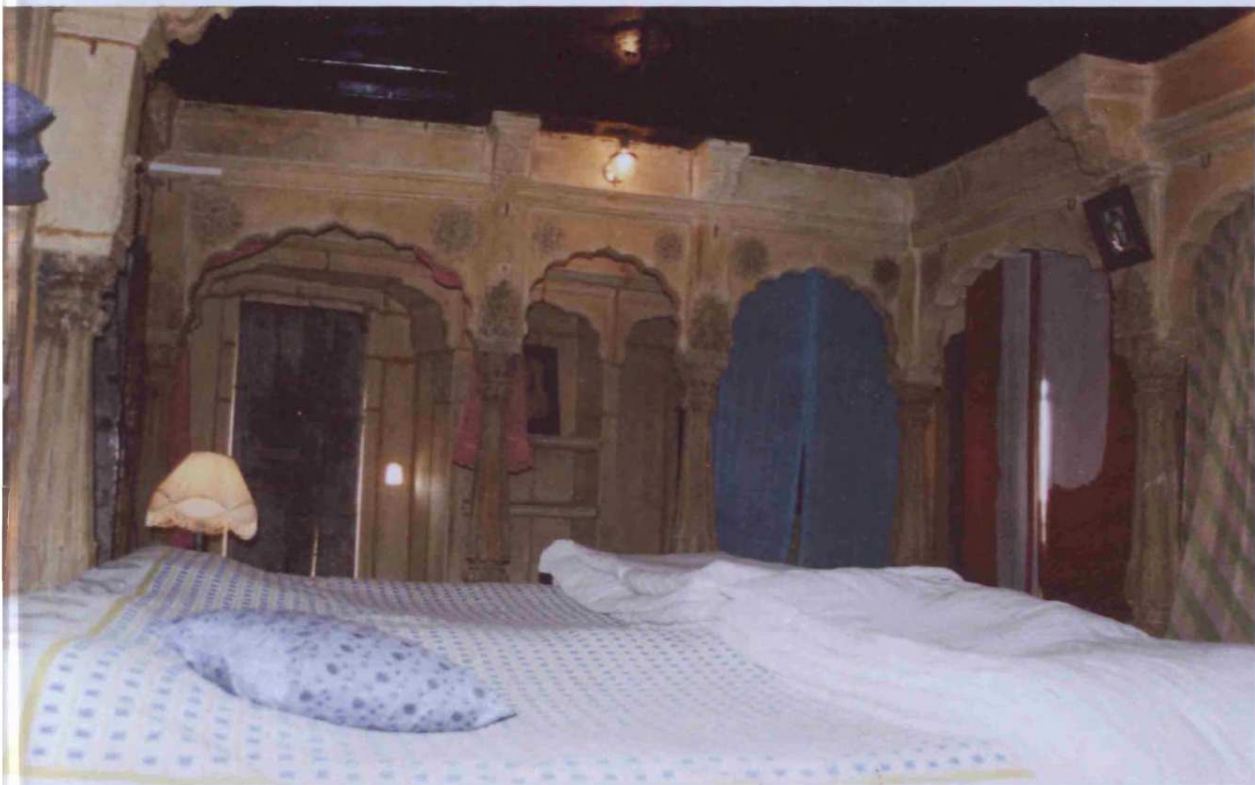


Fig. 202 Interior of range to rear of chowk, first floor





*Fig. 203 Mol on first floor, with gallery on left, corresponding with front facade*



*Fig. 204 Mol on first floor, with gallery at rear, corresponding with side elevation*





205 Side elevation of haveli

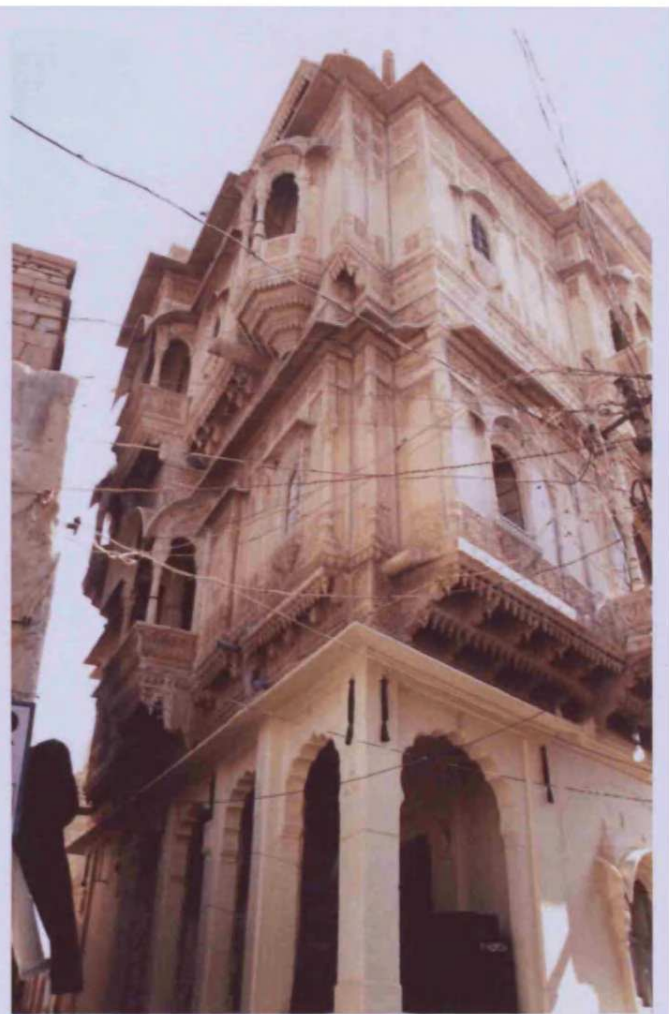


Fig. 206 Front elevation of haveli



207 Detail of side elevation



Fig. 208 Detail of side elevation

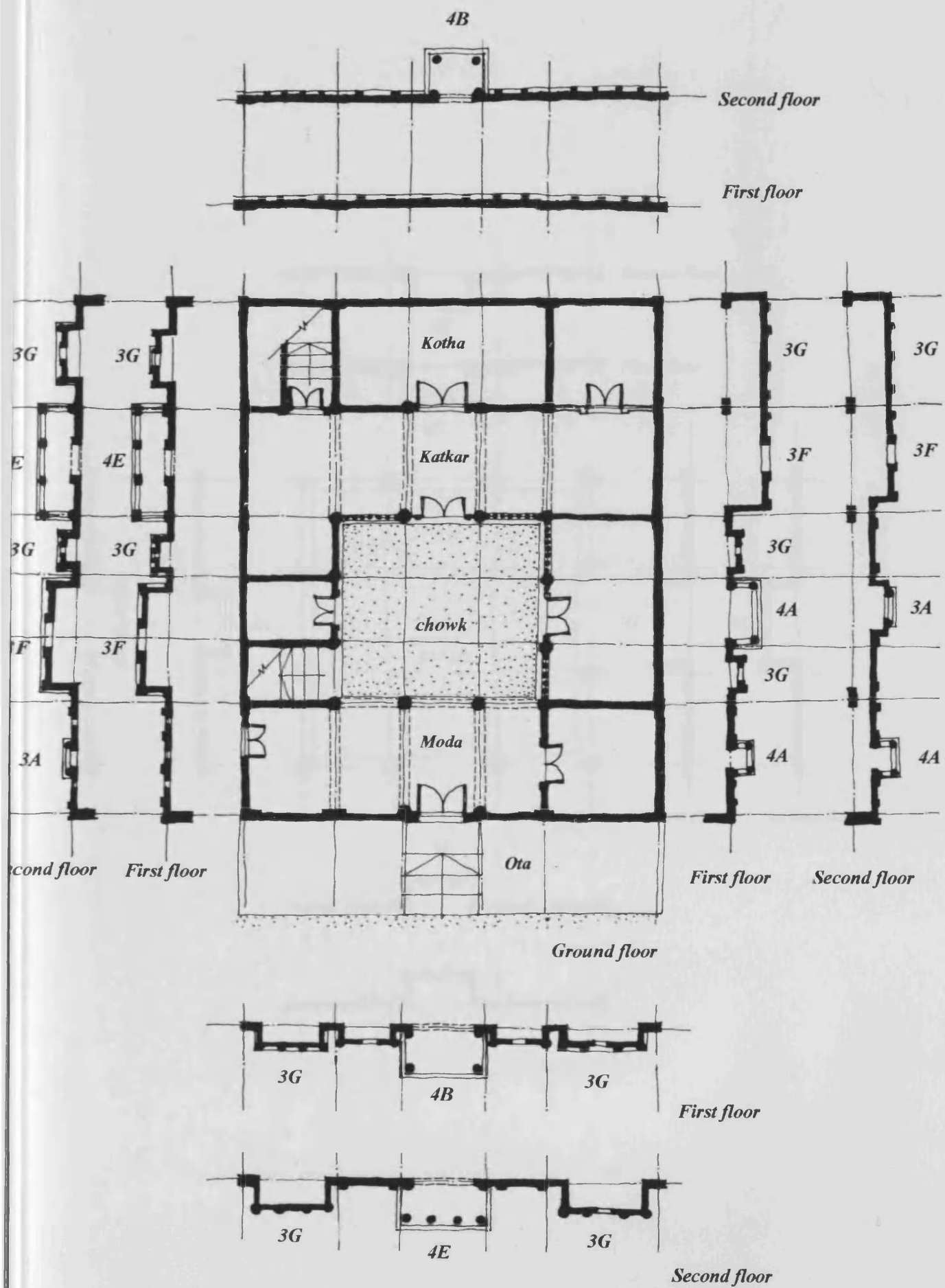


Fig. 209 Haveli of Hari Vallabh Gopa, Kund Para

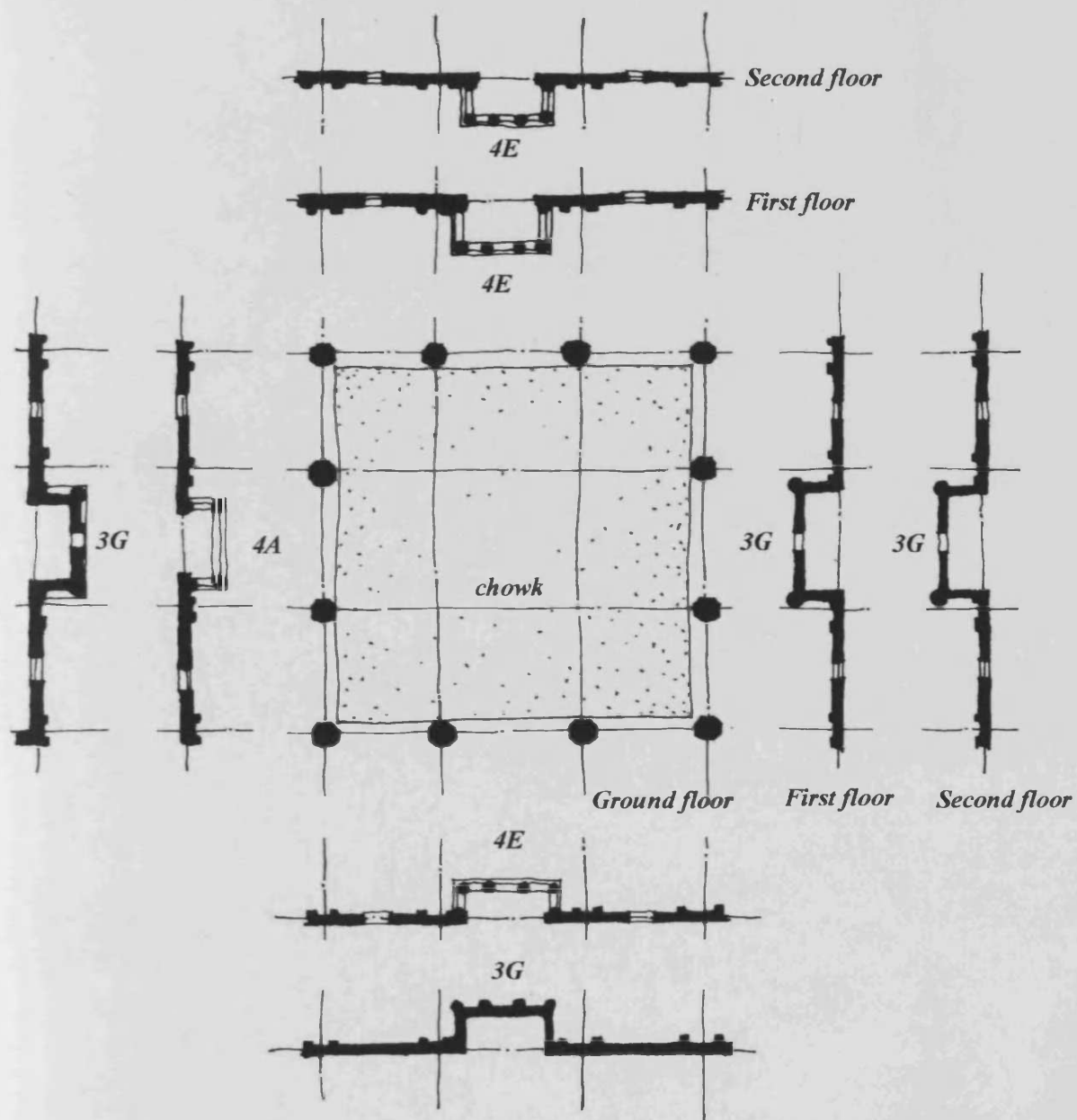


Fig. 210 Plan of chowk, haveli of Hari Vallabh Gopa





*View of main chowk as seen from terrace above*



*Fig. 212 Ranges to rear of main chowk*



*213 Pathiyal adjacent to chandni at rear of haveli, second floor*



*Fig. 214 Pathiyal adjacent to shorter span of chandni, second floor*





*Fig. 215 Front facade, first and second floors*

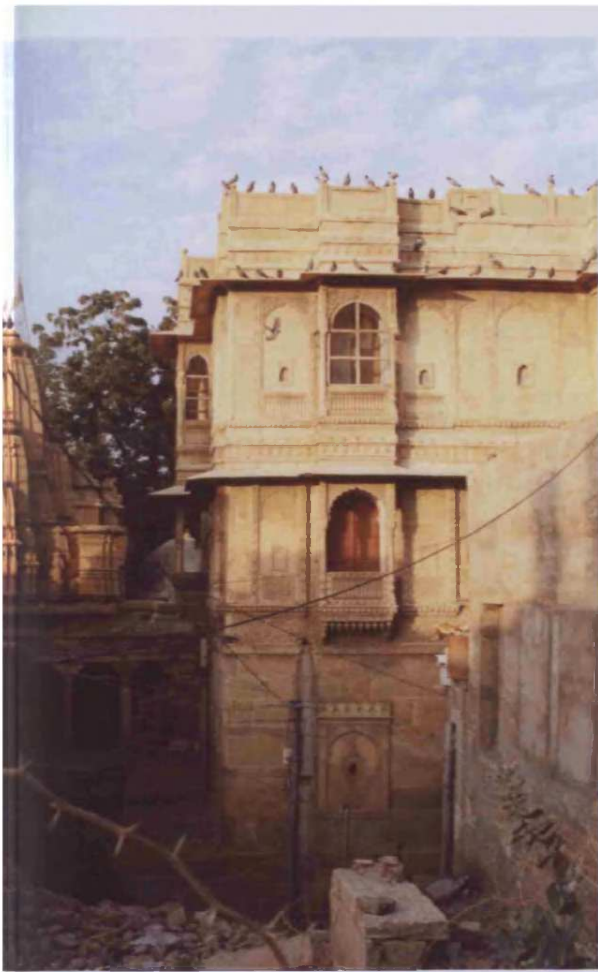


*Fig. 216 Side elevation facing public street, first and second floors*



*Fig. 217 Rear elevation*





2218 Side elevation with cul de sac street on left



Fig. 219 Side elevation facing public chowk

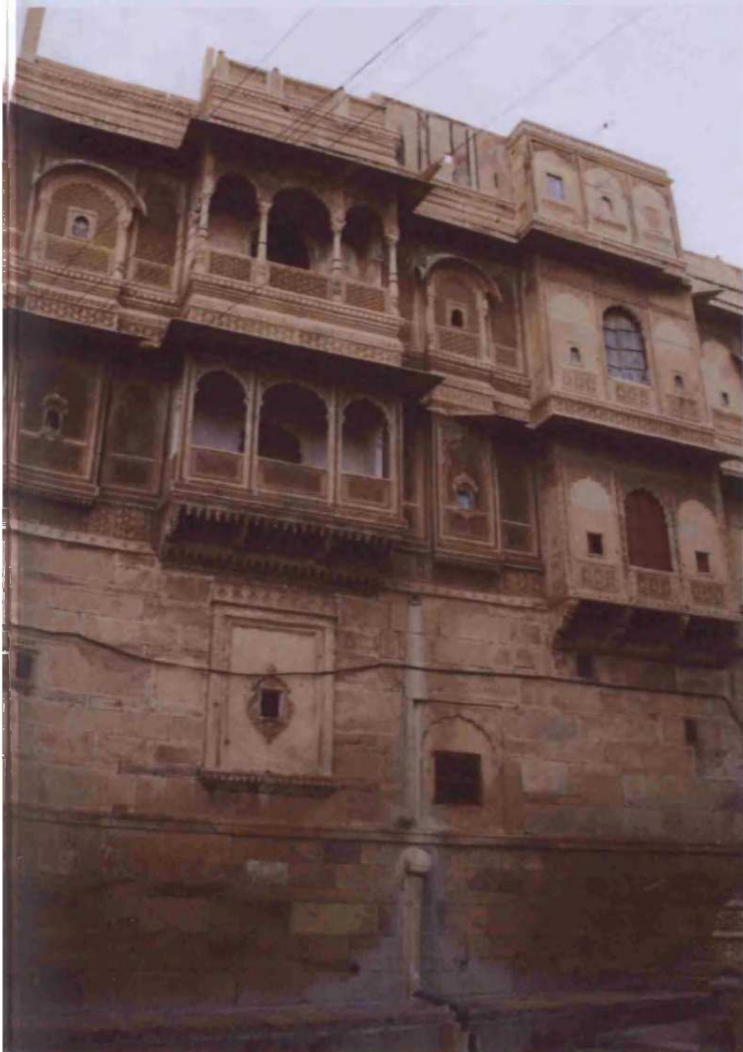


Fig. 220 Side elevation facing public chowk

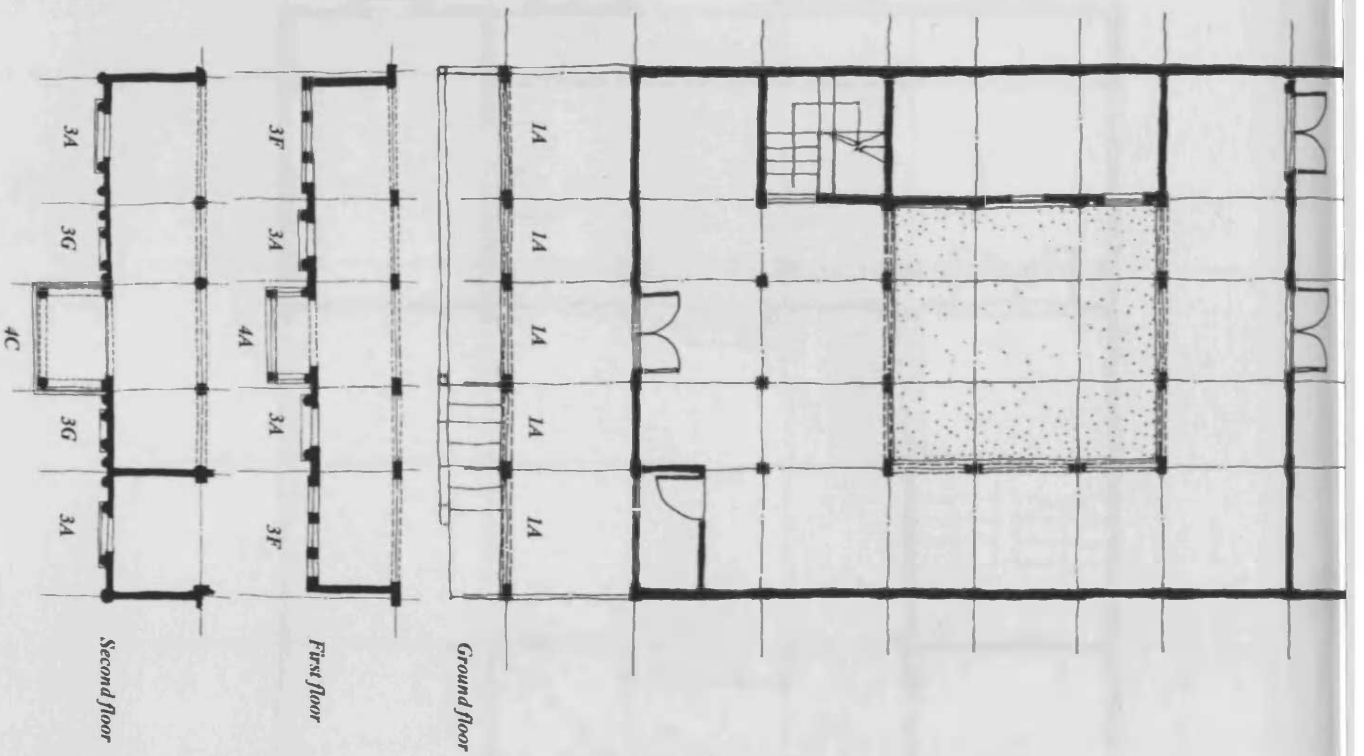


Fig. 221 Suraj Haveli, floor plans

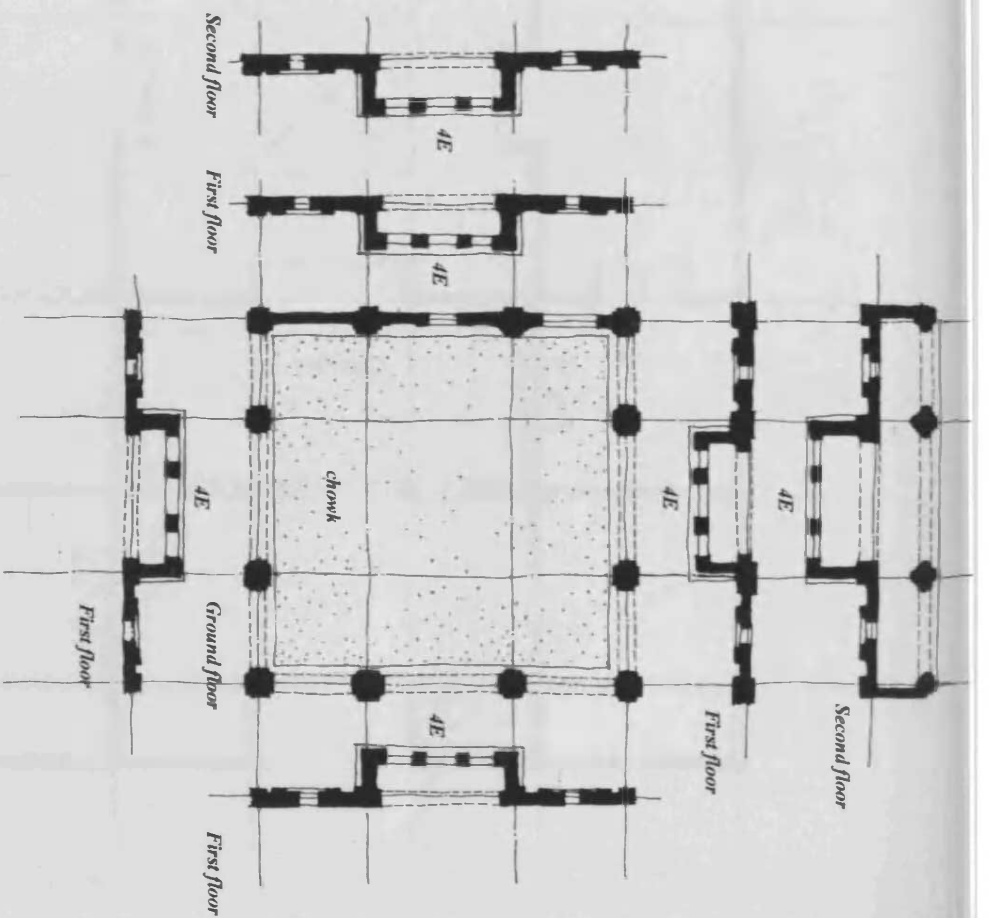


Fig. 222 Chowk, Suraj Haveli



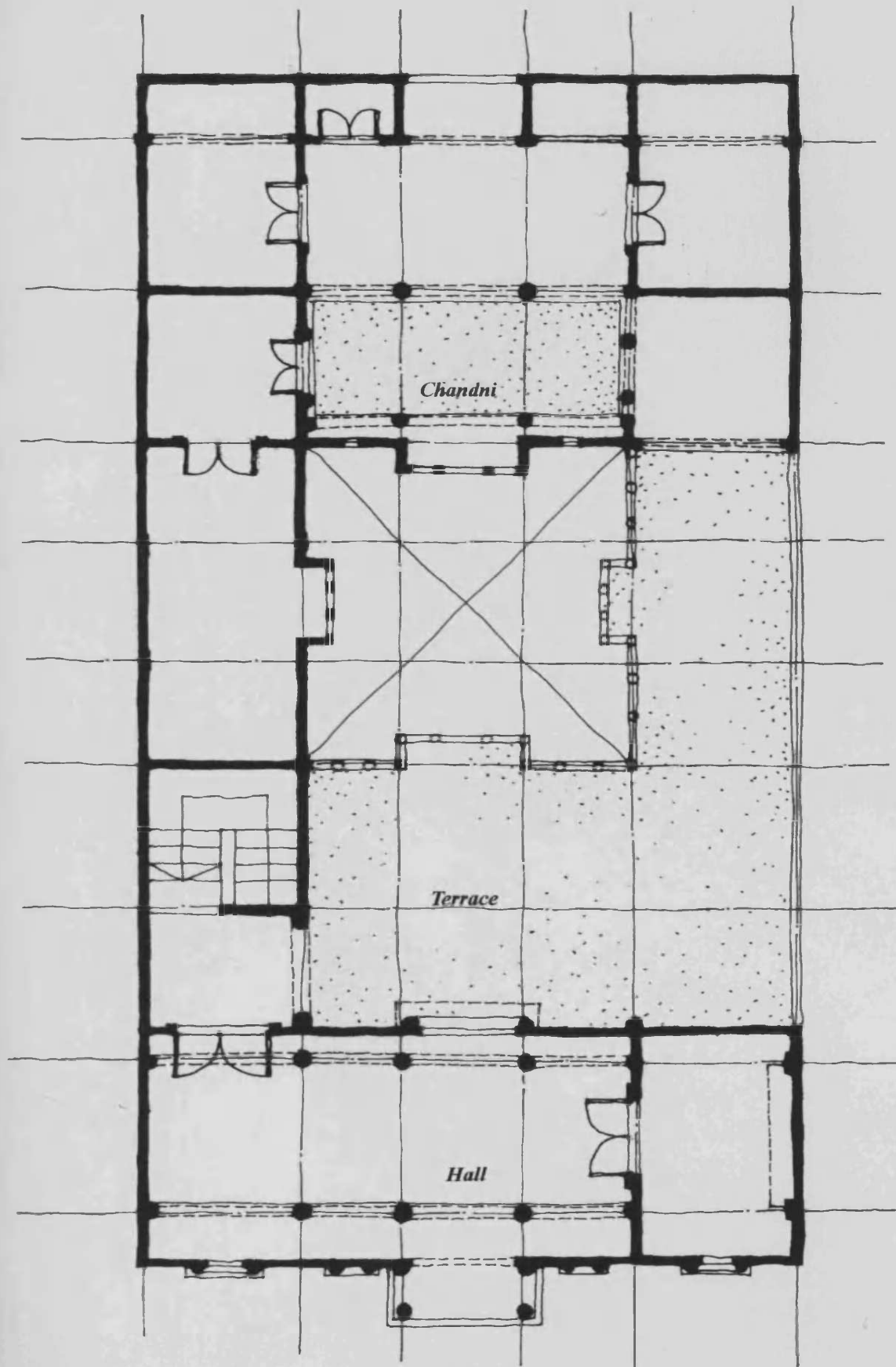


Fig. 223 Suraj Haveli, second floor plan



*Fig. 224 Ranges to the front of the chowk*



*Fig. 225 Tibari jharokha on first floor to rear of chowk*





Fig. 226 Ranges to left and rear of chowk on second floor, seen from terrace in front

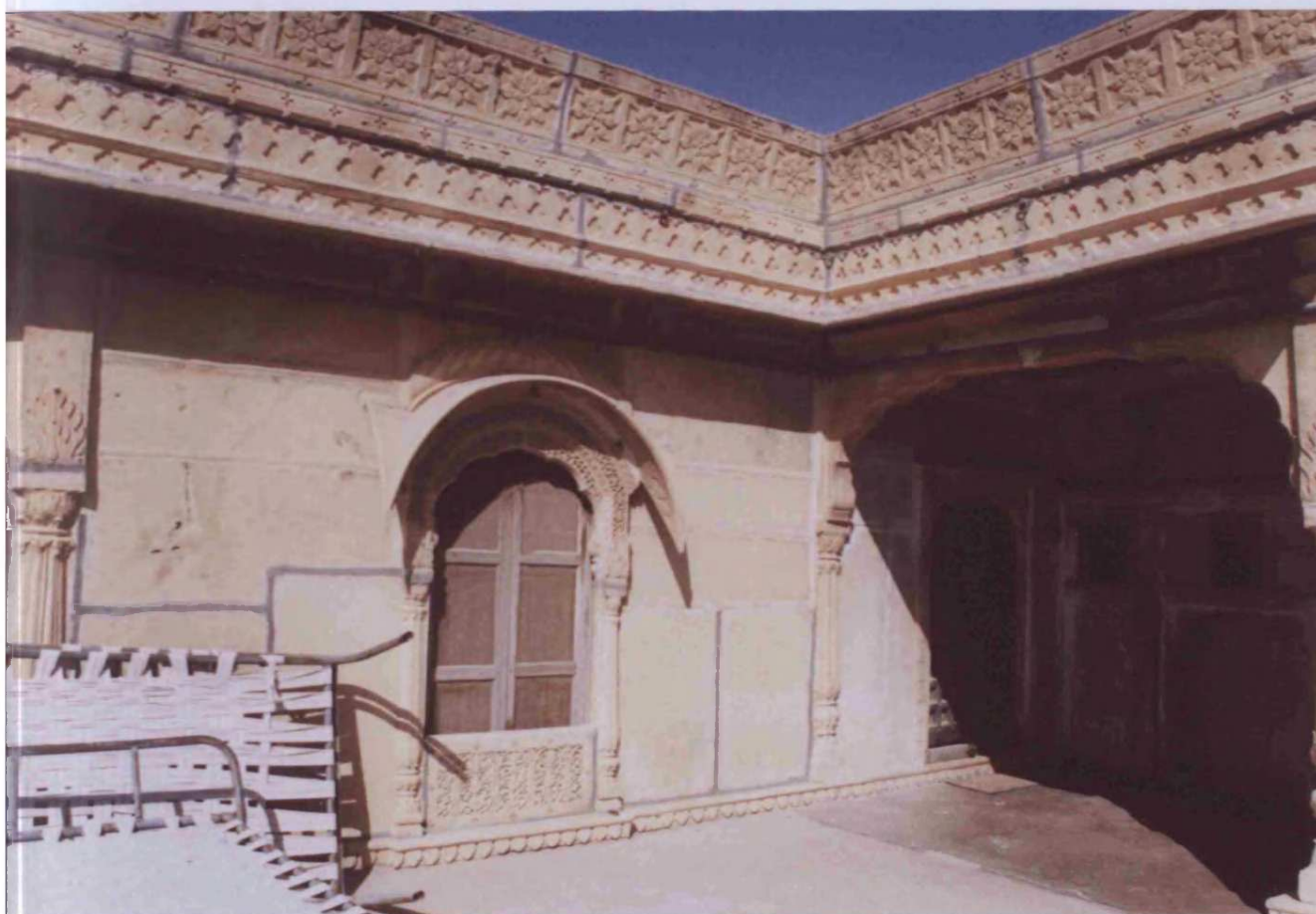


Fig. 227 Terrace on second floor adjacent to chowk



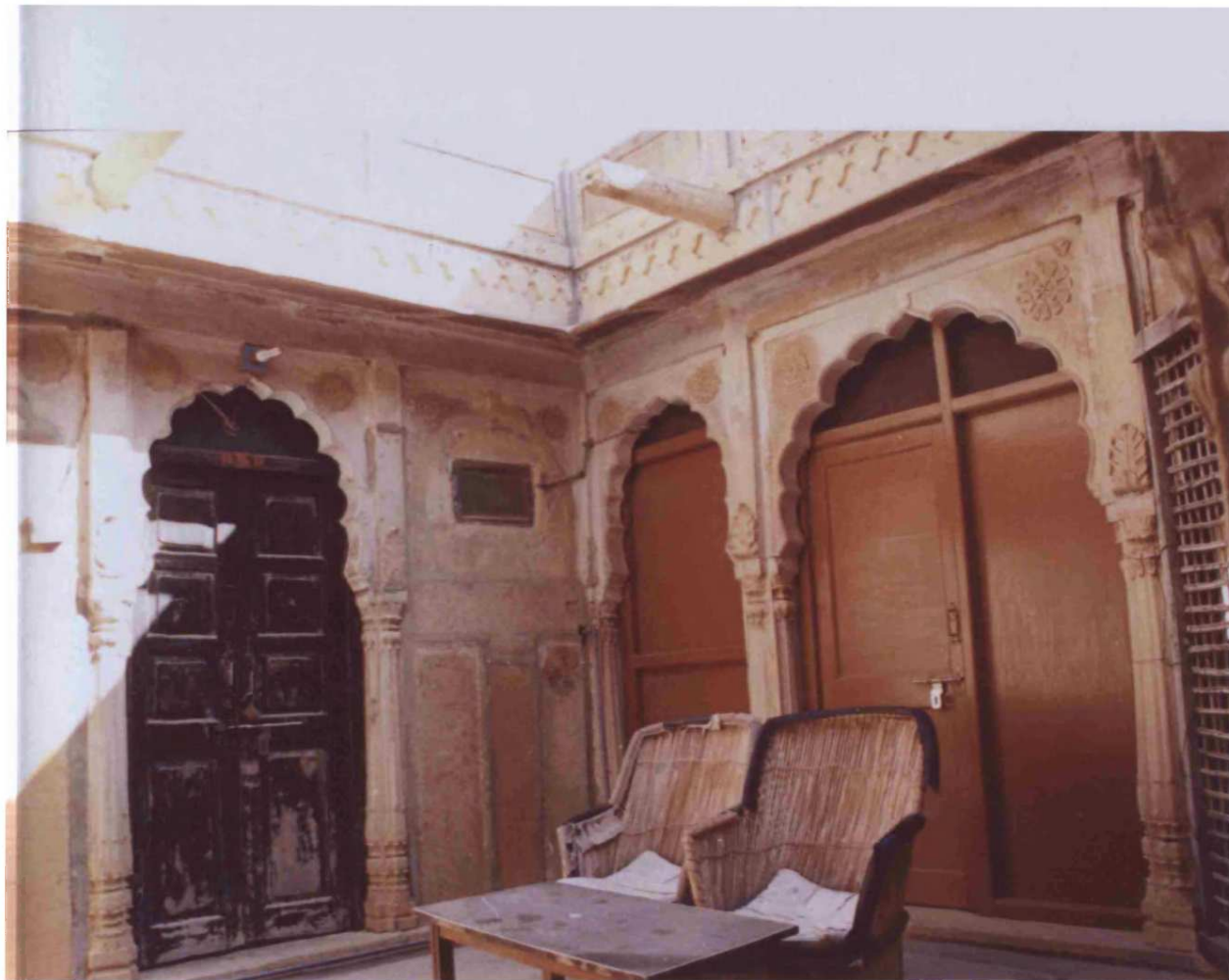
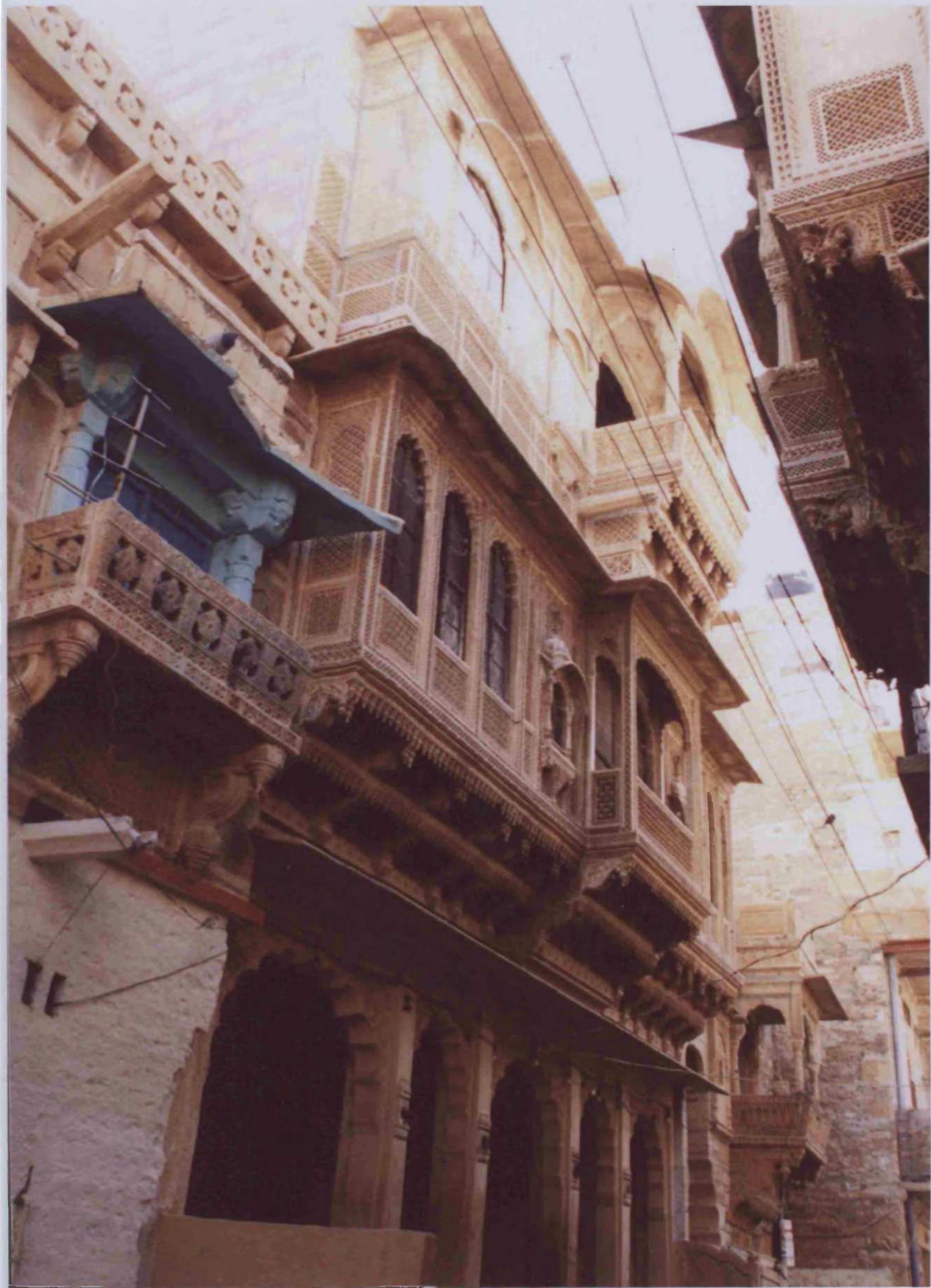


Fig. 228 Chandni on second floor to rear of chandni



Fig. 229 Jharokha adjacent to chandni on second floor, overlooking main chowk below





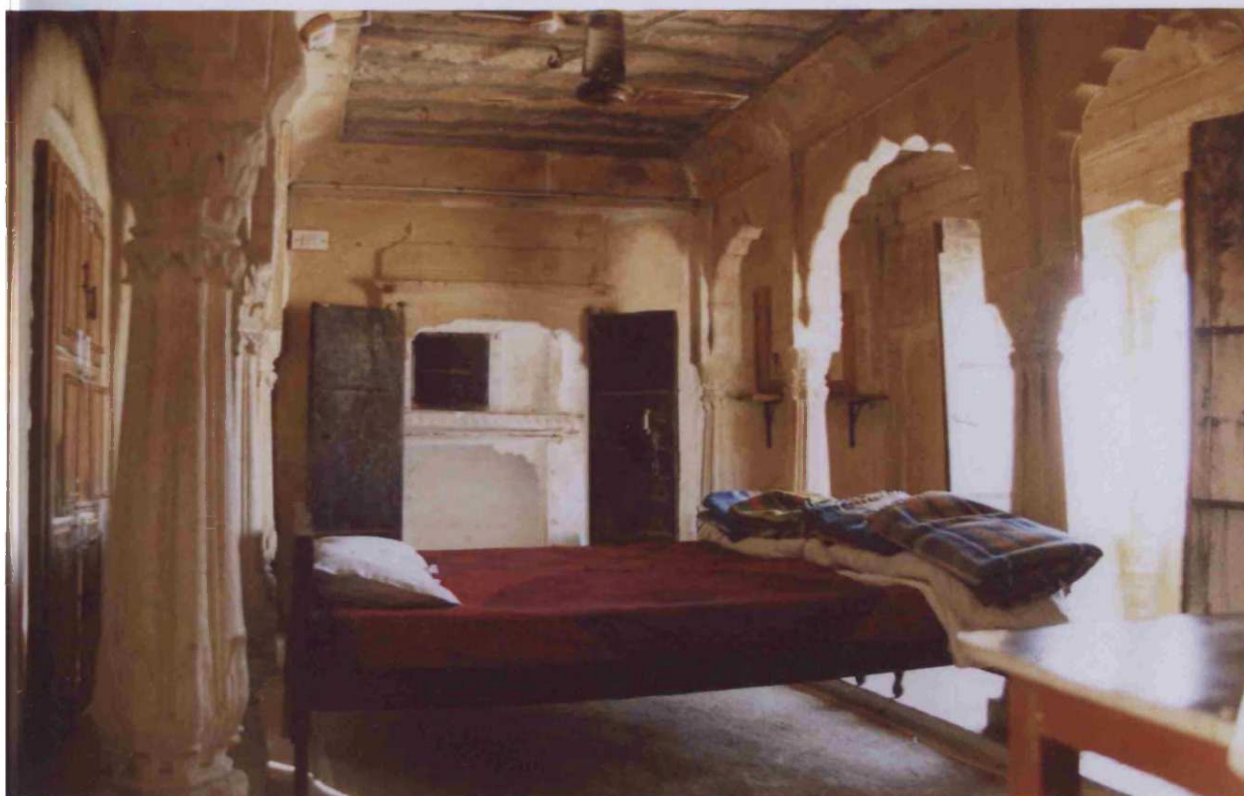
*Fig. 230 Main facade, Suraj Haveli*





*Fig. 232 Range to left of chowk housing kitchen*

*331 Pathiyal to right of chowk*



*Fig. 233 Hall built over the front part of the haveli on second floor*

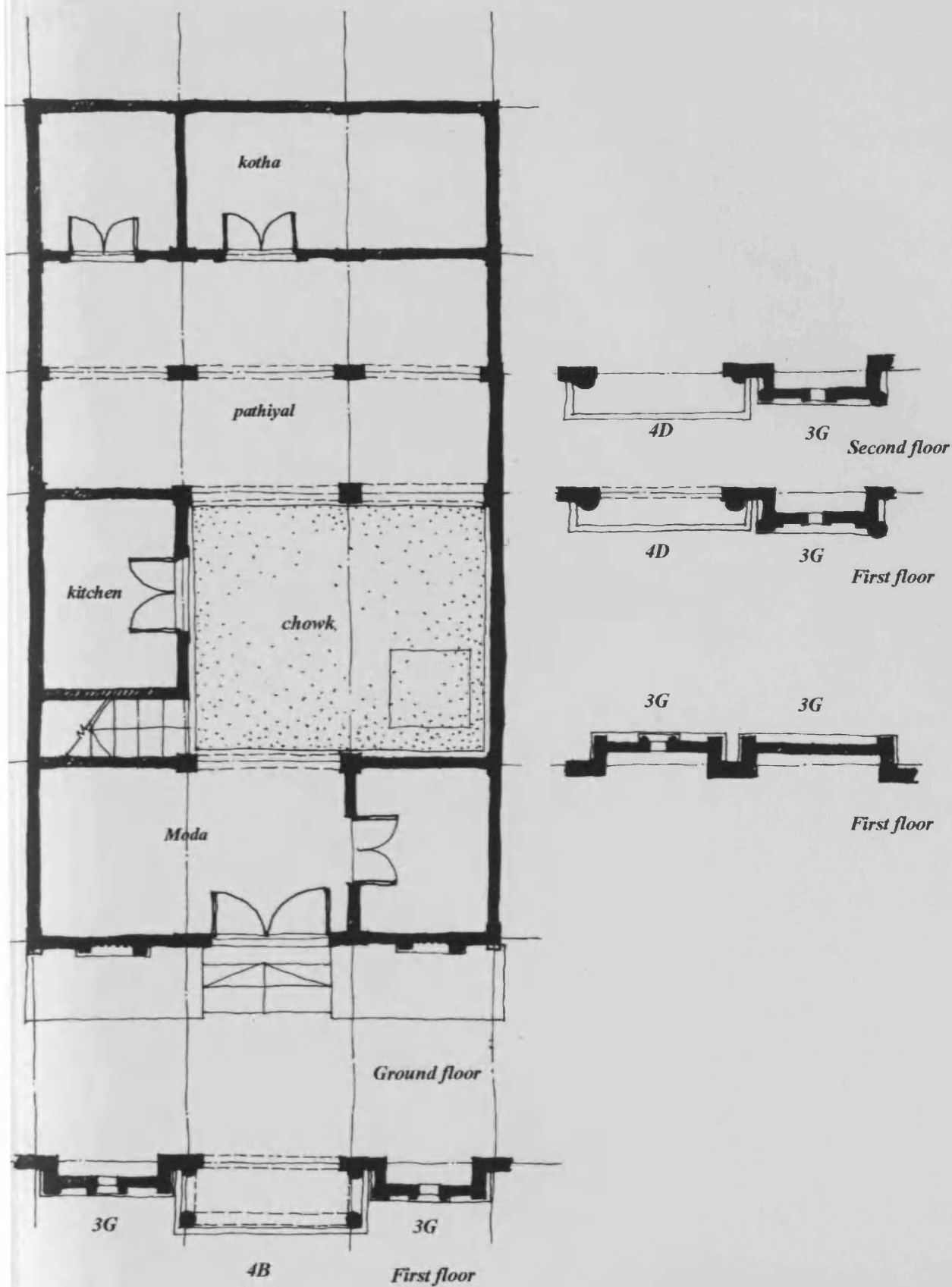


Fig. 234 Haveli in Jethapara





Fig. 236 Range to rear of

Fig. 236 Range in front of chowk

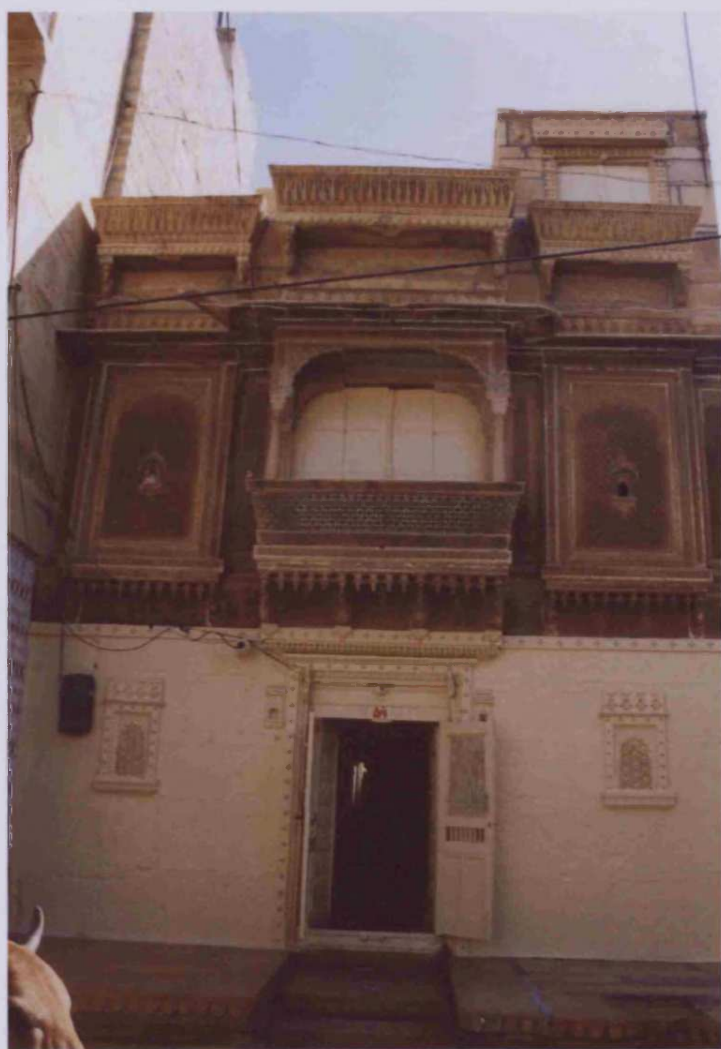


Fig. 237 Front elevation



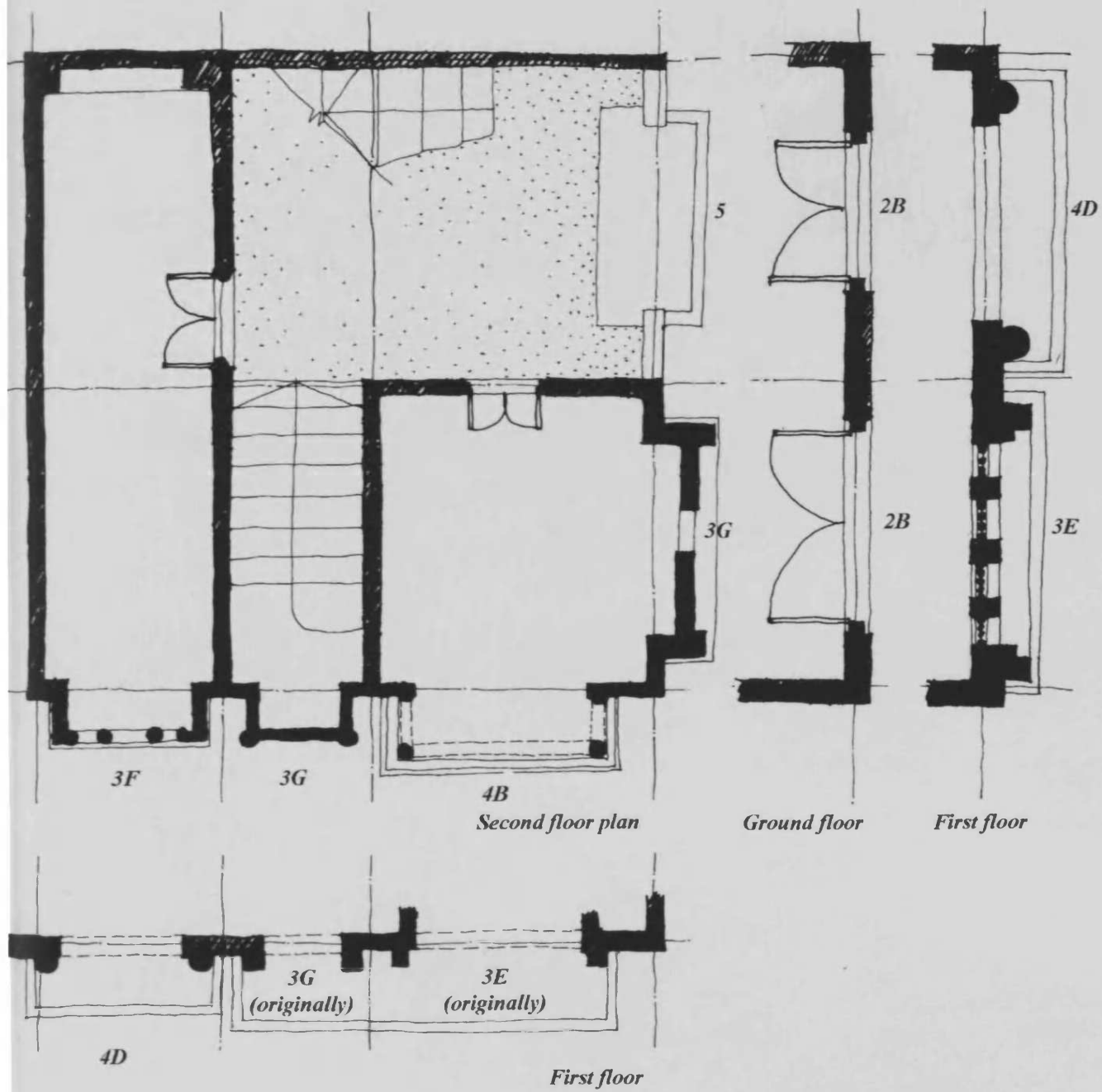


Fig. 238 Haveli in Vyaspara

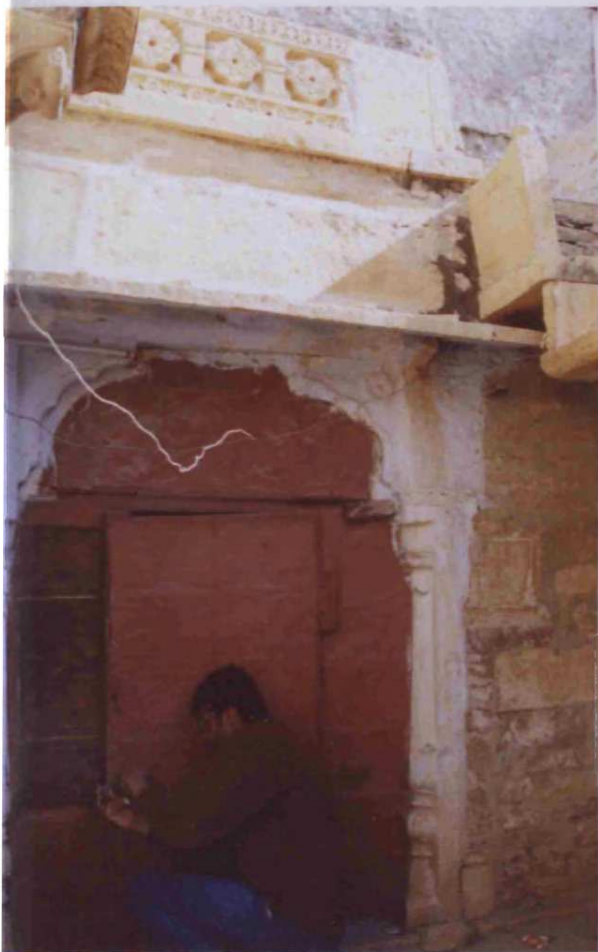


Fig. 239 Entrance to range built to the left of terrace, second floor



Fig. 240 Jharokha on elevation facing street



Fig. 241 Interior of range built to the left of terrace



Fig. 242 Bari on first floor in elevation facing street



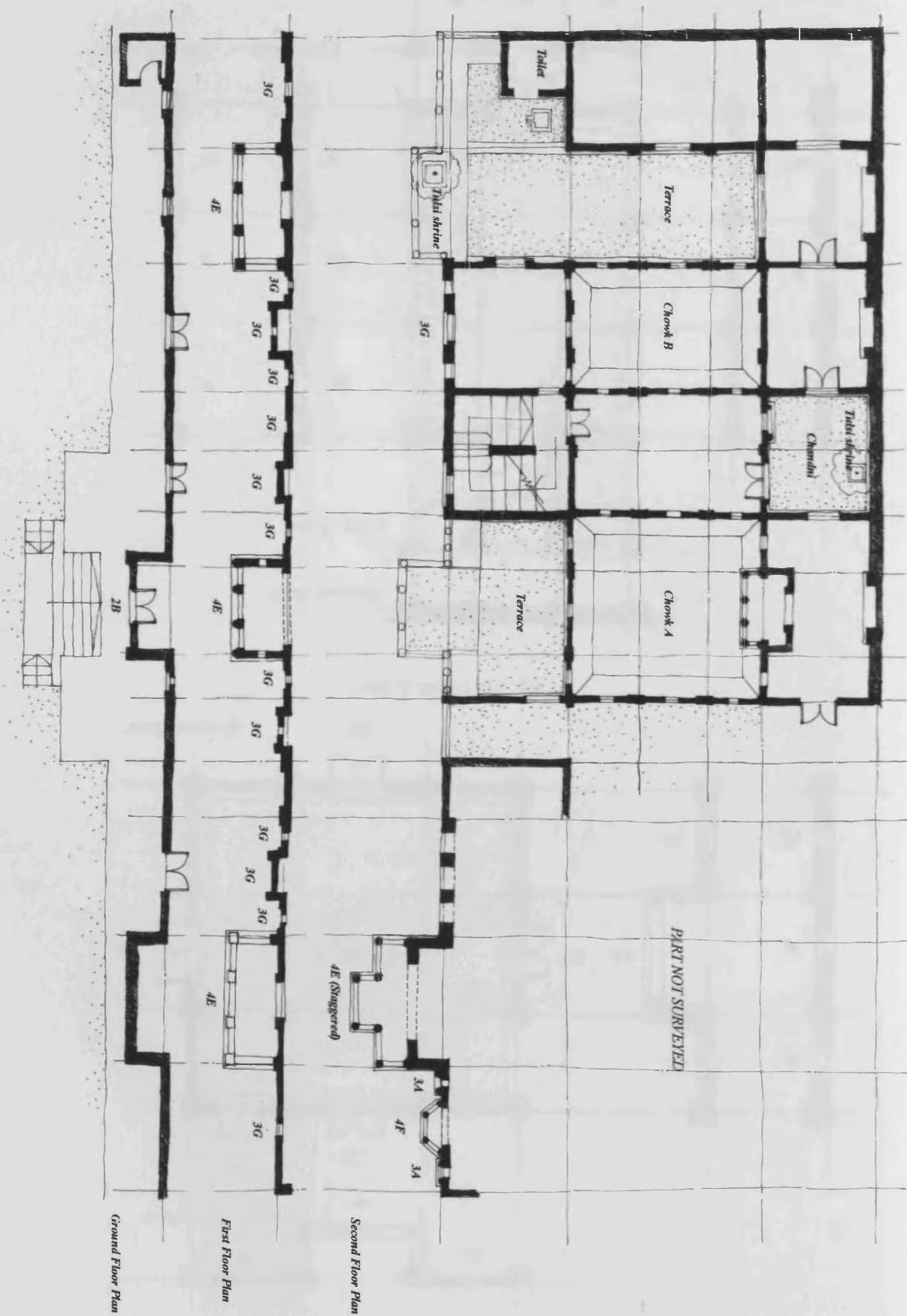


*Fig. 243 Interior of range built to the left of terrace*



*Fig. 244 Elevation facing public chowk*

Fig. 245 Salim Singh ki Haveli, floor plans





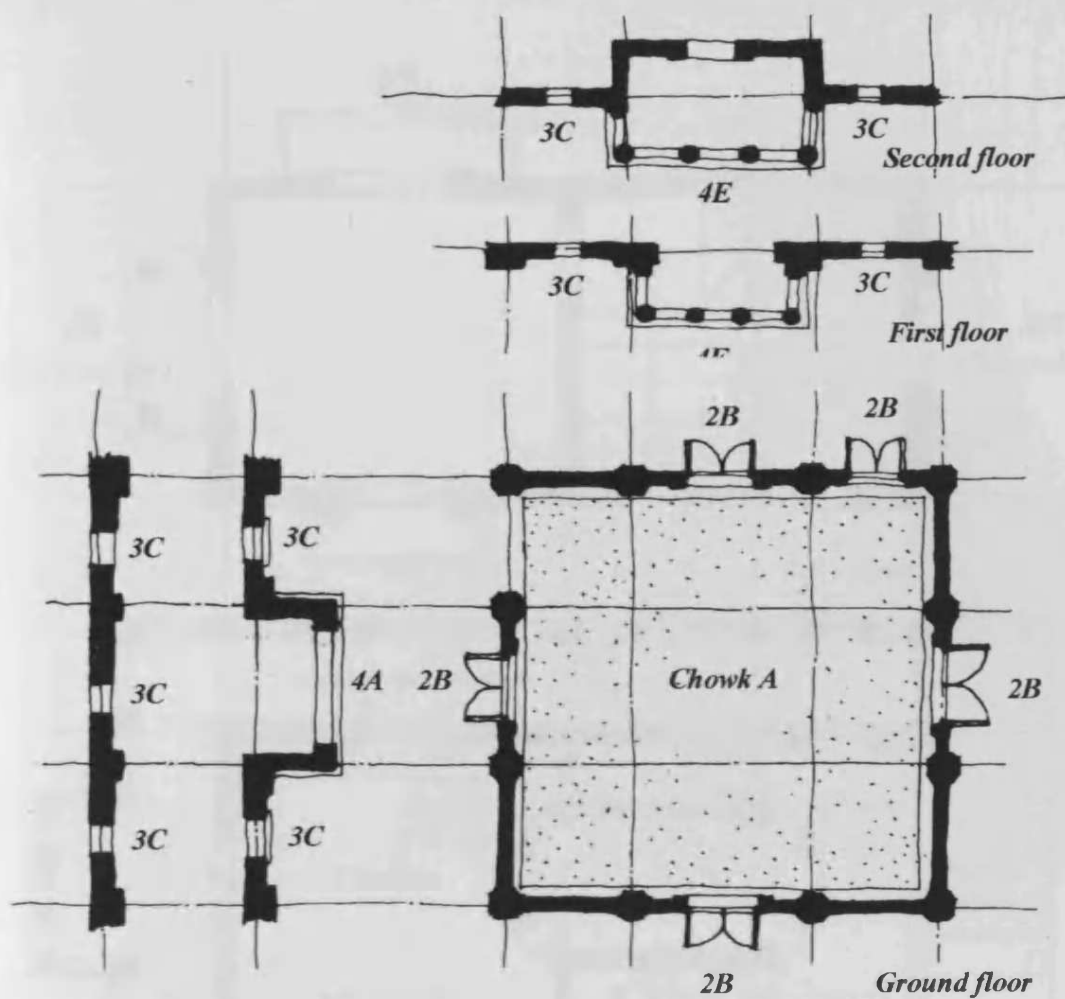


Fig. 246 Chowk A, plan

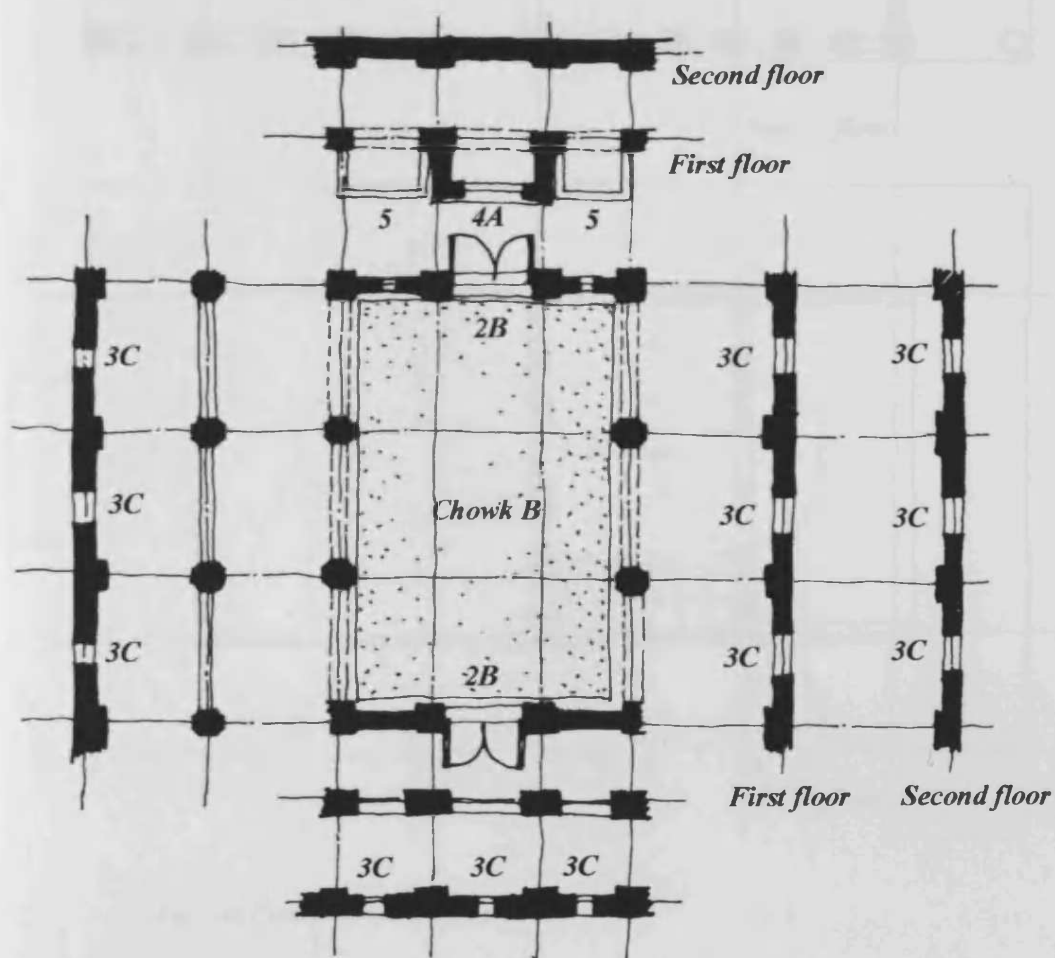


Fig. 247 Chowk B, plan

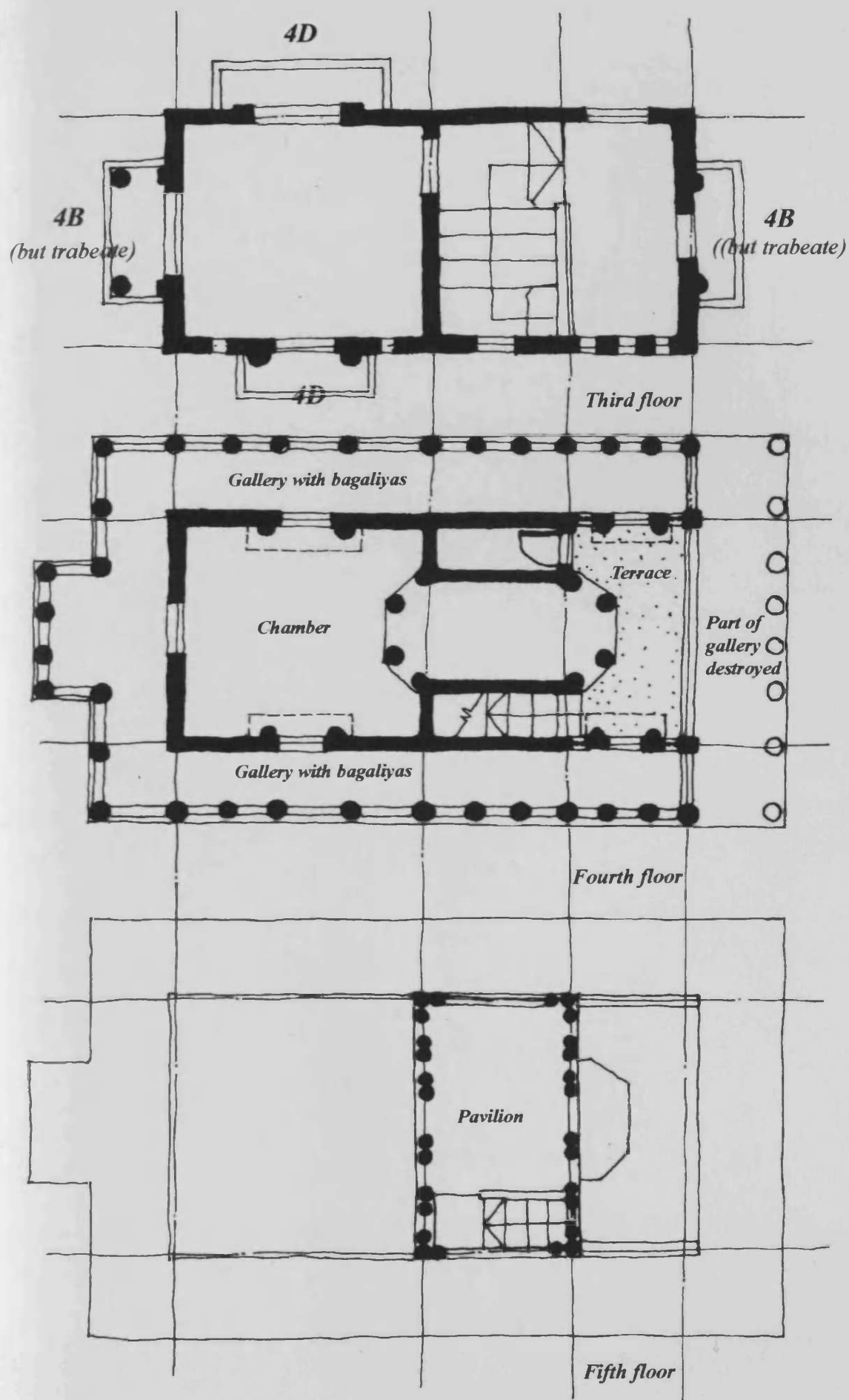


Fig. 248 Central Tower Block, plan



249 Range to rear of Chowk A

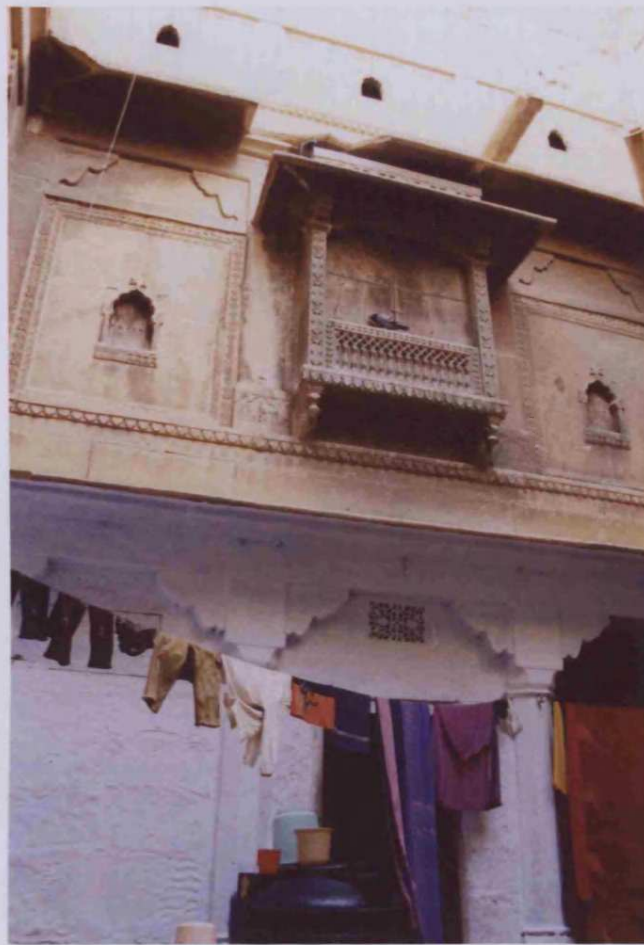
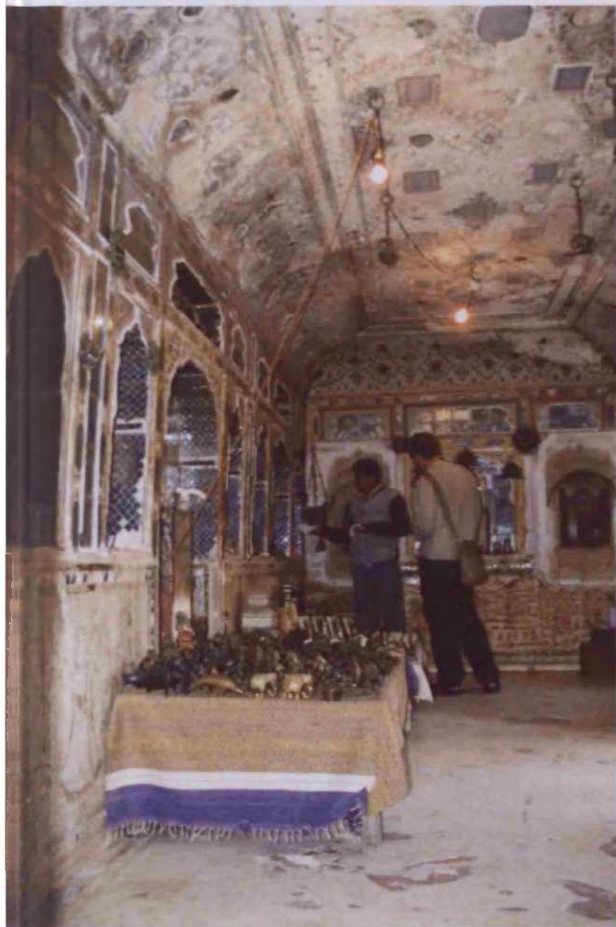


Fig. 250 Range to left of Chowk A



251 Interior of mol on first floor



Fig. 252 Interior of jharokha associated with mol on first floor





*Fig. 253 Terrace to left of Chowk B, on second floor*



*Fig. 254 Chowk B, looking at ranges to left*



*Fig. 255 Staircase tower block to the front of Chowk B*



*Fig. 256 Ranges to rear of Chowk B*





*Chandni to rear of haveli on second floor*



*Fig. 258 Range to rear of Chowk A, second floor*



*Tower block over staircase seen from Chowk A*



*Fig. 260 Tower block over staircase seen from rear*





Fig. 261 Tower block to left of entrance

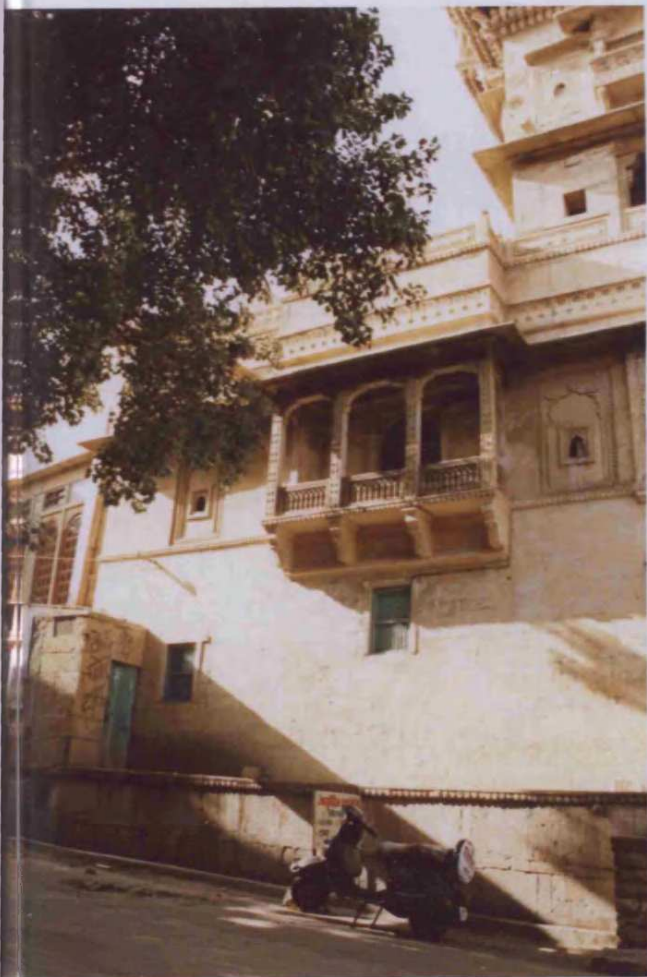


Fig. 262 Front facade showing ranges to extreme left of haveli

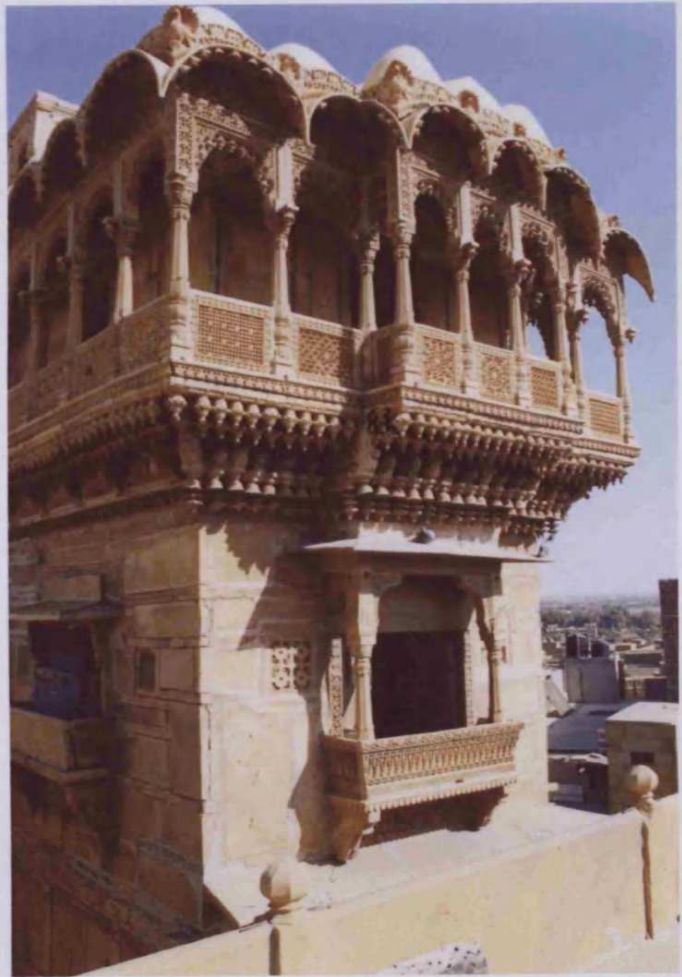


Fig. 263 Elevation of gallery with bagaliyas, on shorter side





*Fig. 264 Front facade with ranges to right of entrance*



*Fig. 265 Front facade with ranges to extreme right of haveli*



*Fig. 266 Projecting block in centre with entrance doorway*





Fig. 267 Terrace in tower block on fourth floor with access from peripheral gallery

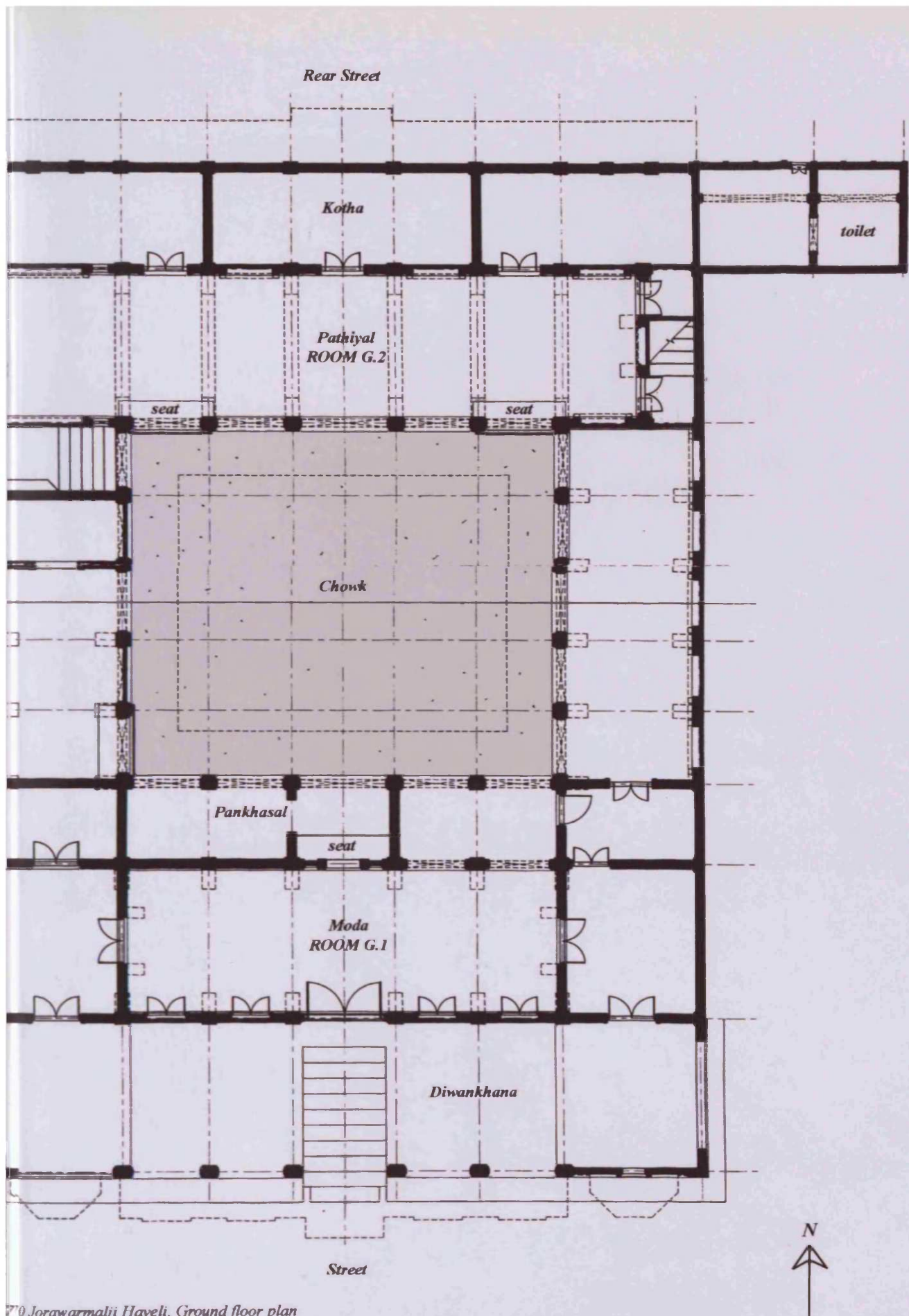


Fig. 268 Staircase leading up to pavilion on fifth floor from terrace on fourth floor in tower block over staircase



Fig. 269 Chamber decorated with mirror-work on fourth floor, in tower block over staircase





70 Jorawarmalji Haveli, Ground floor plan



Fig. 271 Interior of moda, Ground floor, Jorawarmalji haveli

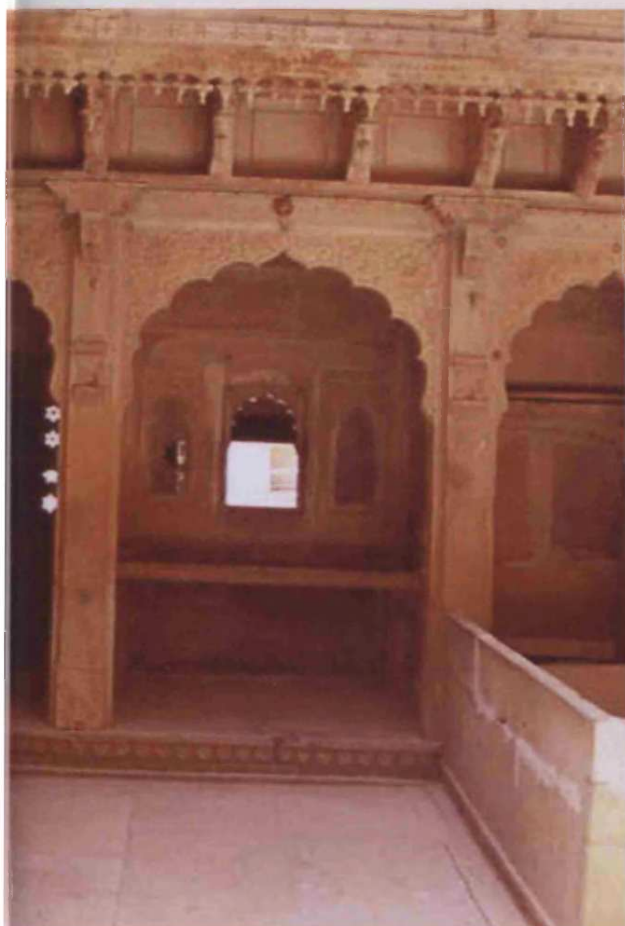


Fig. 272 Timber ceiling over pathiyal, Ground floor, Jorawarmalji haveli



Fig. 273 Access to chowk from moda, Ground floor, Jorawarmalji haveli





Central bay of pankhasal, Ground floor, Jorawarmalji

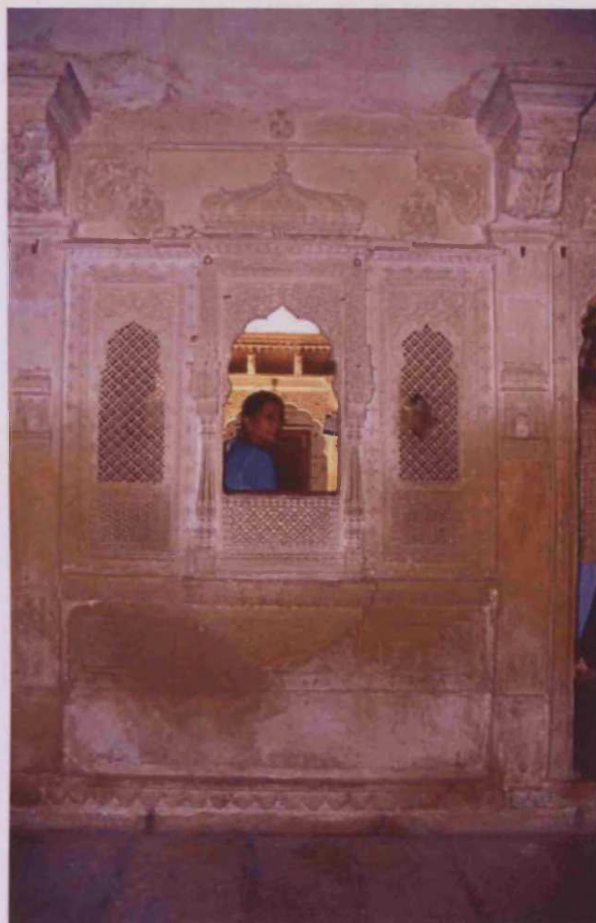


Fig. 275 Central bay of pankhasal seen from moda, Ground floor, Jorawarmalji haveli

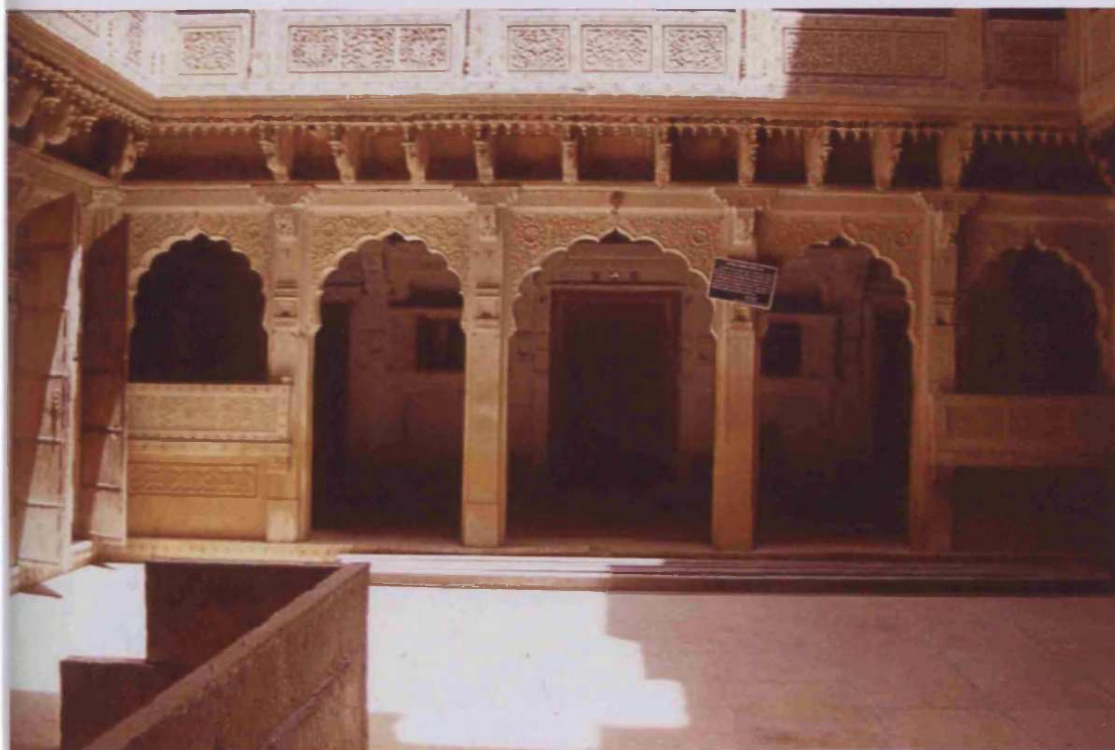


Fig. 276 North elevation of arcade to chowk, Ground floor, Jorawarmalji haveli

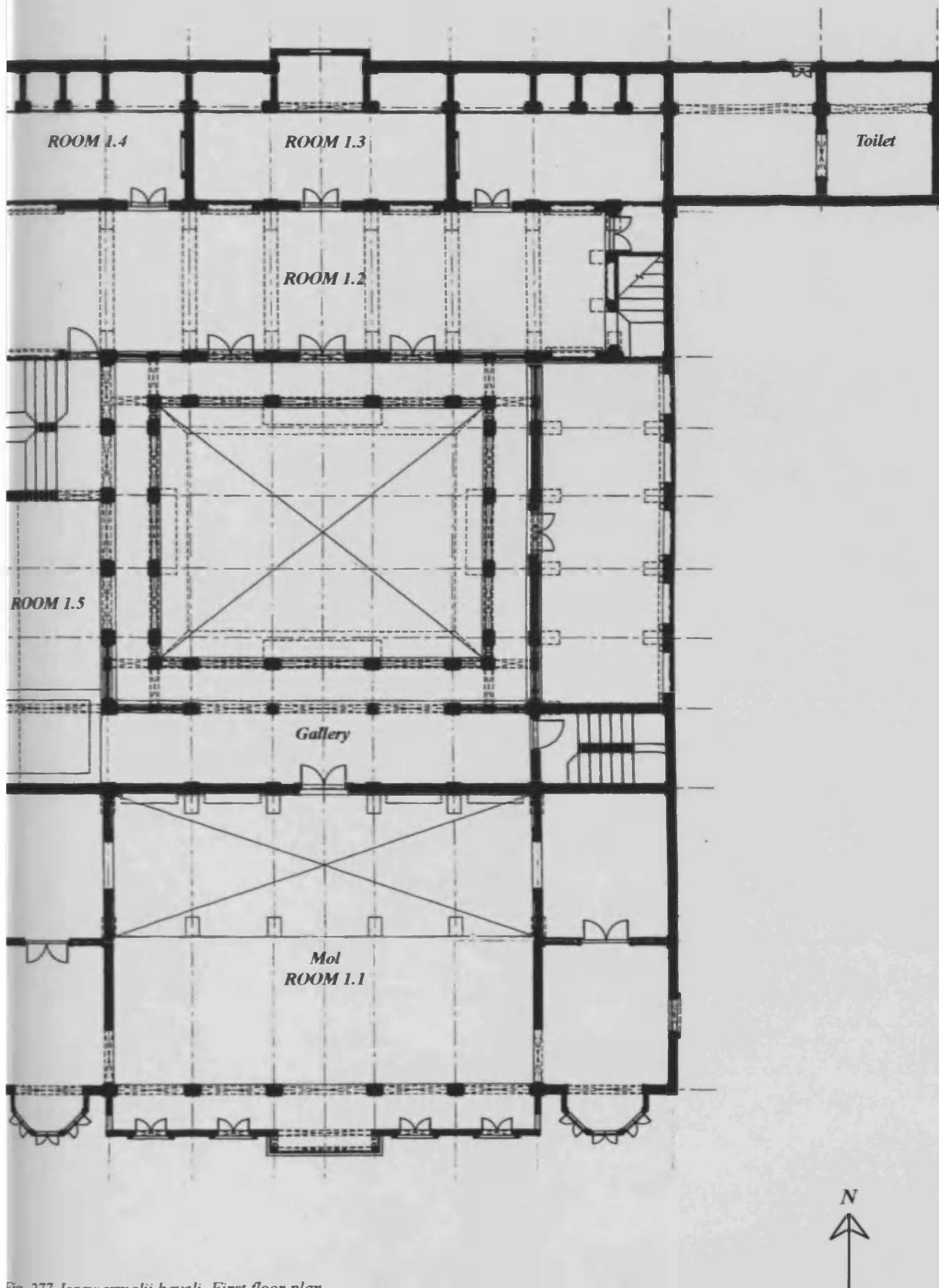


Fig. 277 Jorawarmalji haveli, First floor plan





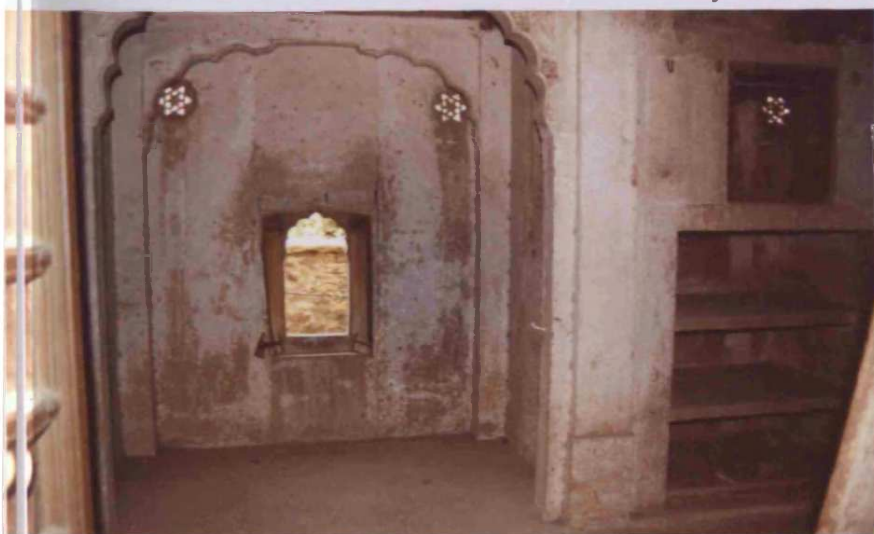
*Fig. 278 Gallery around chowk, First floor, Jorawarmalji haveli*



*Fig. 279 Arcade of surangdar khambhas to the south of chowk, First floor, Jorawarmalji haveli*

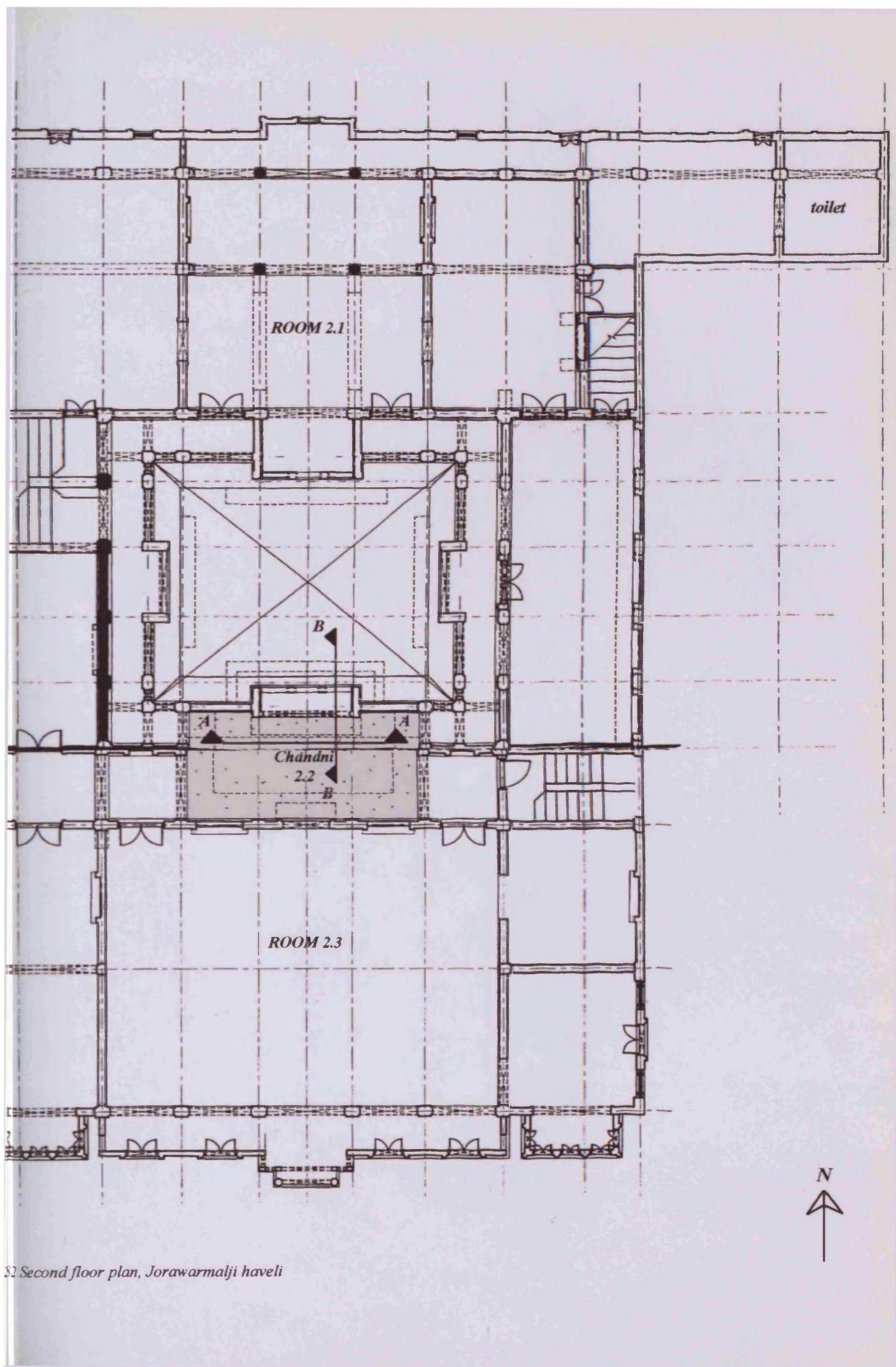


*Fig. 280 Built-in storage in projection in rear facade, First floor, Jorawarmalji haveli*



*Fig. 281 Bari and built-in storage in rear facade, First floor, Jorawarmalji haveli*





52 Second floor plan, Jorawarmalji haveli

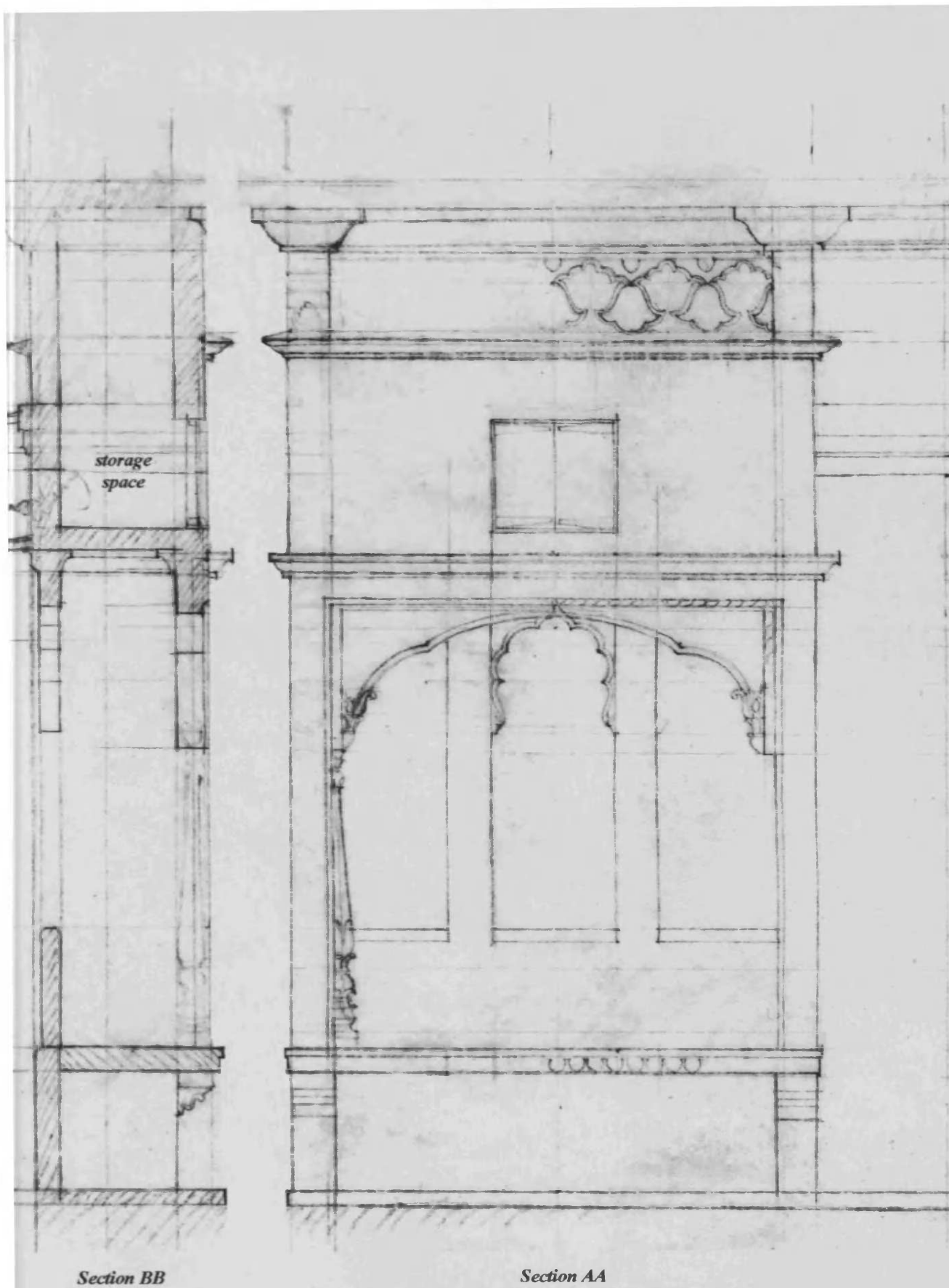


Fig. 283 Chandni 2.2 (for location, refer to Second floor plan)





View from chandni 2.2, looking towards ranges to the  
rough jharokha



Fig. 285 View of chandni with margol opening into adjacent  
hall to the south

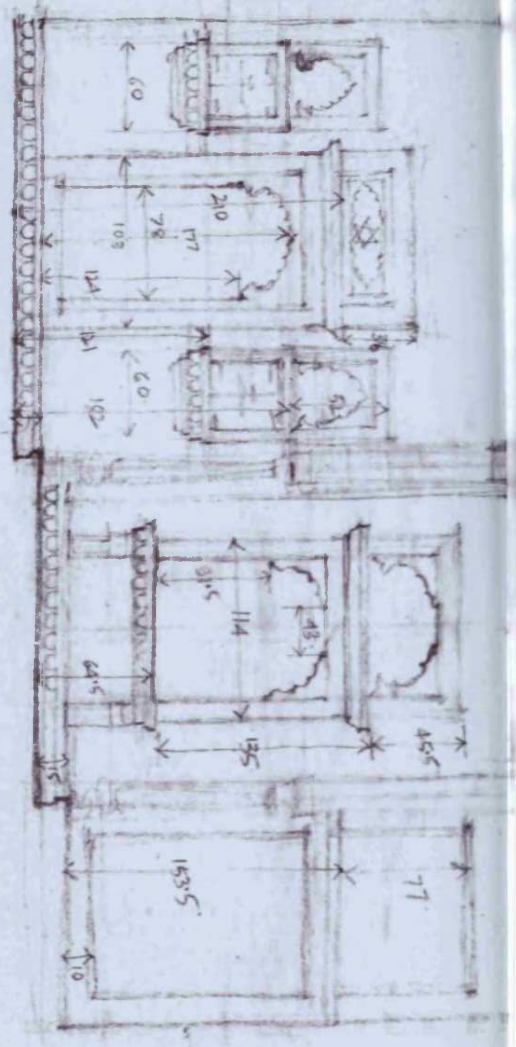


Bari projection in northern range facing chowk

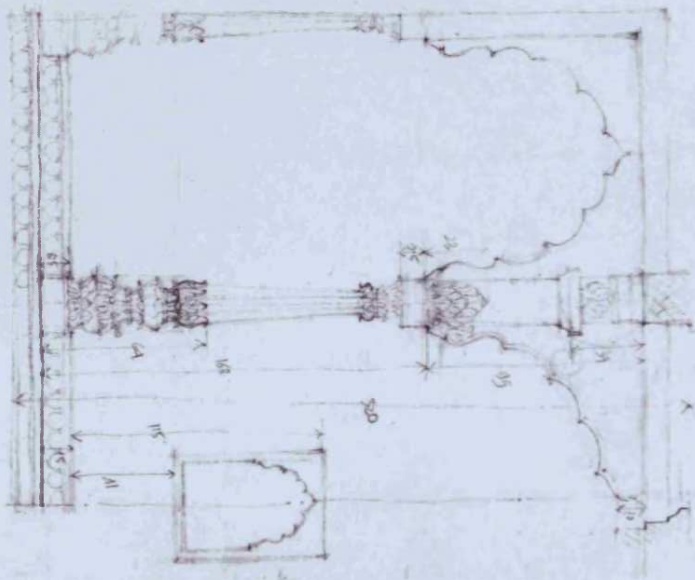


Fig. 287 View of gallery projection adjacent to external facade, Room 2.3





Cross-section A-A through room



Detail of Surangdar khambha



East and west elevation of shorter bay towards the front of the room



Surangdar khambhas (structural) braced at their upper ends with cusped margol



Bari overlooking chowk seen from within room

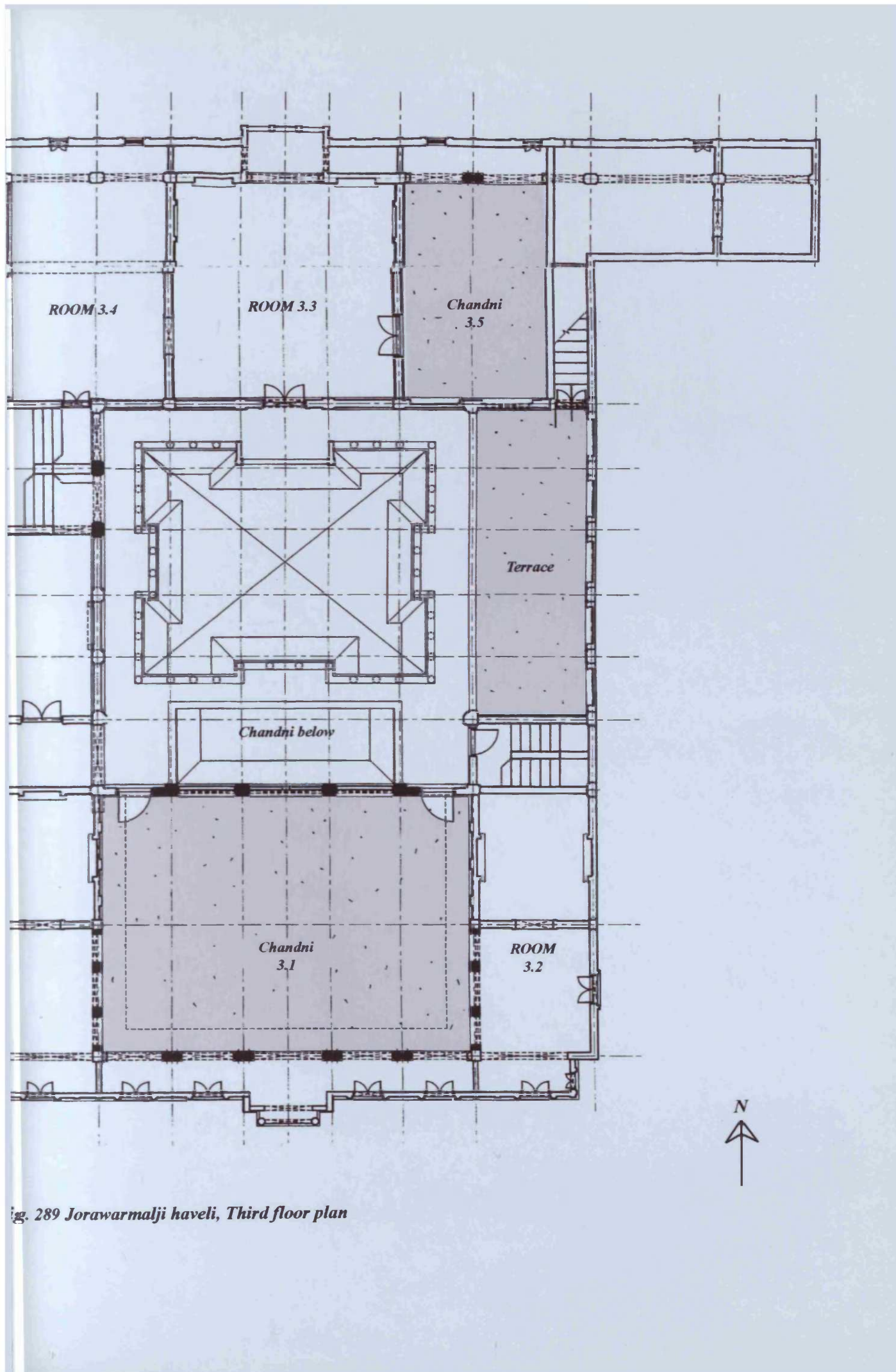
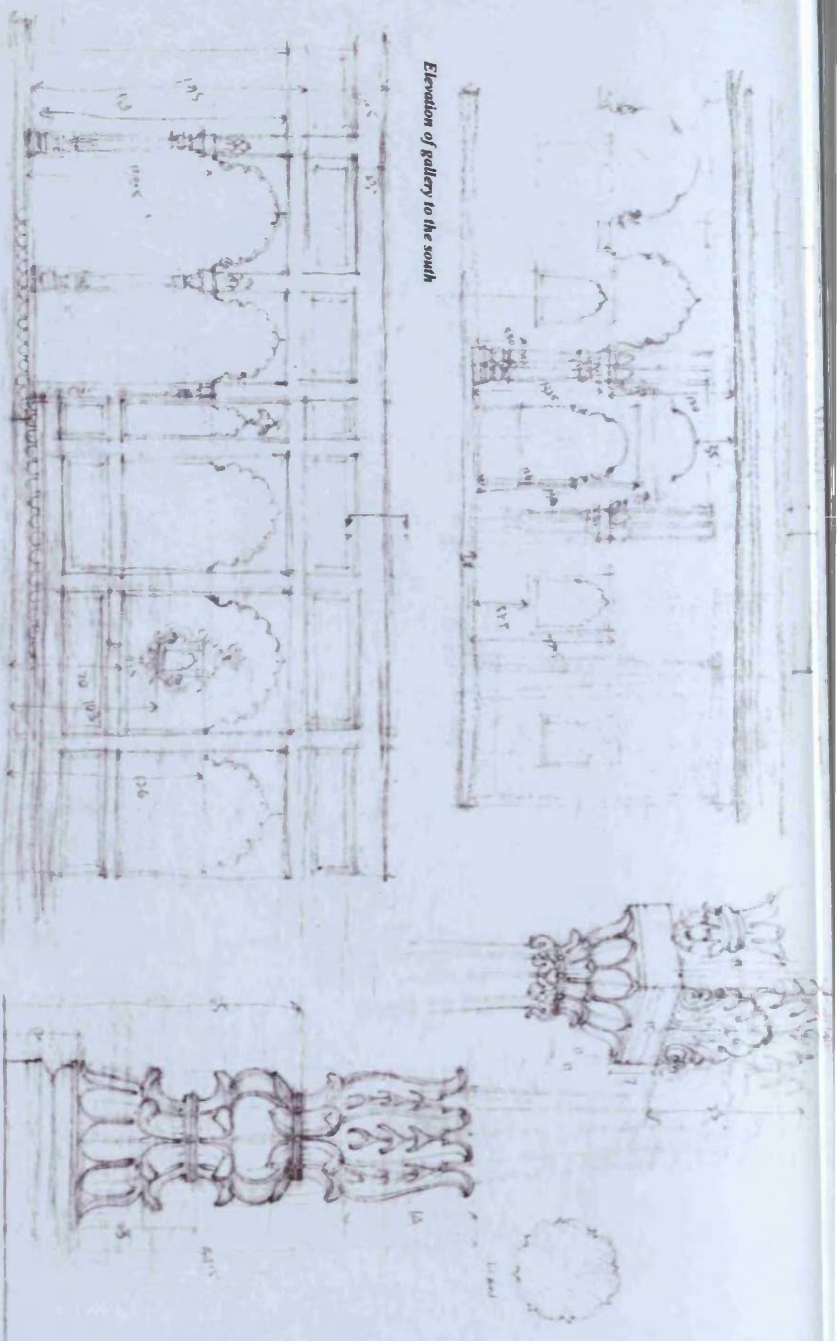


Fig. 289 Jorawarmalji haveli, Third floor plan

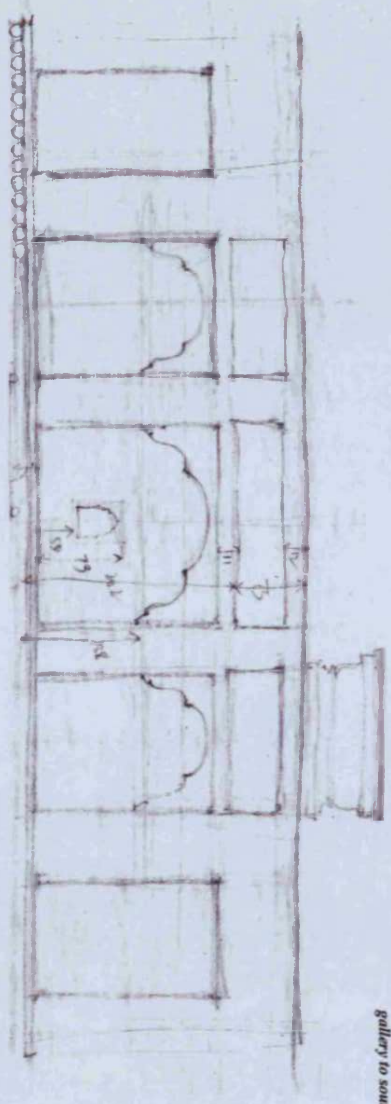




Elevation of gallery to the south

Elevation of range to the east/ west

Detail of surangdar khambha in gallery to south



Elevation of wall to north



Range to east/ west

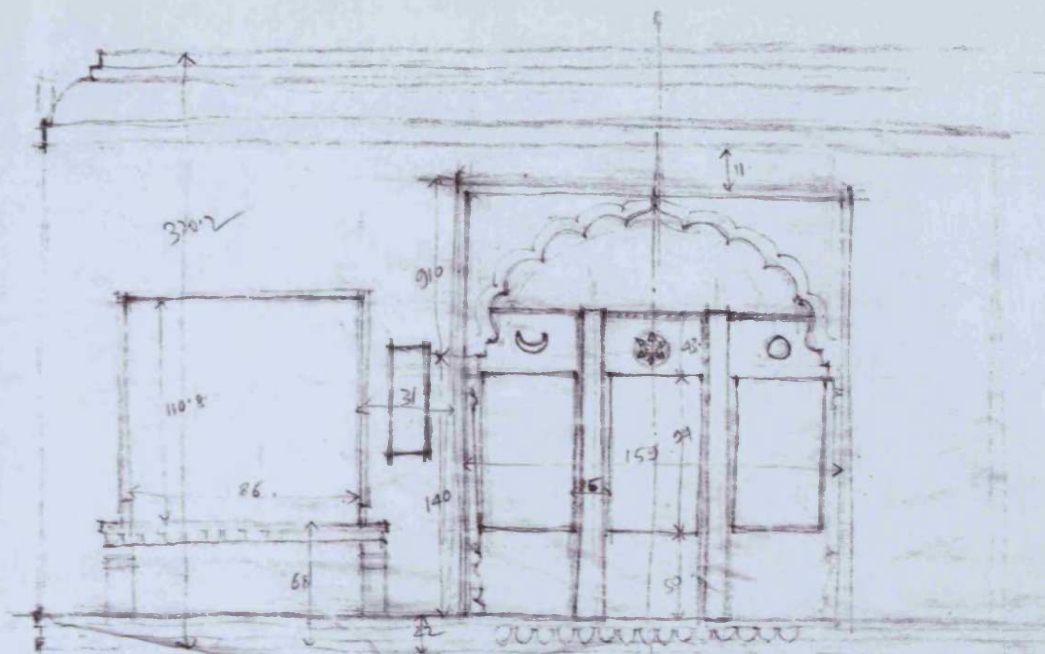


Range to north

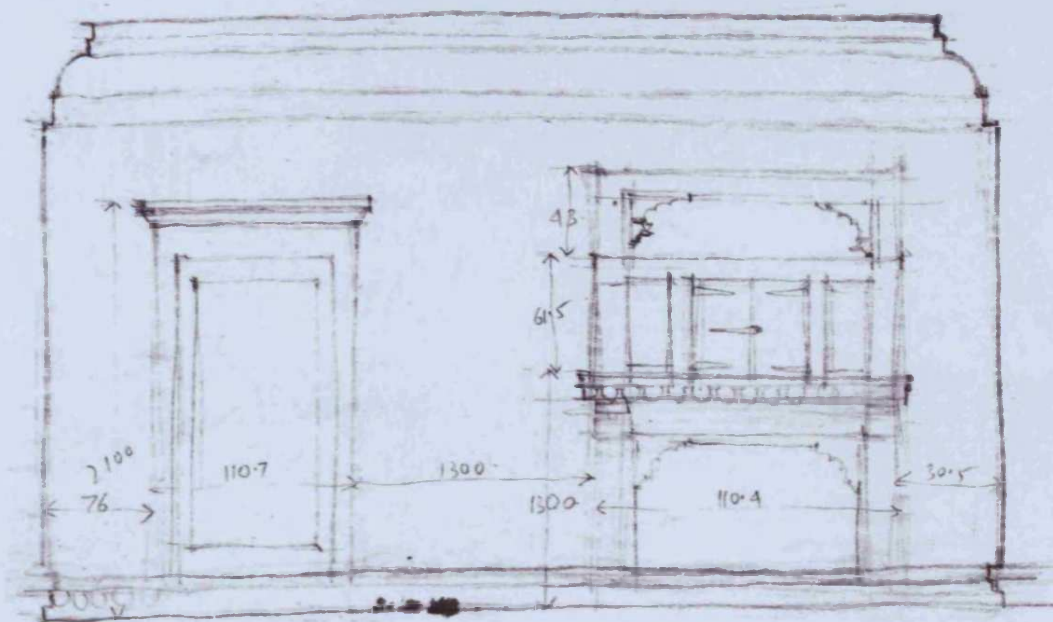


Gallery to south

Fig. 290 Detail of Chandni 3.1 (refer to third floor plan)



*North elevation of room*



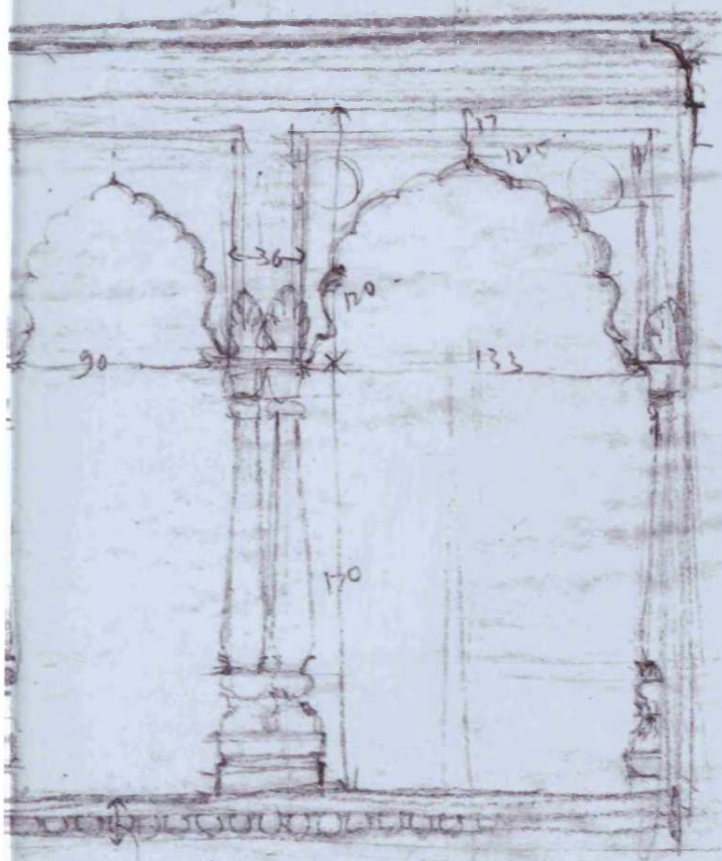
*East/west elevation of room*



*View of northern edge of room*

*Fig. 291 Room 3.3 (refer to third floor plan)*





*Section of gallery to the north*



*Unequal division of bays in gallery to the north, third and fourth floors*



*View of chandni looking south*

*Fig. 292 Chandni 3.5 (refer to third floor plan)*





Fig. 293 Jharokha on north facade to chowk, third floor, Jorawarmalji haveli



Fig. 294 View of terrace from fourth floor, Jorawarmalji haveli



Fig. 295 View of chowk from fourth floor terrace, Jorawarmalji haveli



Fig. 296 Gallery on terrace built over northern edge of haveli, Jorawarmalji haveli



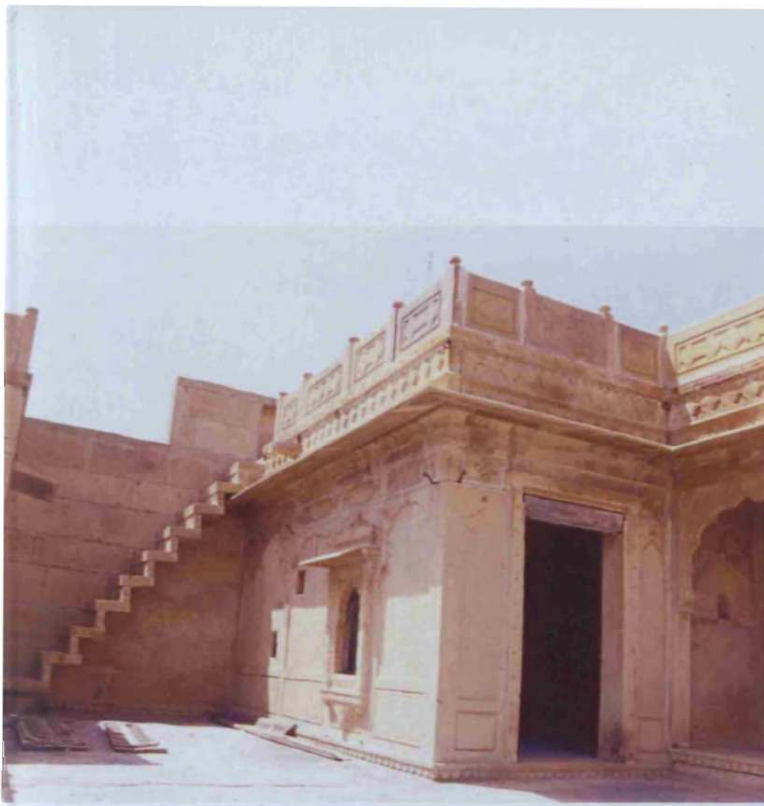


Fig. 297 Room adjacent to terrace on fourth floor, Jorawarmalji haveli



Fig. 298 South (front) elevation, Jorawarmalji haveli



Fig. 299 Projection in central five bays supported on double row of todis, first floor, Jorawarmalji haveli



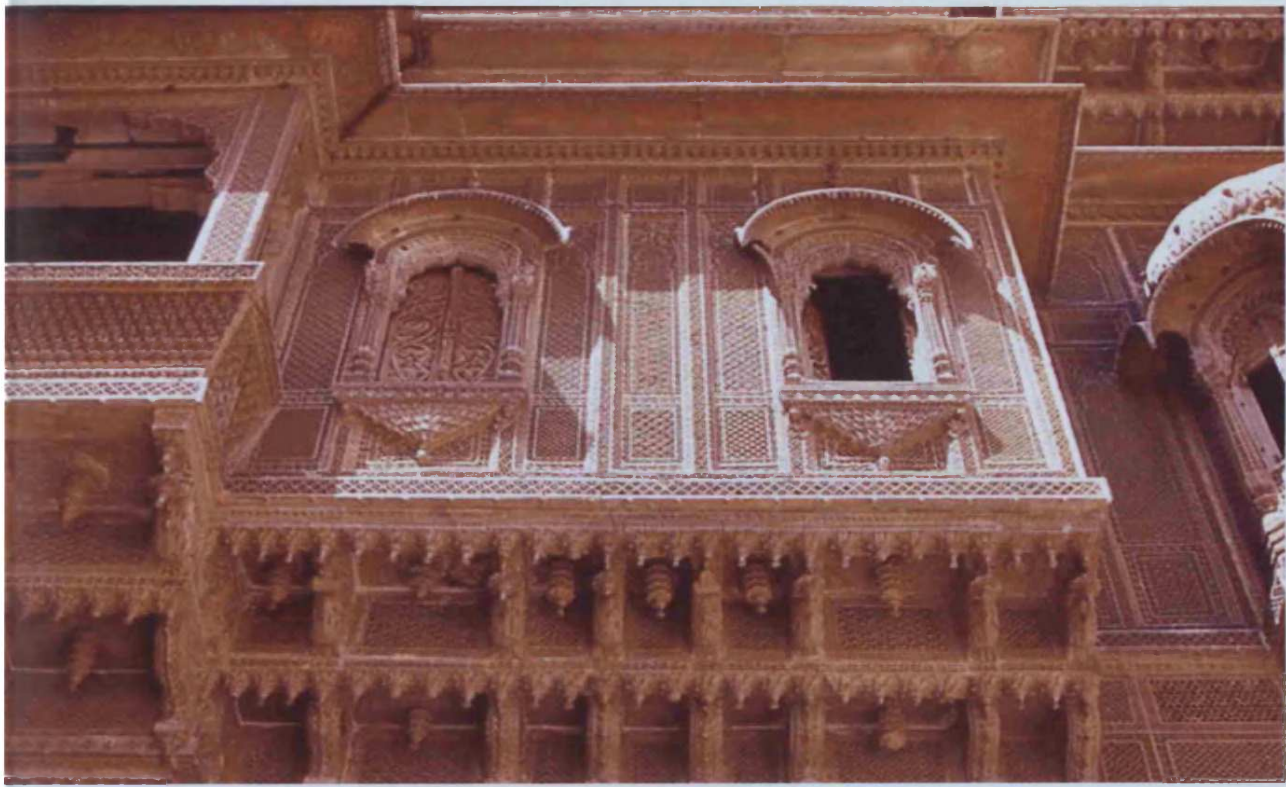
Fig. 300 End bay of diwankhana, ground floor, Jorawarmalji haveli





*Fig. 301 Watercolour rendering of kanwal, First floor, Jorawarmalji haveli*

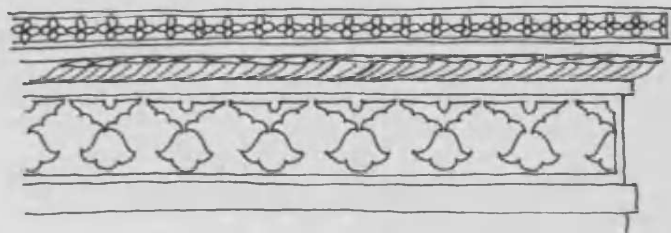




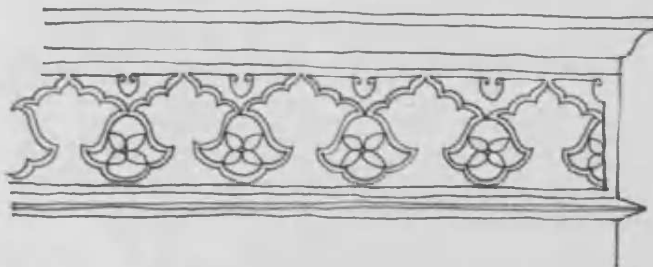
*Fig. 302 Projection in facade flanking central bay,  
First floor, Jorawarmalji haveli*



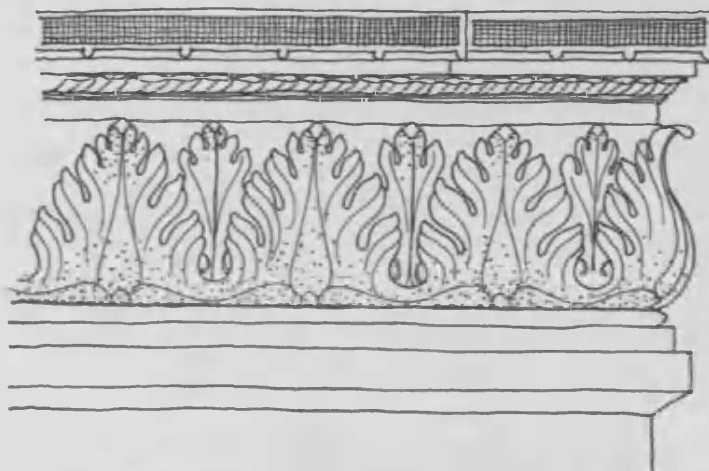
*Fig. 303 Bay at eastern edge of facade with kanwal,  
First floor, Jorawarmalji haveli*



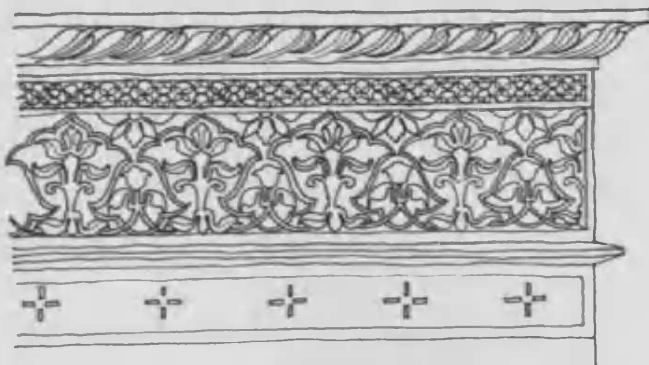
*Third floor (dasa)*



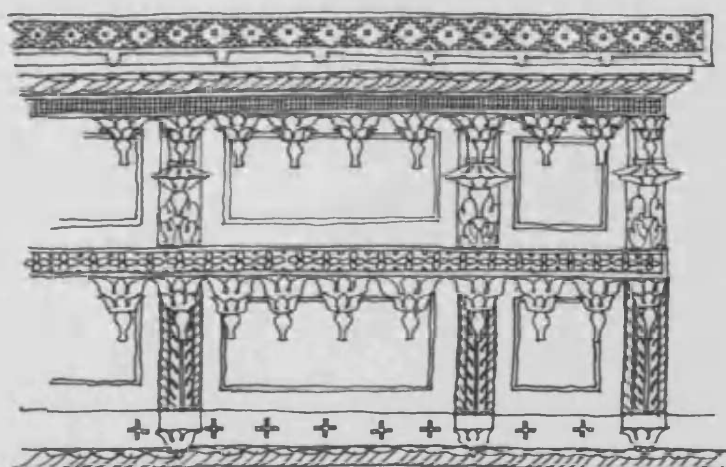
*Third floor (kangra moulding  
with chaufulias between double  
chajjas)*



*Second floor (dasa with acanthus  
moulding below)*



*Second floor (kangra moulding  
between double chajjas enriched  
with vegetal designs)*



*First floor (dasa)*

**Fig. 307** Horizontal mouldings at various floor levels, south elevation, Jorawarmalji Haveli



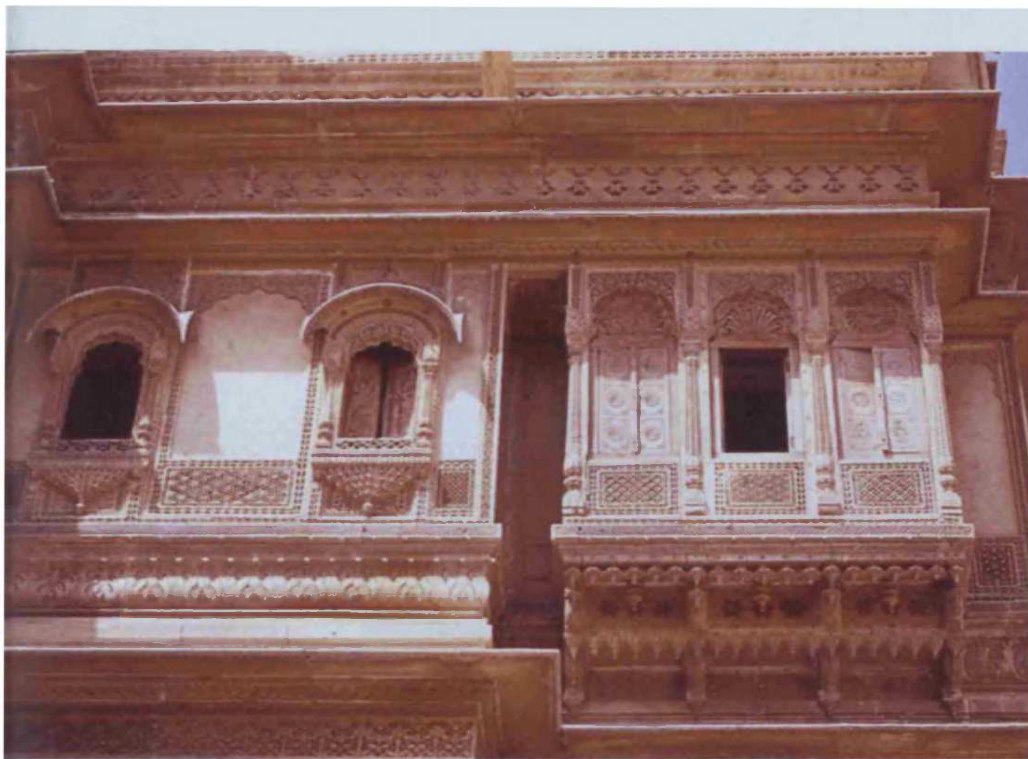


Fig. 304 Treatment of facade on second floor, Jorawarmalji haveli



Fig. 305 Central bay on second and third floors, Jorawarmalji haveli

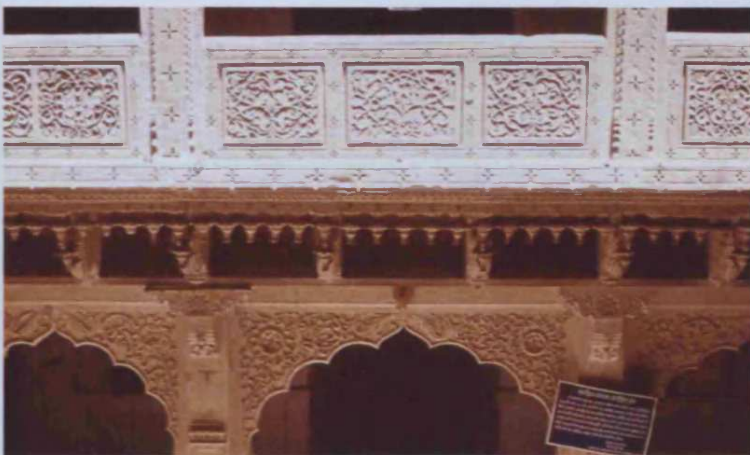


Fig. 306 Strip elevation to east, Jorawarmalji haveli





*Fig. 308 North (rear) facade, Jorawarmalji haveli*



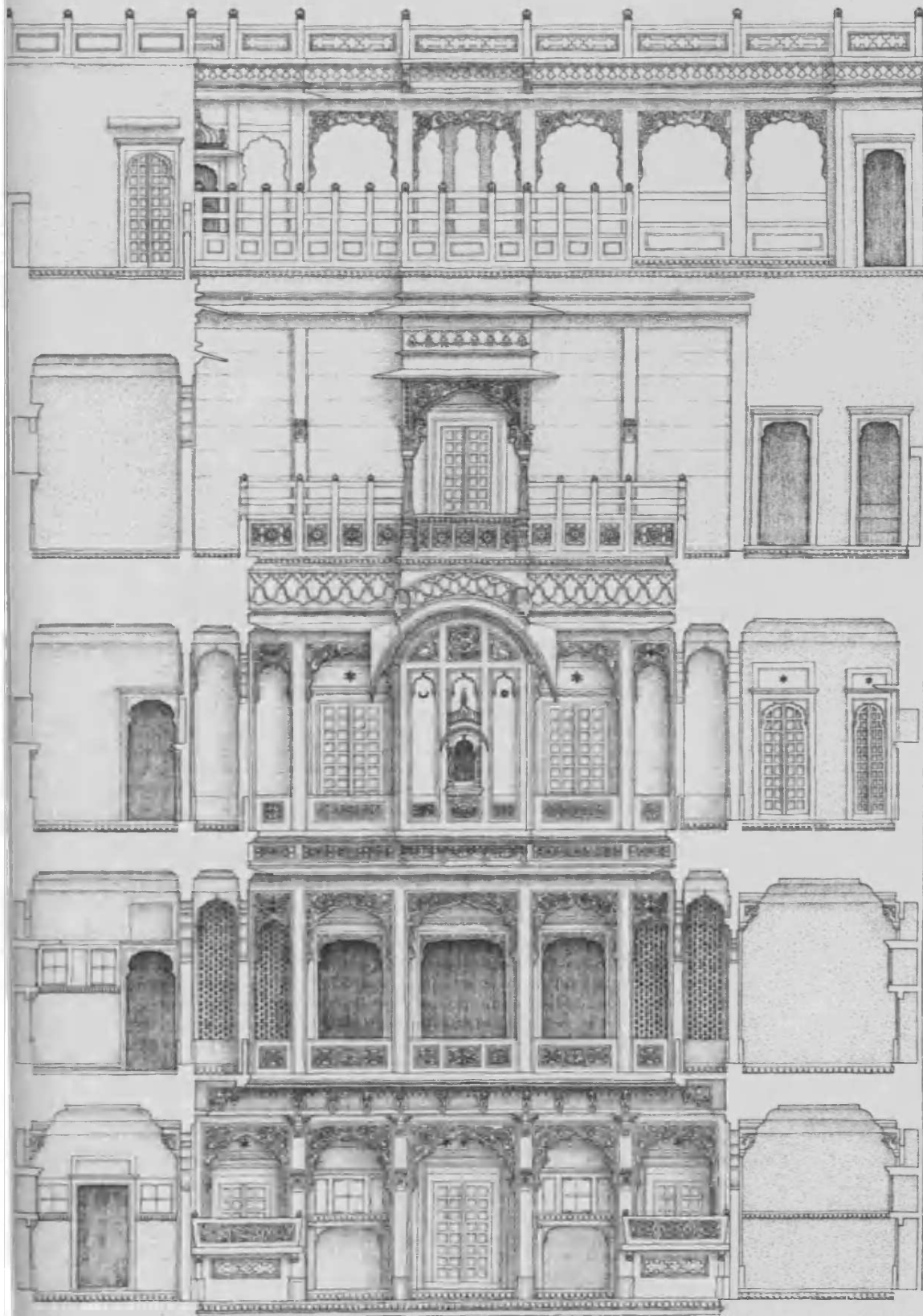
*Fig. 309 Network of todis at first floor slab level in gallery overlooking chowk, Jorawarmalji haveli*



*Fig. 310 Jharokha in range to east overlooking chowk, Second floor, Jorawarmalji haveli*



*Fig. 311 Jharokha in range to south overlooking chowk, Second floor, Jorawarmalji haveli*



312 Jorawarmalji Haveli, Section through chowk facing north



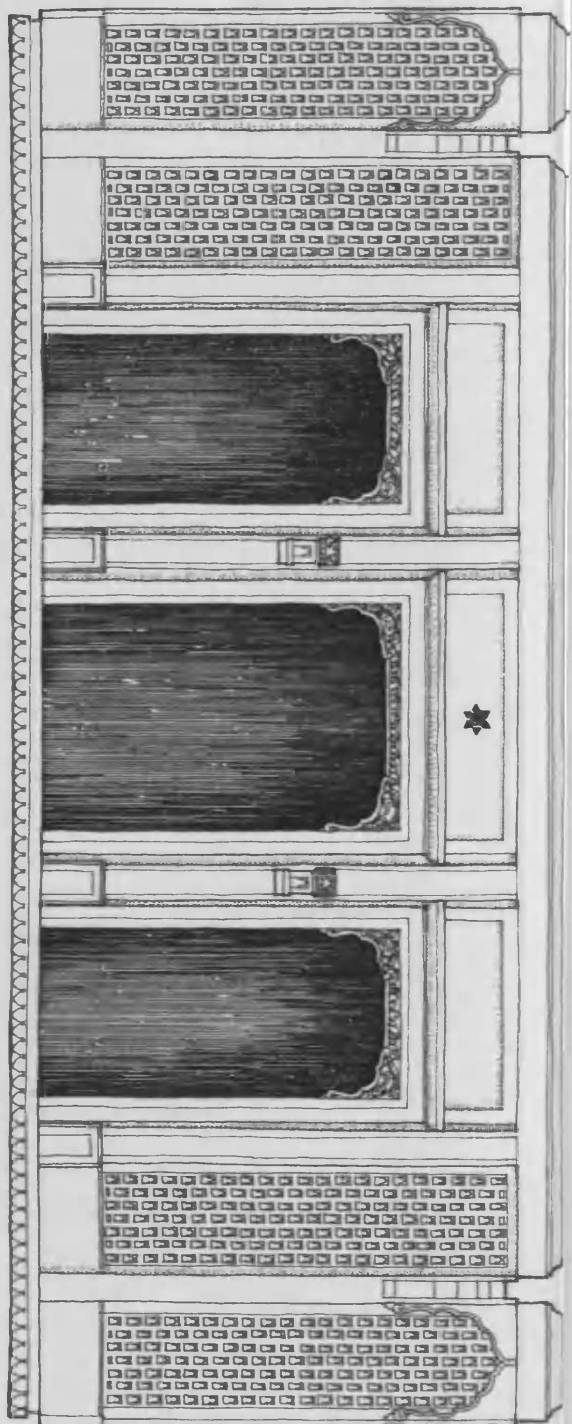


Fig. 313 Elevation of range behind gallery on northern facade overlooking chowk, first floor, Joravarnalji haveli

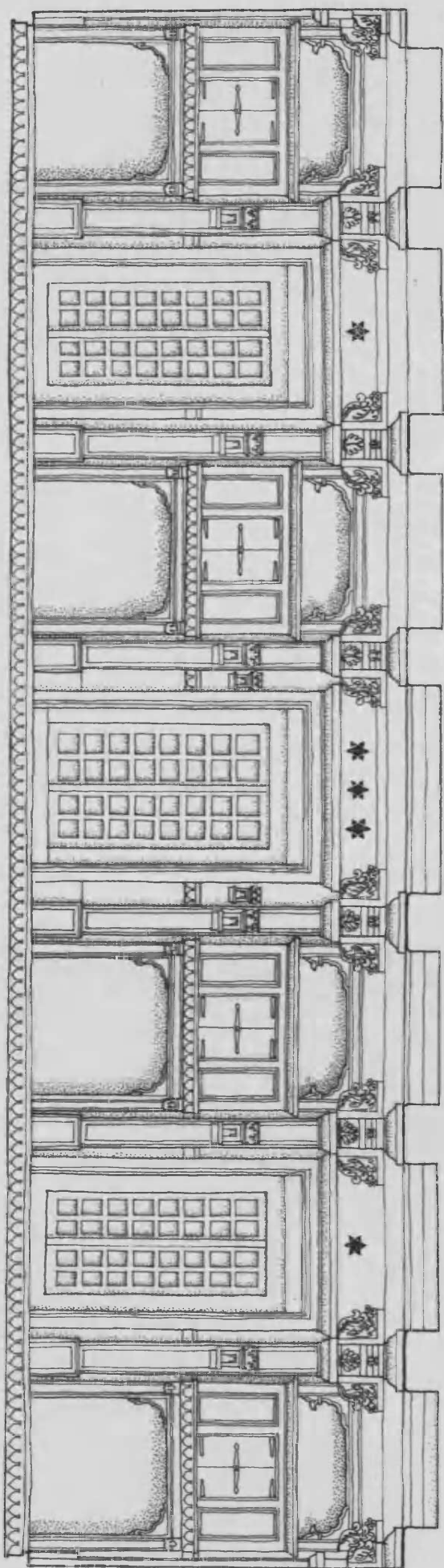
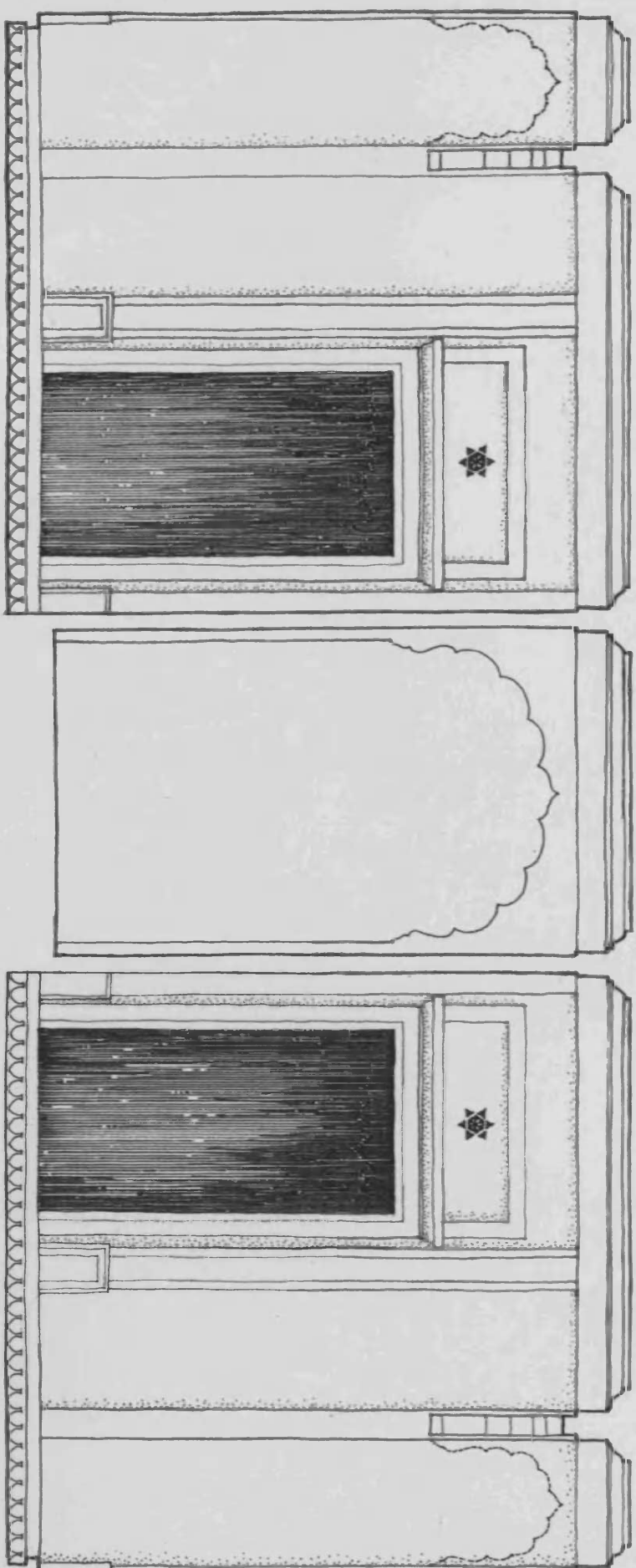


Fig. 314 Elevation of pathiyal behind chowk arcade, ground floor, Joravarnalji haveli



*Fig. 315 Elevation of facade behind gallery, north facade overlooking chowk, second floor, Jorawarmaji haveli*

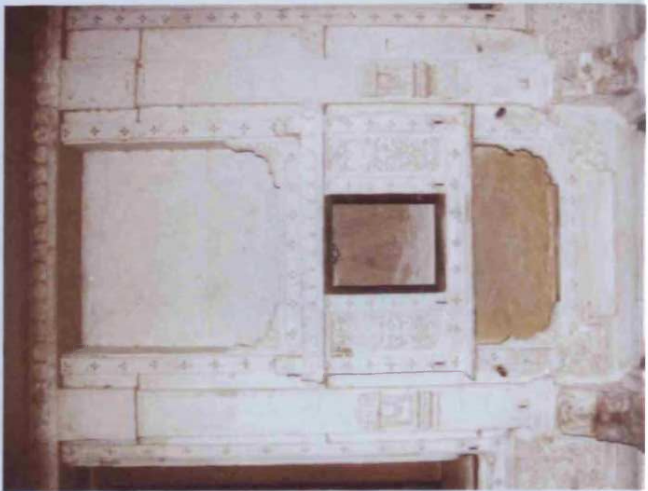


Fig. 316 Ala positioned between bhambhas,  
First floor, Joravarnalji haveli



Fig. 317 Ala alternating with doorways in consecutive bays, Ground floor kotha, Joravarnalji haveli



Fig. 318 Ala with continuous dala and gadar moulding above, First  
floor, Joravarnalji haveli



Fig. 319 Ala with deep beel above,  
First floor, Joravarnalji haveli

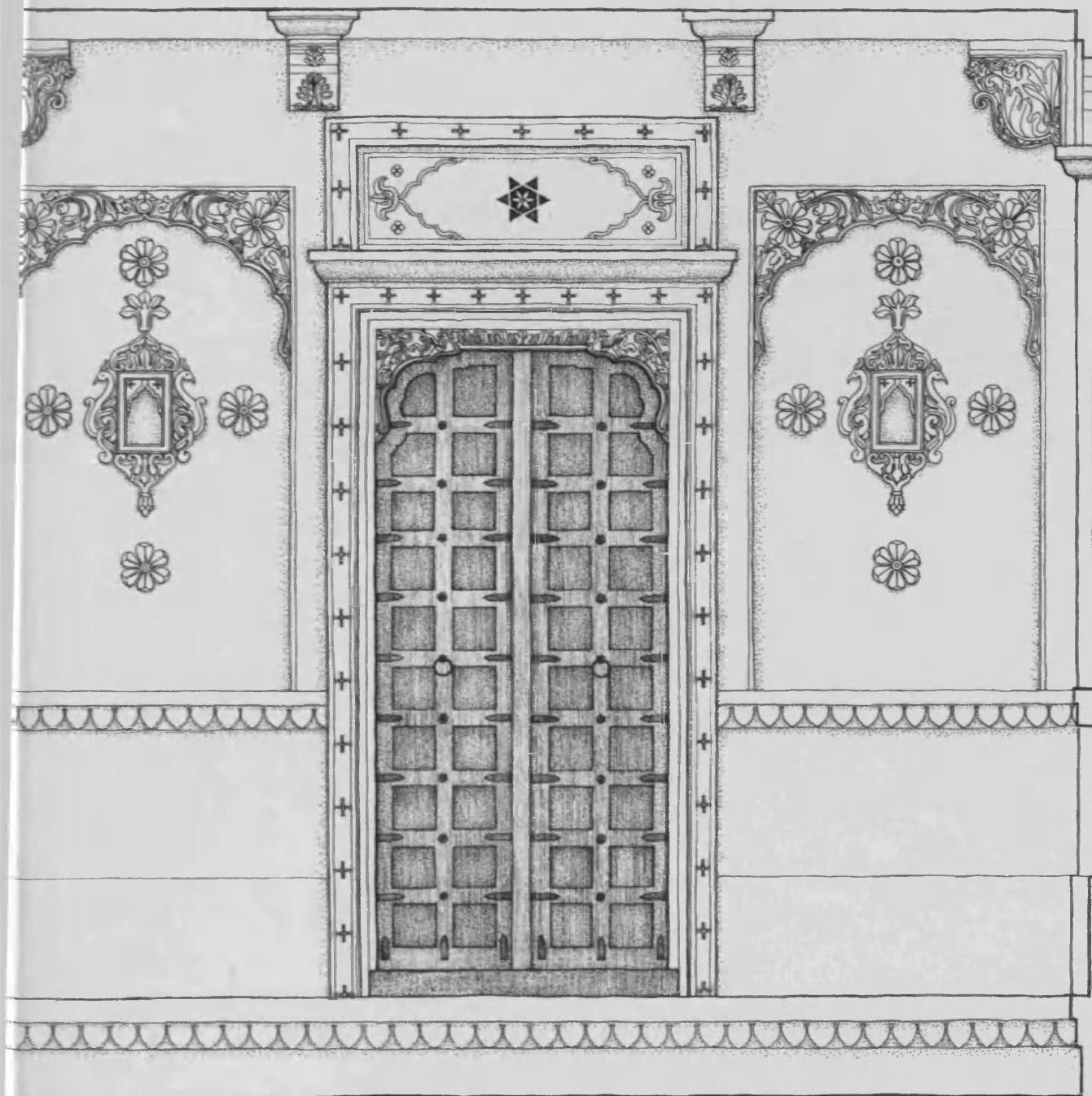


Fig. 320 Ala with shelving in niche below, Ground floor pathiyal, Joravarnalji haveli

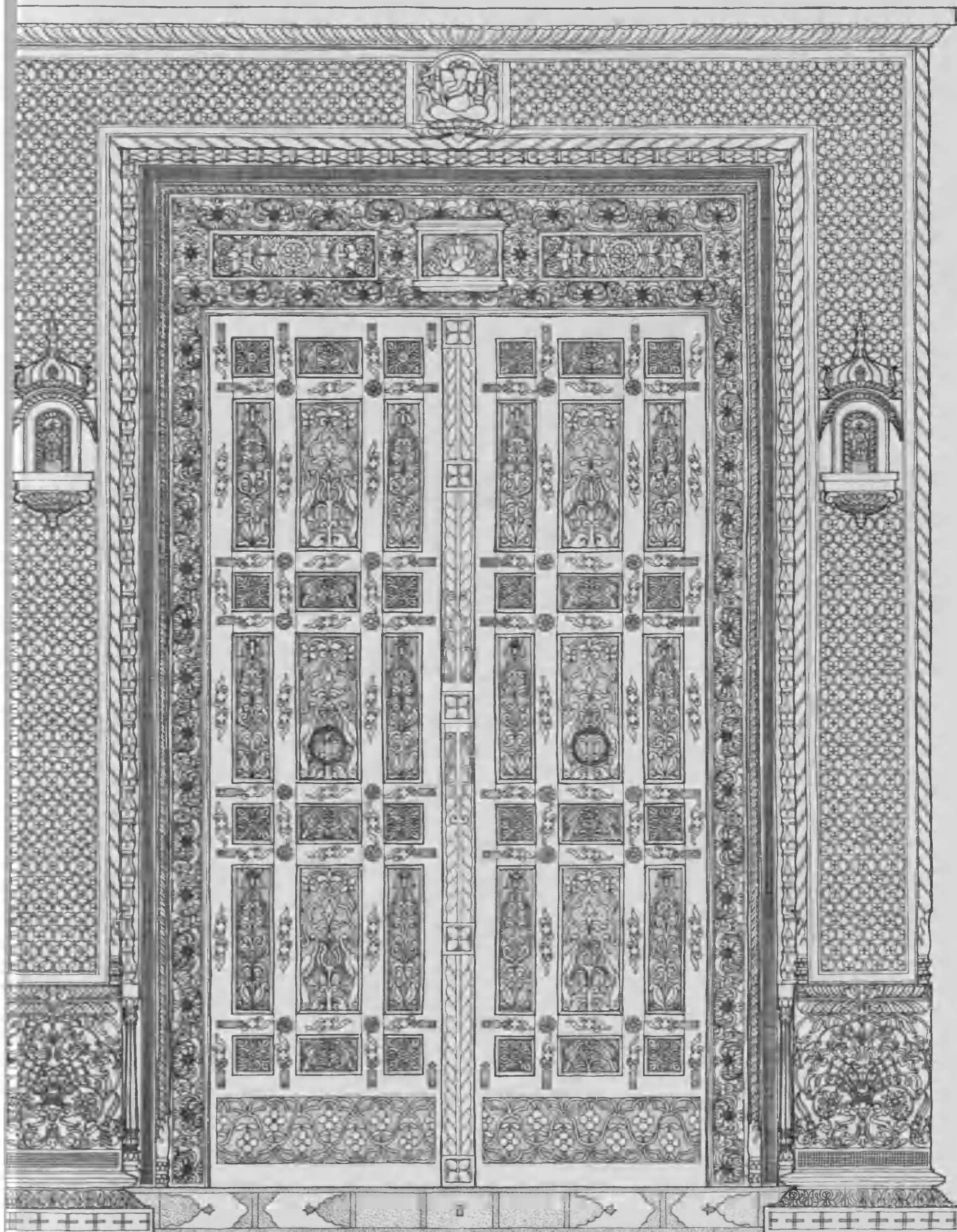


Fig. 321 Tripartite division of niche below ala (extreme left), Ground floor, Joravarnalji haveli

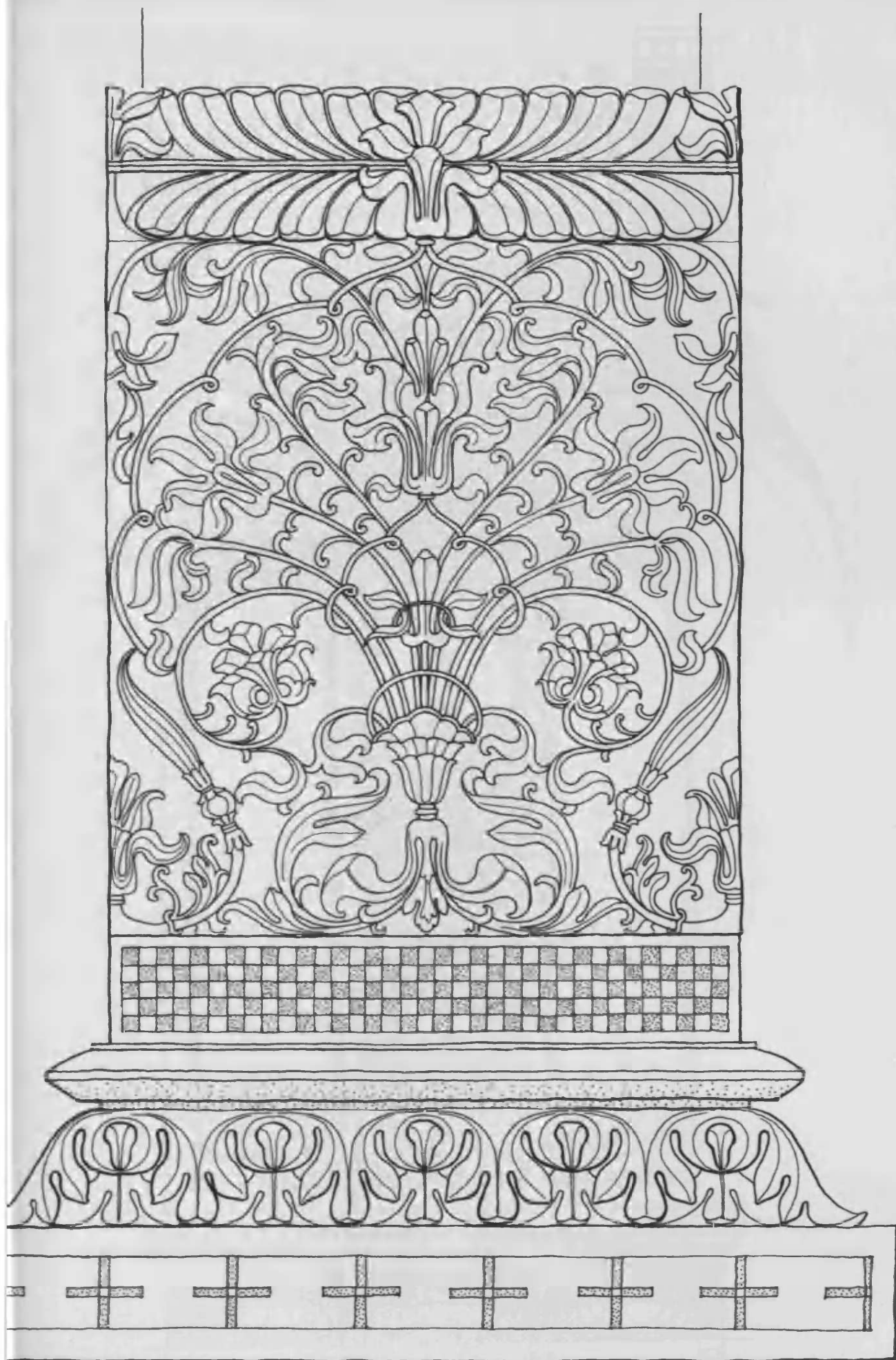




?? West elevation, Moda interior (Room G.1) (refer to Ground floor plan)



Entrance door, Jorawarmalji haveli



Detail of paggi, Entrance door, Jorawarmalji haveli





Fig. 325 Nokwali bari in northern range overlooking chowk, second floor, Jorawarmalji Haveli

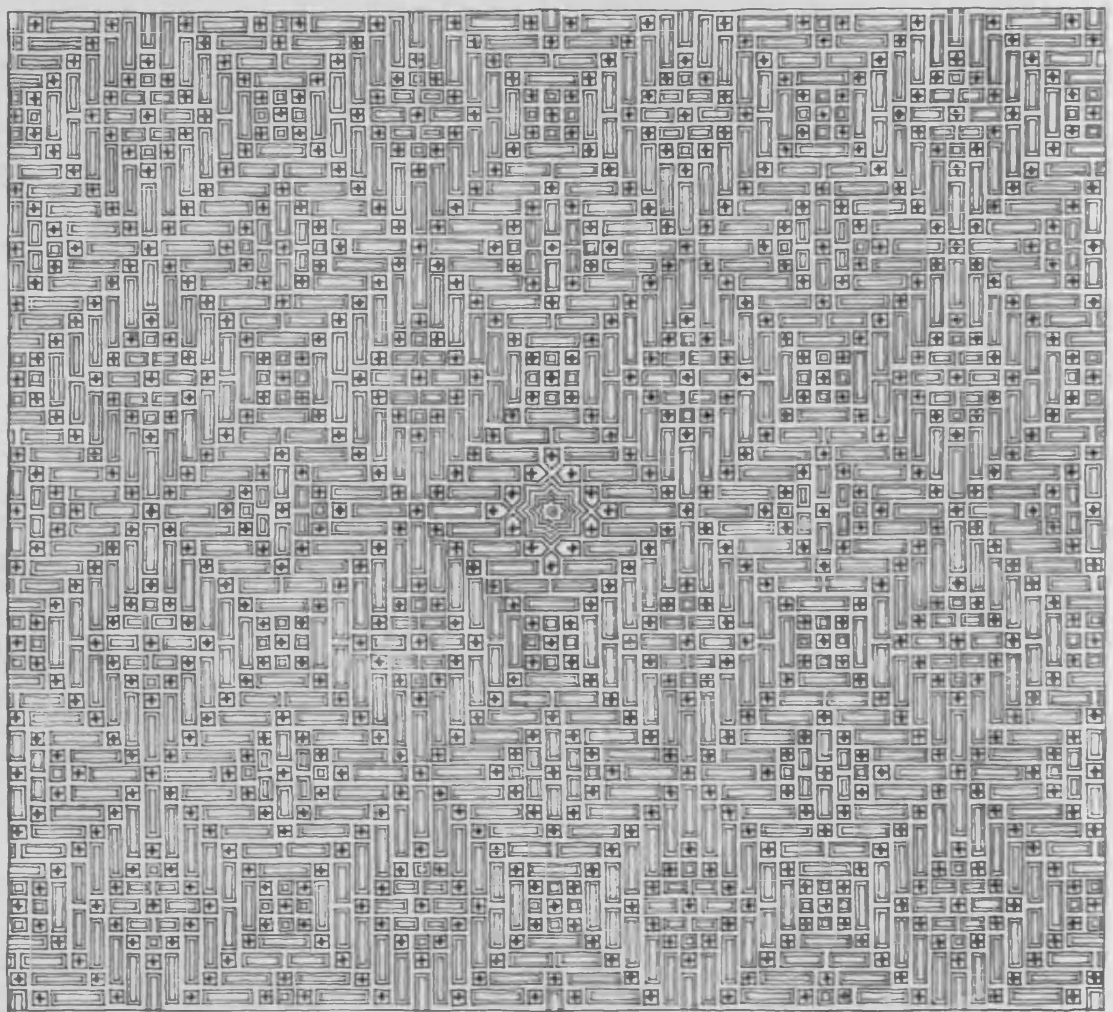
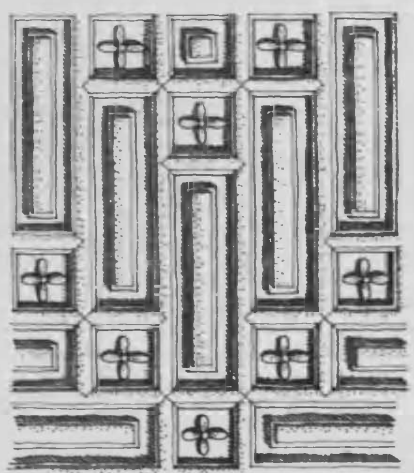
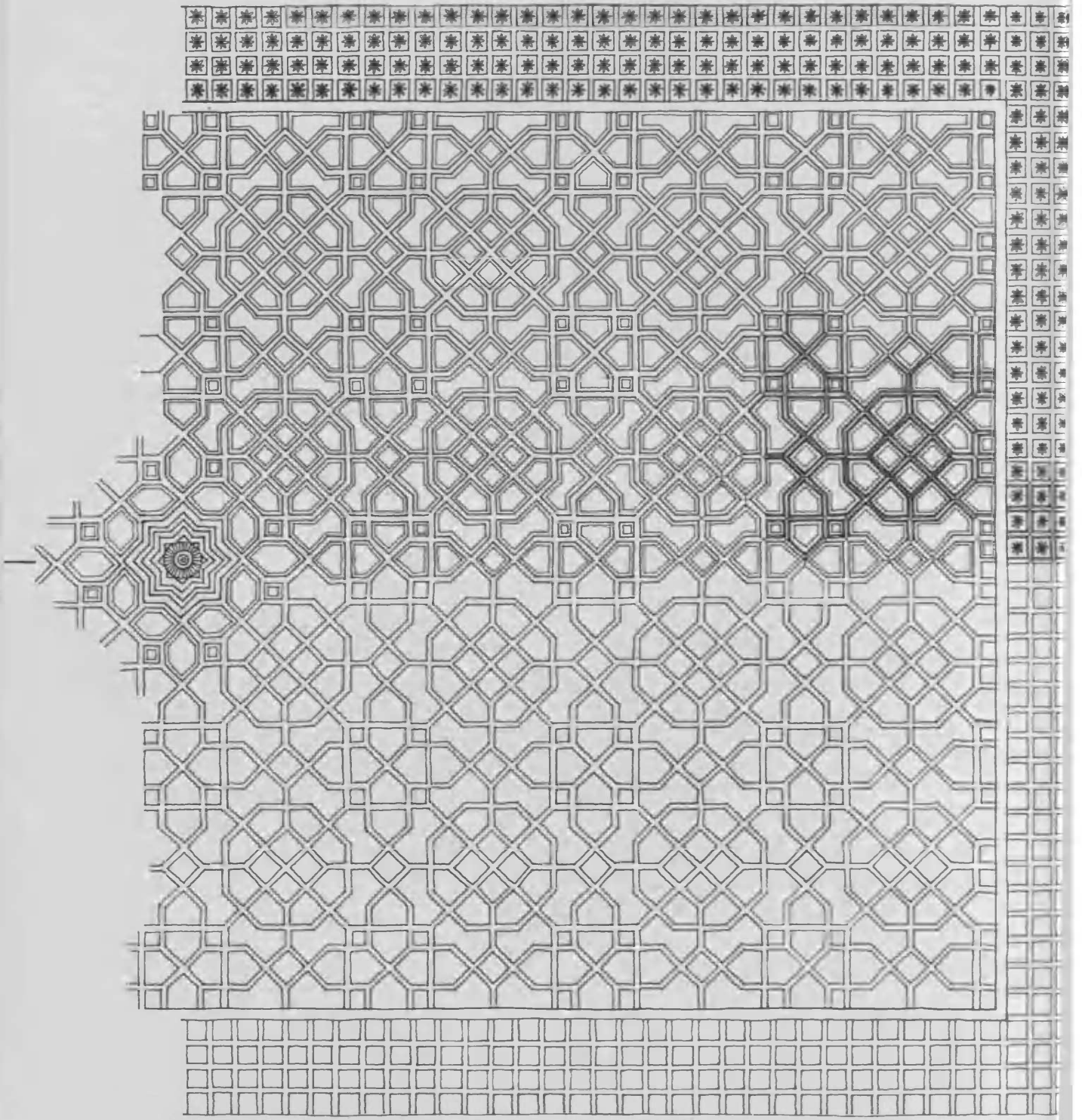


Fig. 326 Ceiling over hall, third floor, Jorawarnalli haveli







g. 328 Ceiling over mol, First floor, Jorawarmalji haveli



g. 329 Ceiling over hall, Third floor, Jorawarmalji haveli



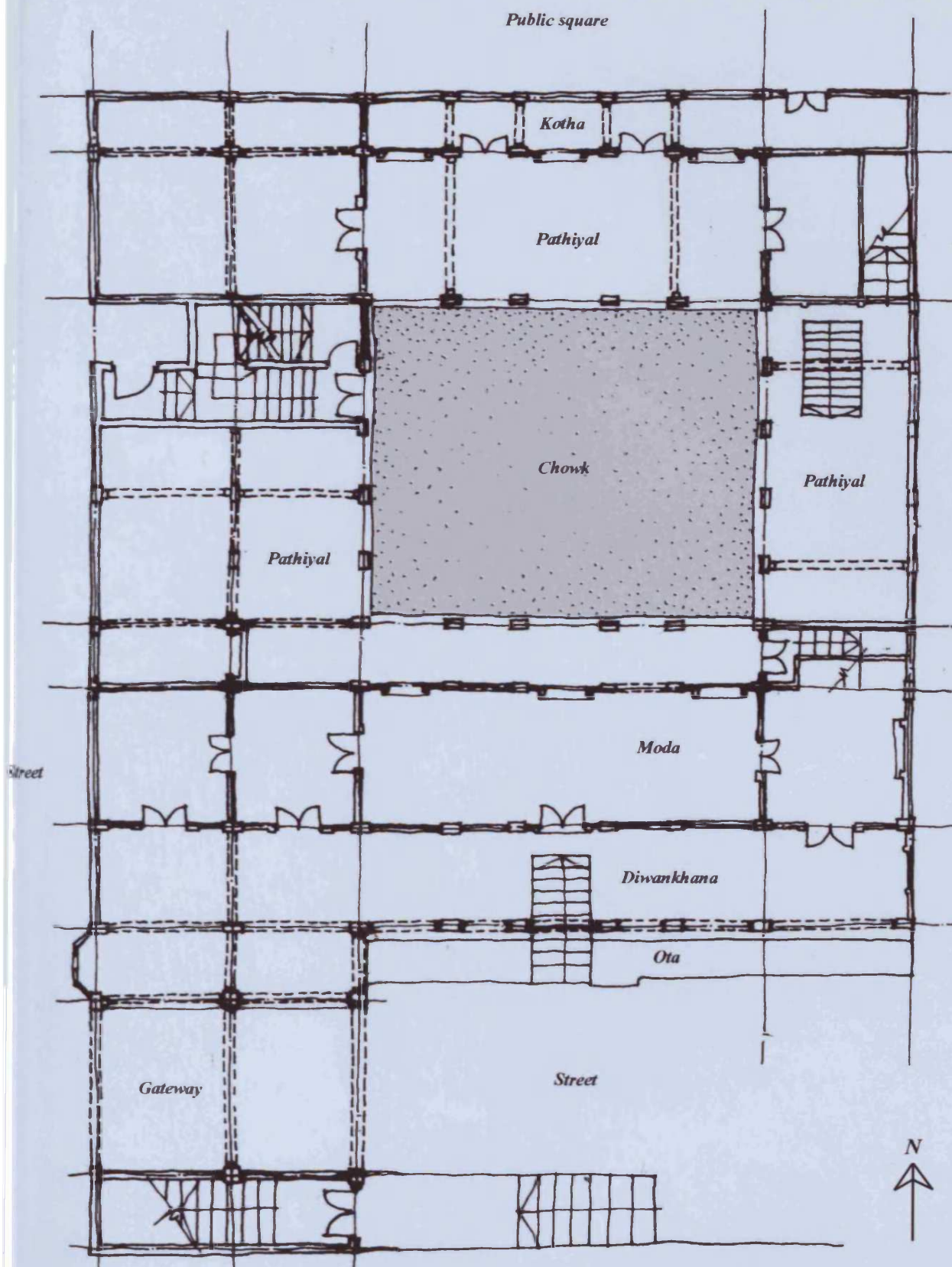
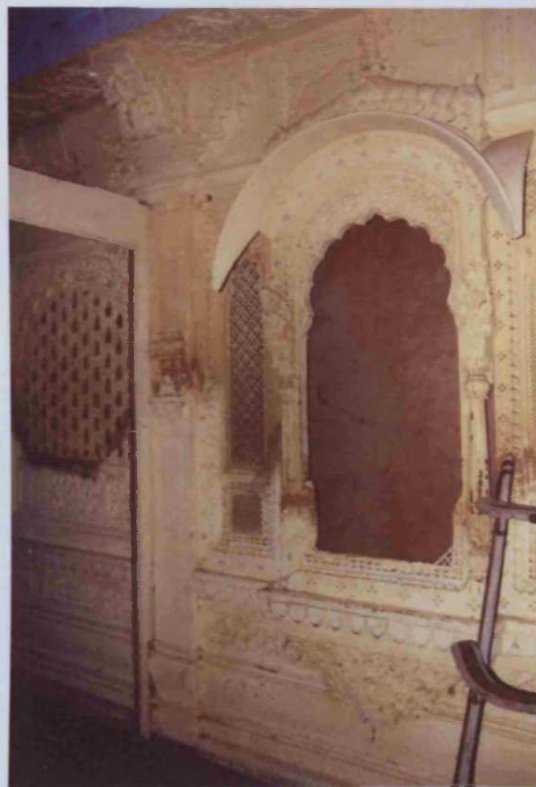


Fig. 330 Bahadurmalji haveli, Ground Floor Plan



*Fig. 331 Diwankhana, Bahadurmalji haveli*



*Fig. 332 Bari in relief, Ground floor moda, Bahadurmalji haveli*

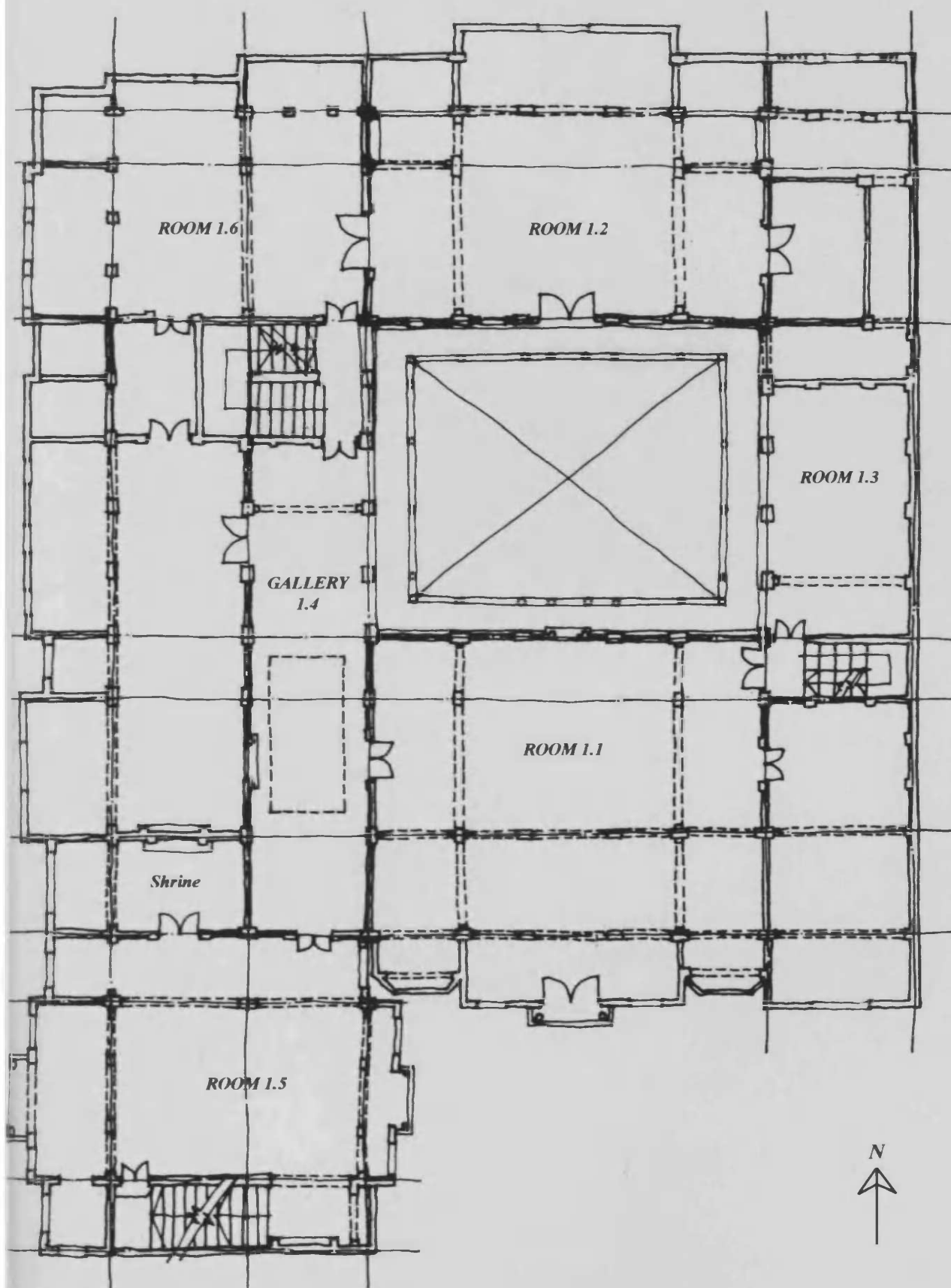


*Fig. 333 Equal bays along width of chowk, Bahadurmalji haveli*

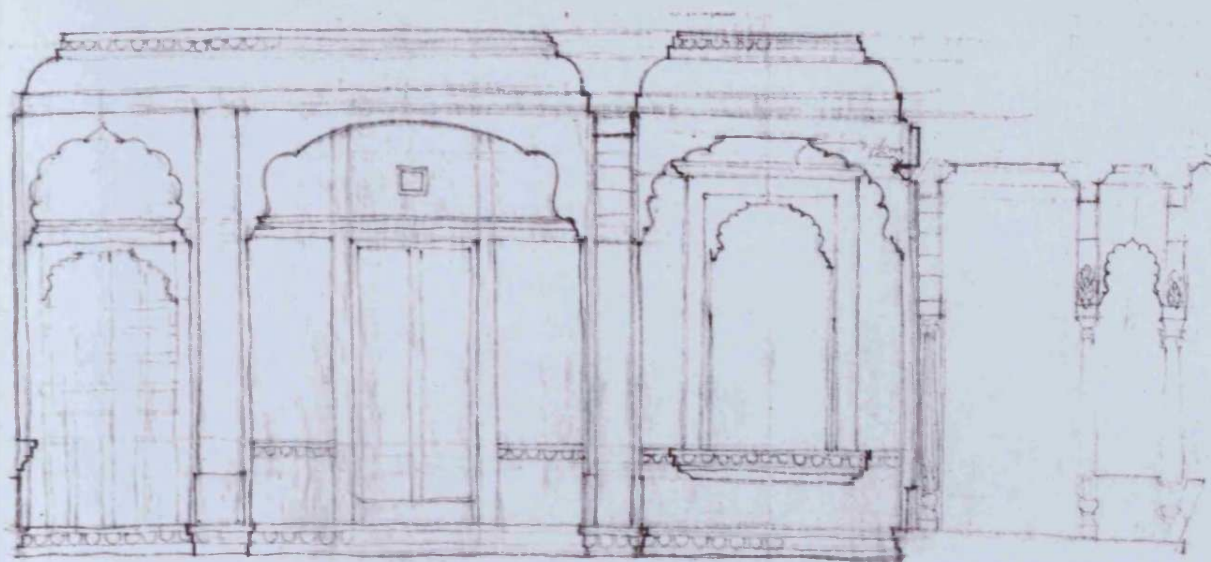


*Fig. 334 Unequal bays along length of chowk, Bahadurmalji haveli*

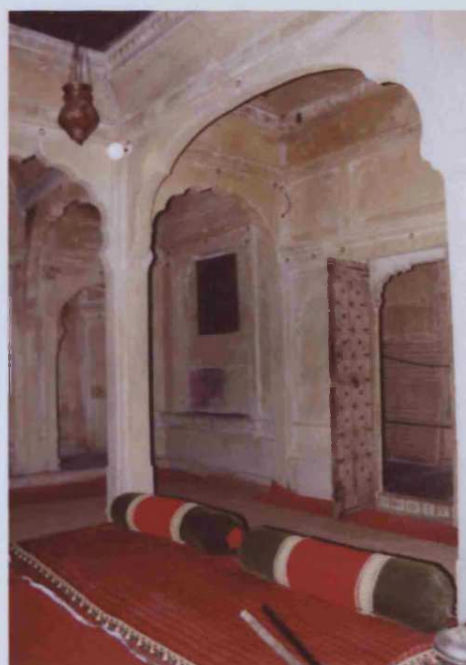




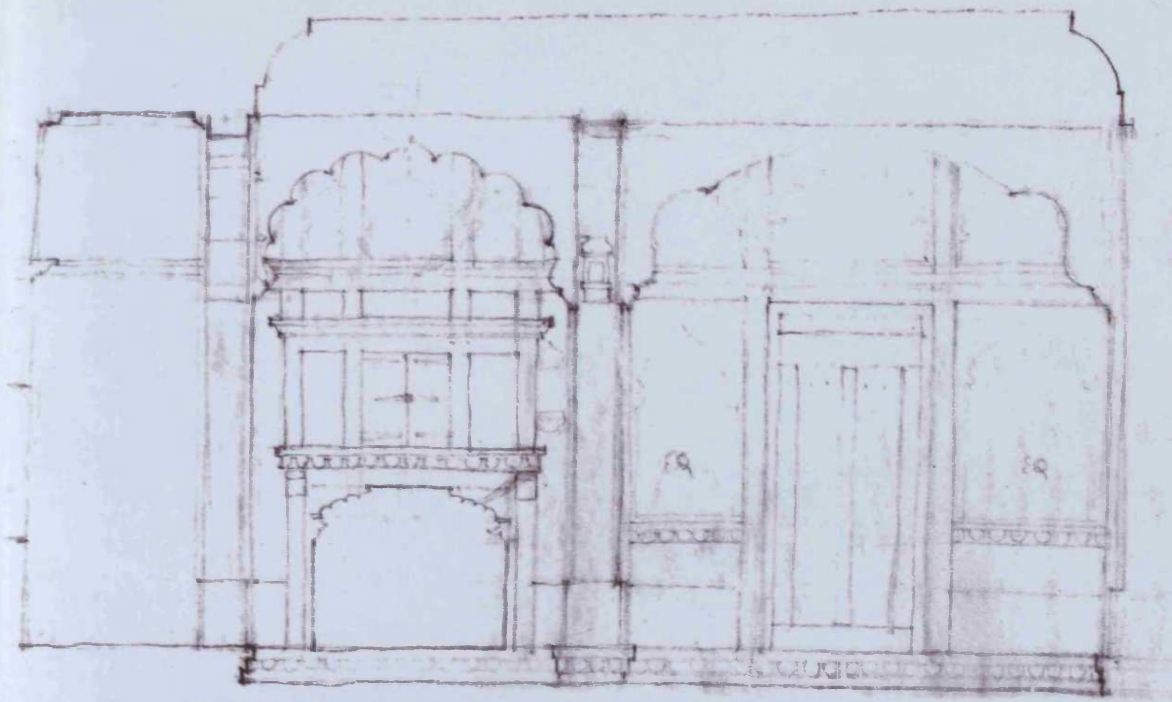
*Fig. 335 Bahadurmalji Haveli, First Floor Plan*



*Cross-section through room and jharokha on front facade*



*Fig. 336 Room 1.1 (refer to First floor plan)*



*Cross-section through room*



*Cross-section through room looking towards gallery on north*



*Fig. 337 Room 1.2 (refer to First floor plan)*



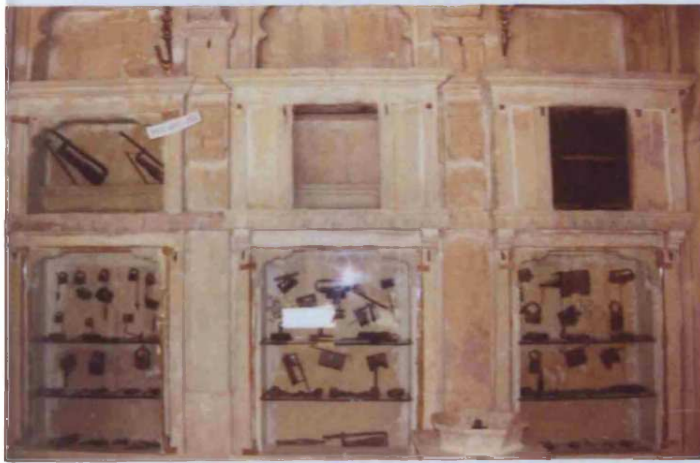
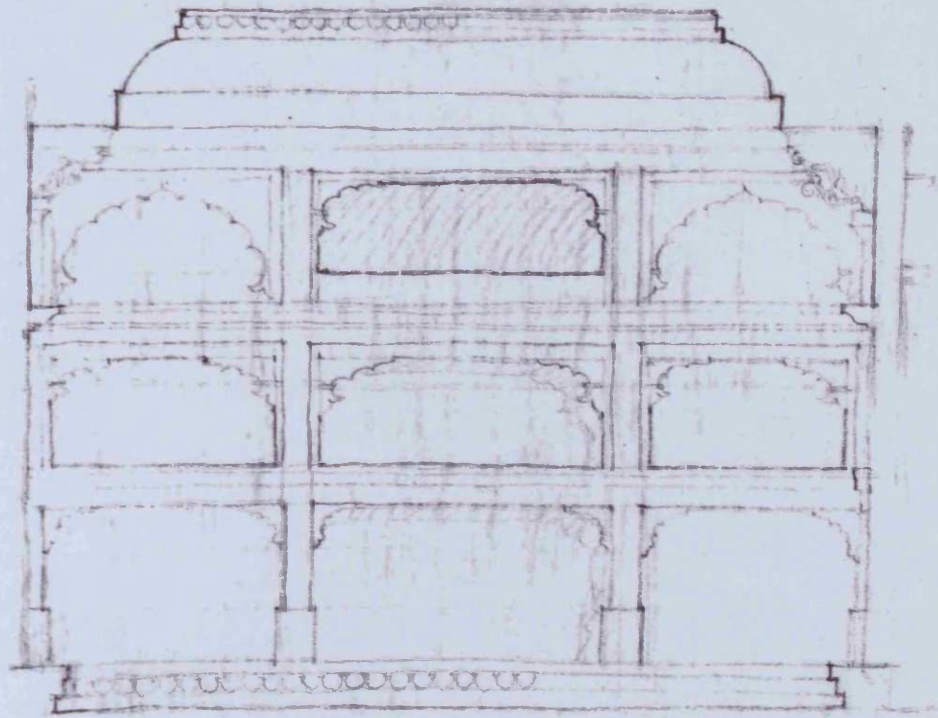


Fig. 338 Room 1.3 (refer to First floor plan)

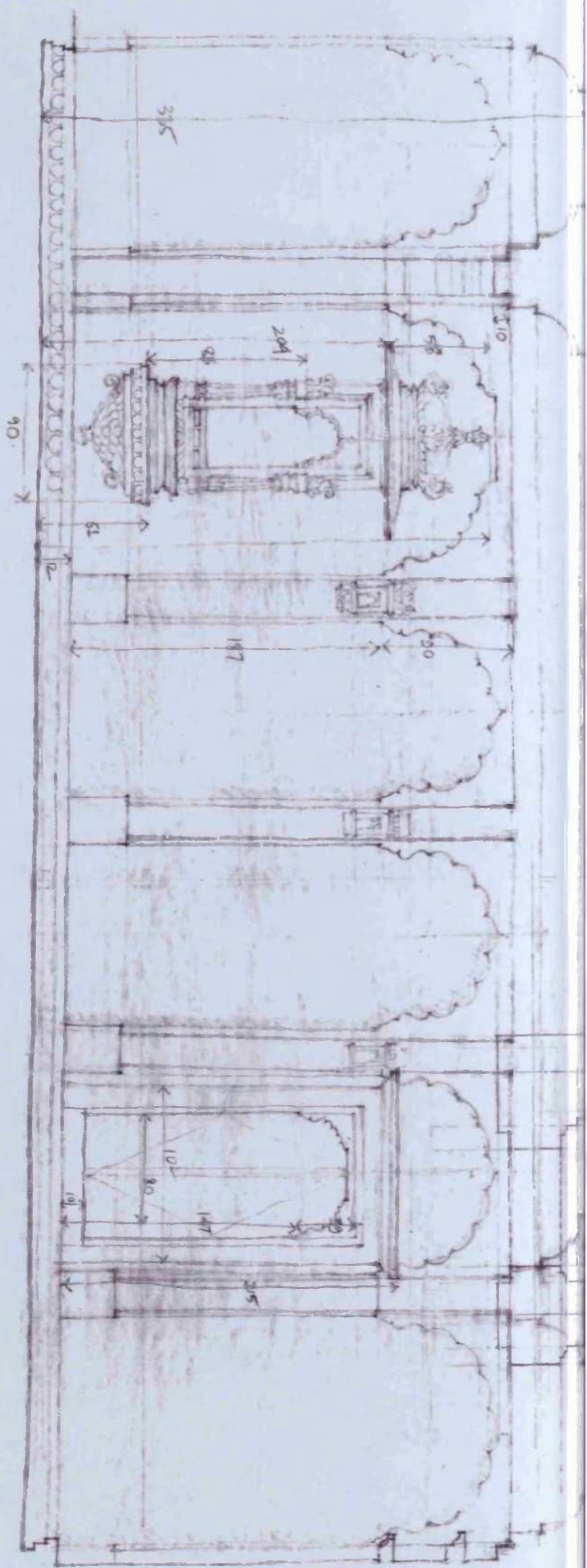
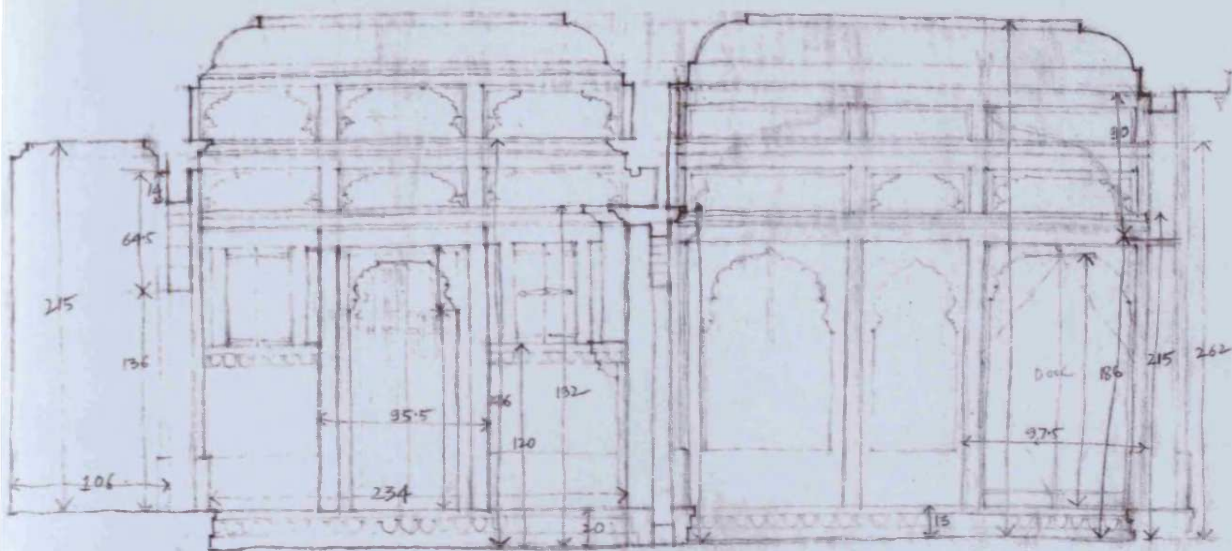


Fig. 339 Gallery 1.4 (refer to First floor plan)





*East-west section through room with projected gallery on left (similar gallery on right not indicated)*



*View of projected gallery to east*



*view of projected gallery to west*

*Fig. 340 Room 1.5 (refer to First floor plan)*



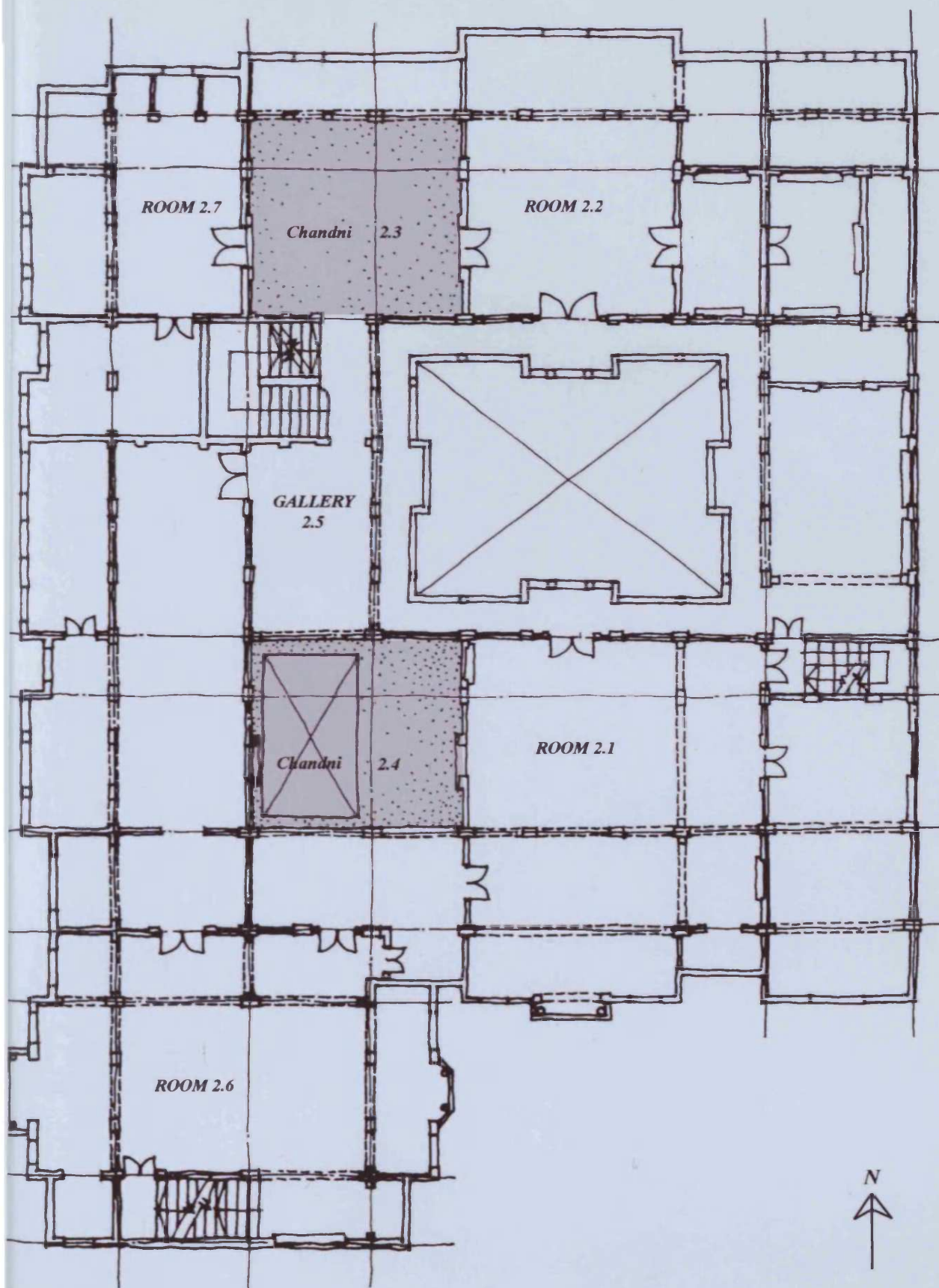
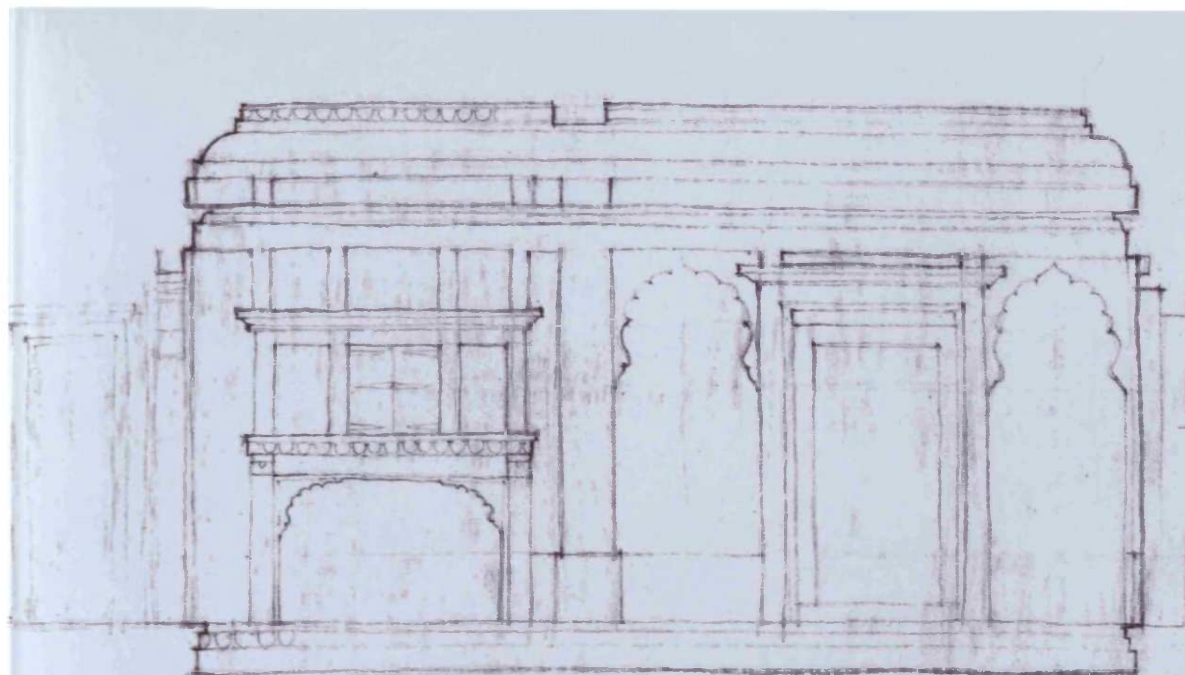


Fig. 341 Bahadurmalji Haveli, Second Floor Plan



*North-south section with projected gallery on left*



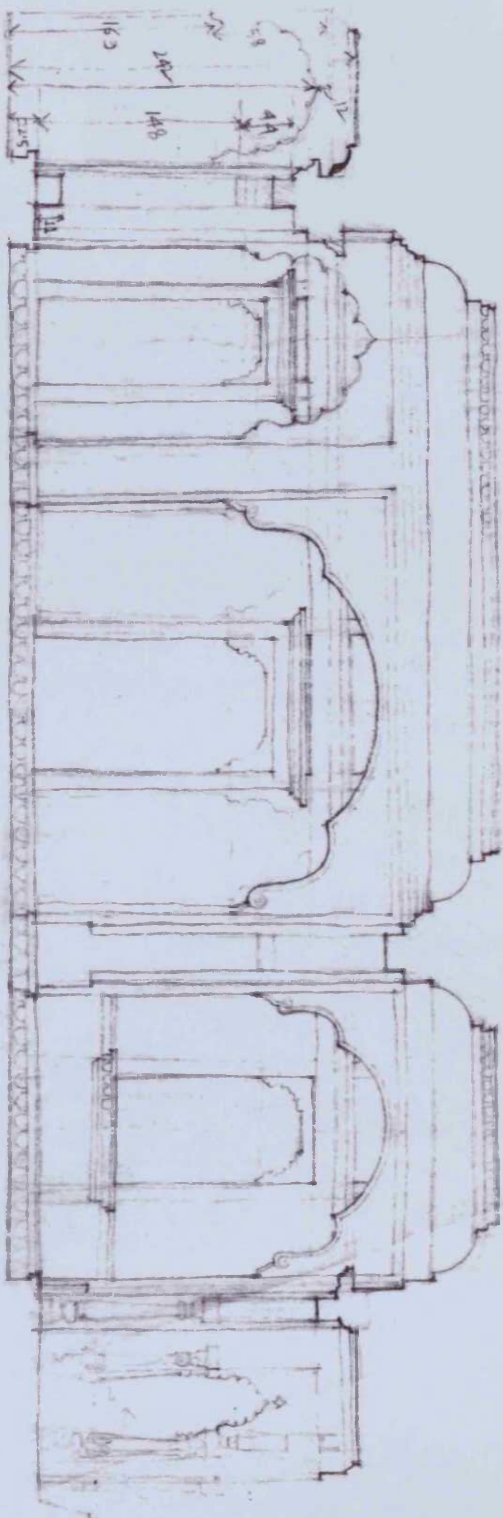
*View of room looking east*



*View of gallery looking north*

*Fig. 342 Room 2.2 (refer to Second floor plan)*





North-south section through room with projected gallery on right



View of room looking north



View of room looking west

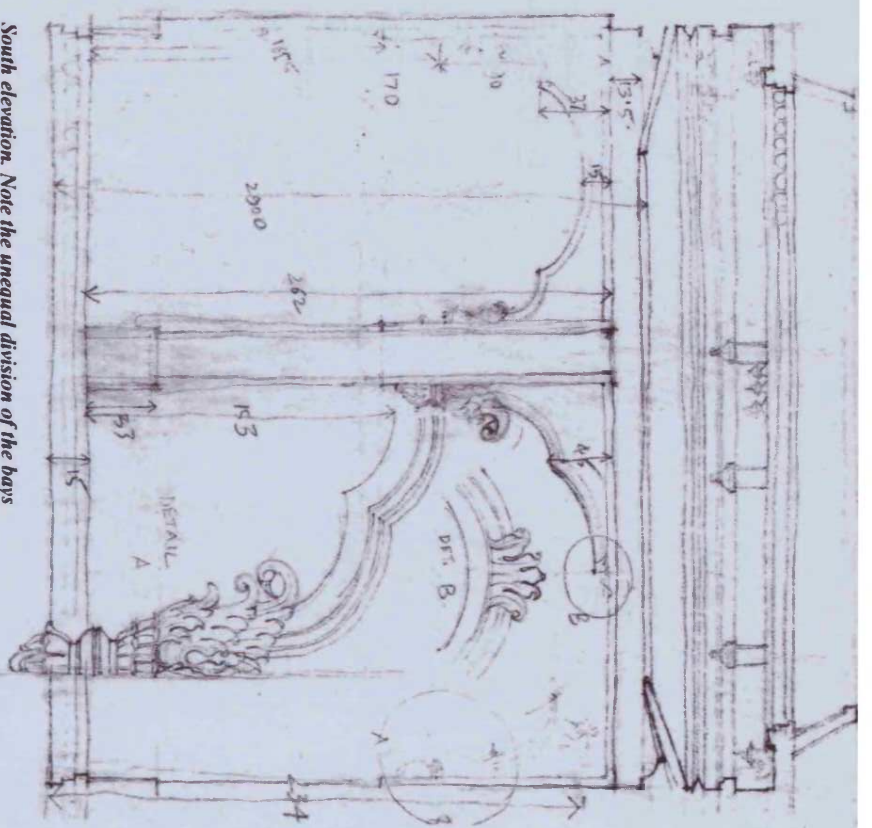


View of room looking east

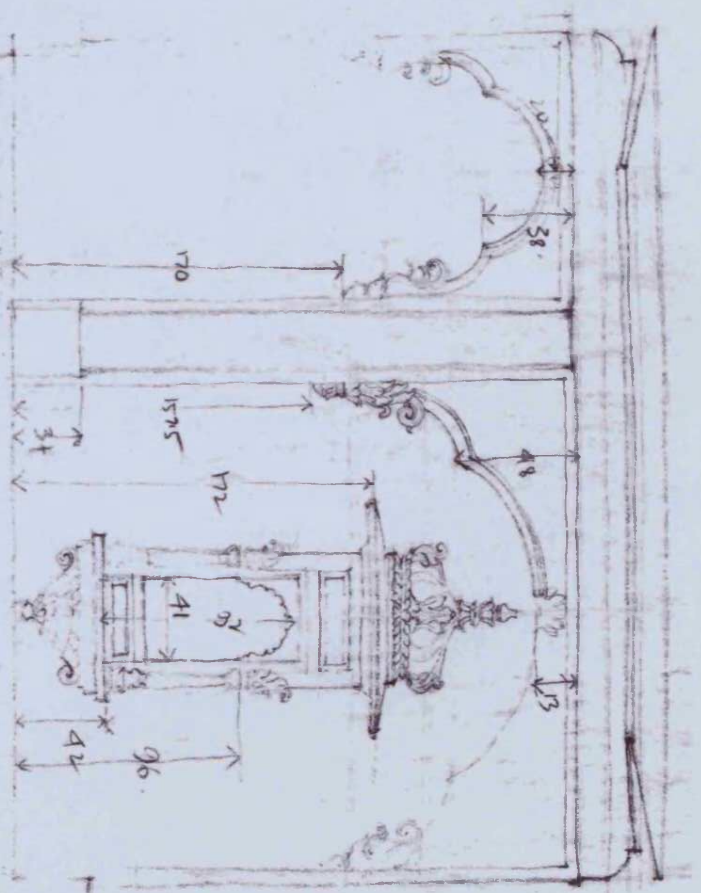








South elevation. Note the unequal division of the bays



East elevation. Bari is visually linked with hall behind



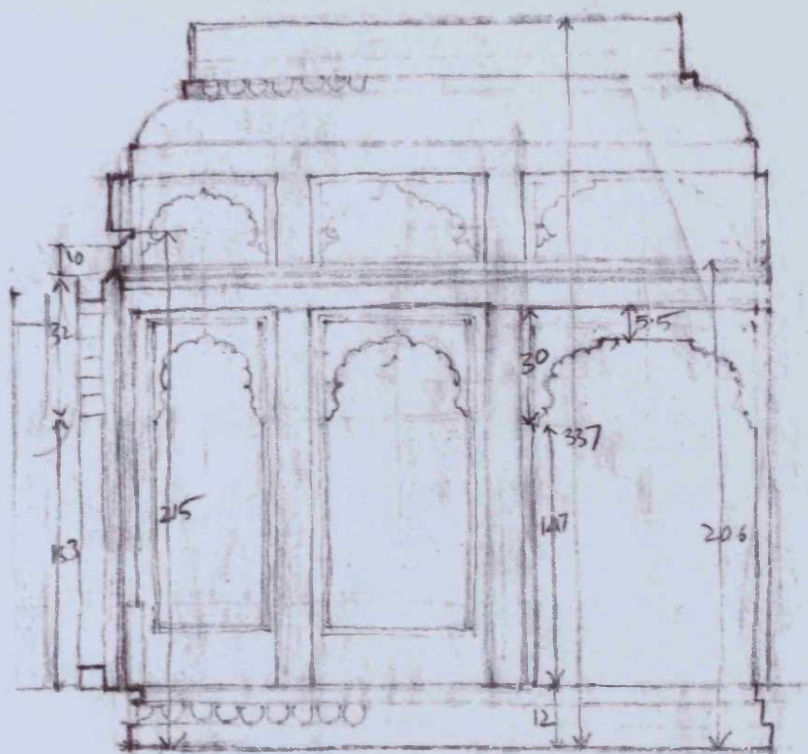
North facade. Blind bay on right corresponds with main chowk



Pathiyal-like space to the south of chandni



Inclined takiya at parapet level



*East-west section through gallery*

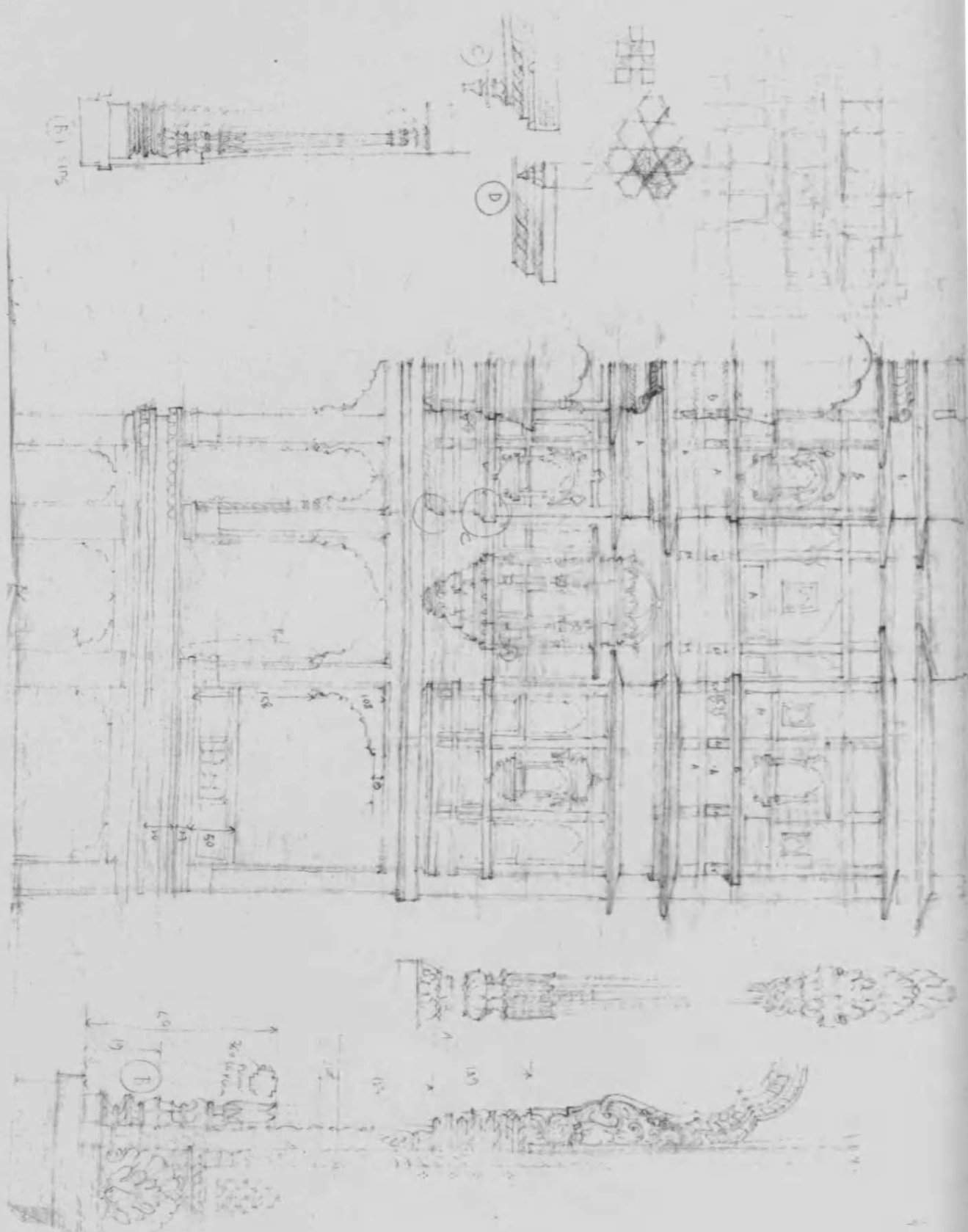


*View of gallery looking north*

*Fig. 346 Gallery 2.5 (refer to Second floor plan)*



Fig. 351 South (Front) elevation, Bahadurnagri Haveli



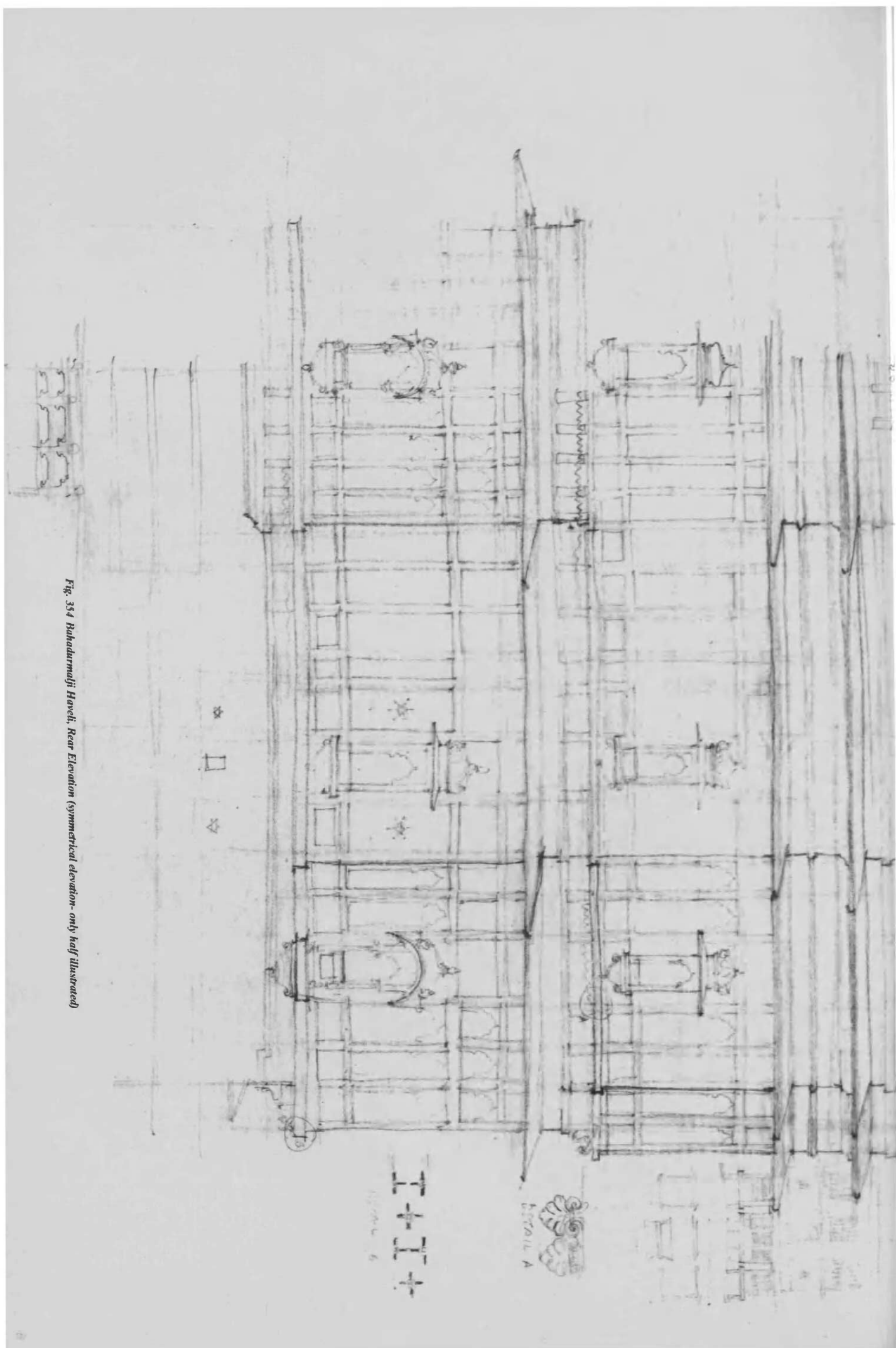


Fig. 354 Bahaduraji Haveli, Rear Elevation (symmetrical elevation- only half illustrated)

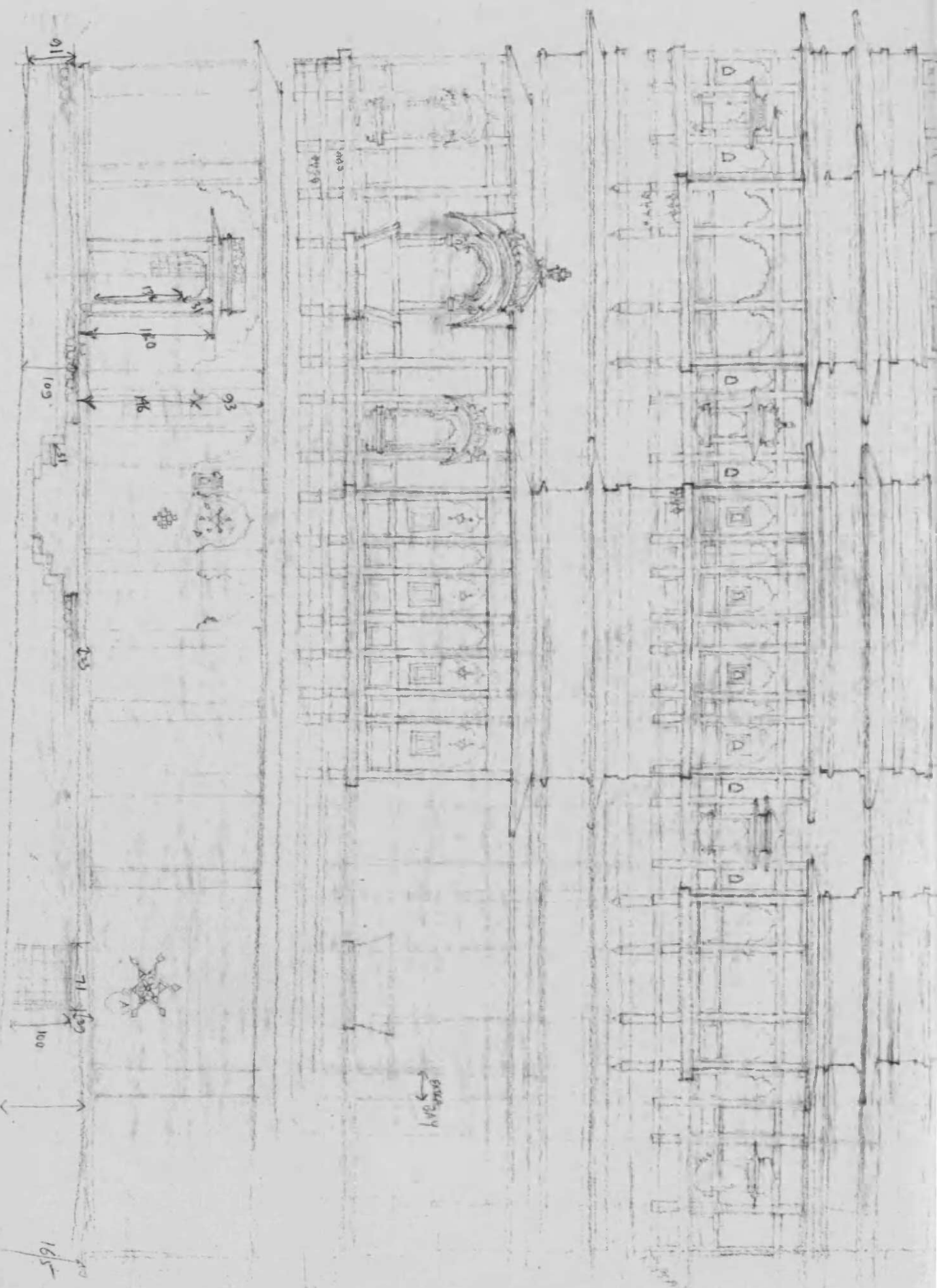


Fig. 355 The West Elevation (northern part), Bahadurmalji Haveli



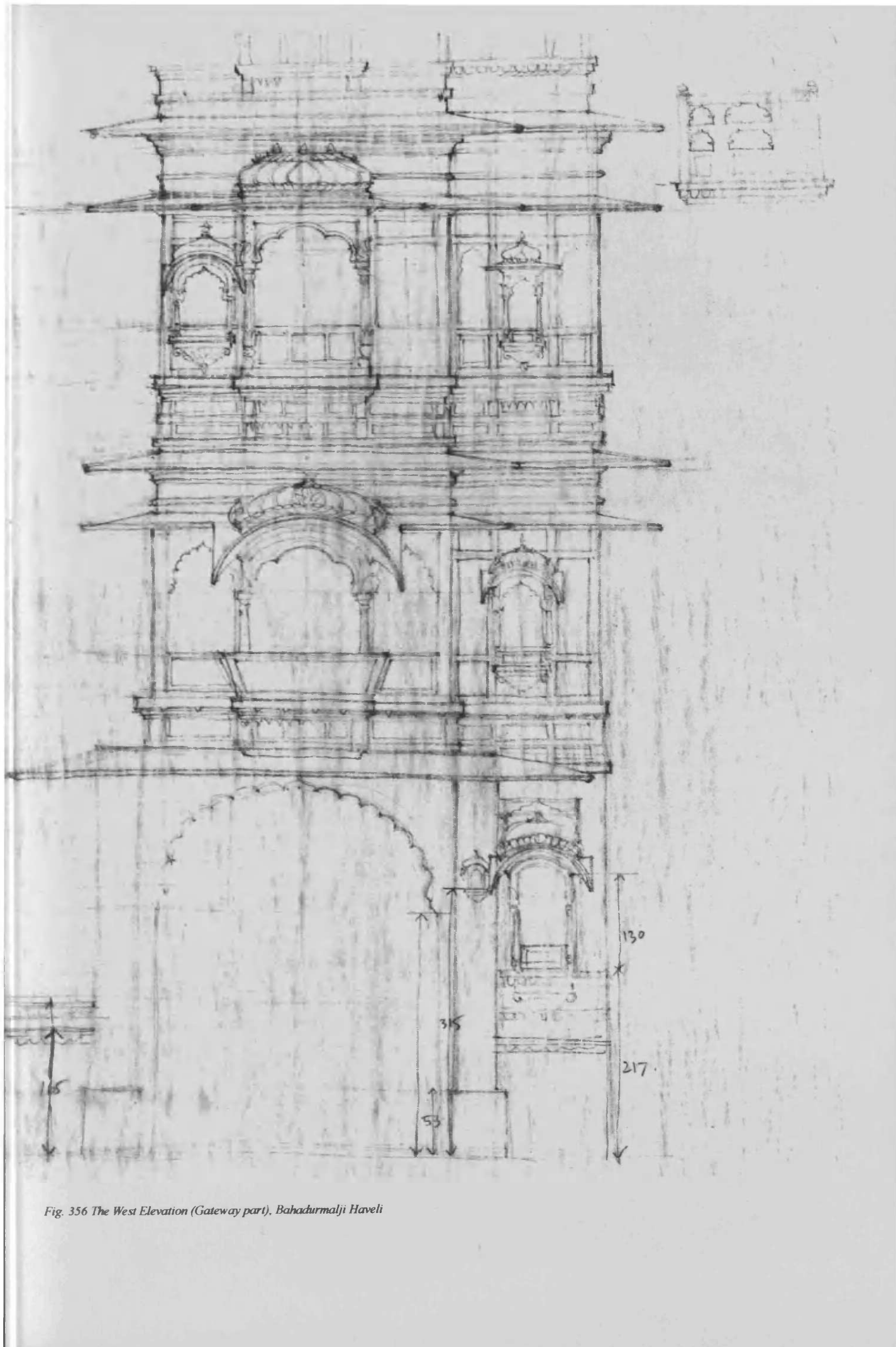


Fig. 356 The West Elevation (Gateway part), Bahadurmalji Haveli



*nokwali baris* and *baris* with flat *chajjas*. The height of the *takiya* in the *baris* is picked up as a band across the stretch of facade on both the floors. Another horizontal band at the apex of the *baris* runs across the facade, thus dividing every vertical panel effectively into three parts. The *chajja* is continuous and emphatic across the length of the facade. It is single on the first floor and double on the second. The treatment of the parapet is tied in with the vertical rhythm of pilasters on the facade and echoes the southern and western elevations.

*The West Elevation:* The west elevation comprises two distinct parts: a substantial length of facade rhythmically staggered in the middle and towards the northern edge corresponding to ten bays of the *haveli* (fig. 330, 355), a gateway structure to the southern edge (fig. 356), corresponding to the three bays appended to the plan form at the south-western corner. The two parts are distinctly different in the treatment of massing and degree of formal elaboration. The northern part is a series of rhythmically staggered planes, arranged with no hierarchically expressed central element (fig. 357, 373). The southern gateway part comprises a vigorously staggered facade, with pavilion like *jharokhas* piled above each other, arranged in perfect symmetry about the centre-line (fig. 358). In a way, the absence of a definite focus in the northern part, provides emphasis to the symmetrical gateway element by contrast. The rhythmically staggered planes in the facade leads the eye quite naturally to a point of rest in the form of the gateway.

We analyse the northern part of the facade first. On the ground floor, the external facade is primarily solid and forbidding, punctured only by stray door openings. The projection of the external facade on the first floor is emphatic and continuous across the entire length of the facade. The central part of this stretch of the facade is projected out further, while the remaining part of the facade is primarily flat, relieved by *baris* and *jharokhas* inserted in key positions. It is important here, to note the delineation of the projected mass in the centre of the facade. The projected mass is unusual in that it is formed of four bays (even number) (fig. 335, 341, 355). Hence, there is no central bay in the projected mass which is treated as a visual focus. On correlating the four projected bays to the structural layout of the *haveli*, one notices a seeming anomaly; the bays do not correspond to the centre of the *chowk*. The four bays correspond to four, out of the five bays of the *chowk*. Most generally, on mature *Mughlai* facades, the bay corresponding to the centre of the *chowk* is hierarchically expressed as the visual focus, and is flanked symmetrically by a scheme of projections and recesses. Here, however, the scheme is different. In order to appreciate the present scheme, it is important to analyse the overall arrangement of bays along the facade. The *chowk* comprises five bays and is flanked by two unequal bays to the north and three unequal bays to the south. To the south of this scheme, three additional bays are appended which form the gateway. It may be recalled that the facade as mentioned previously is treated as made of two parts: the stretch of facade to the north comprising ten bays, and the elaborate gateway facade comprising three bays to the south. As the five bays of the *chowk* are not located in the geometrical centre of the ten bays along the northern part of the facade, a projection corresponding to the centre of the *chowk* would not correspond to the centre of the facade. It is important to bear in mind that this facade abuts a public *chowk*, and forms an important public face to the *haveli*. The selective projection of the four bays, forms the centre of the facade. This projection of four bays is then flanked symmetrically by a scheme of alternately projected and recessed bays incorporating panellised wall surfaces and aedicules such as *baris*, *jharokhas*. The four bays forming the central projection are treated individually as symmetrical entities, with their centres marked with inset miniature *baris*. The composition of the facade is unusual, and is a good example to demonstrate the range of potential compositional variety in the application of the principle of design about the structural bay.



On the second floor, the entire facade is projected out further, from the line of the facade on the first floor (fig. 357). The profile of the facade on this floor faithfully follows the profile of the first floor. The difference from the first floor lies in the aedicular composition. This is discussed in detail below.

The gateway part towards the southern edge of the facade is delineated on the ground floor with an emphatic void passageway, flanked by solid bays inset with *baris* (fig. 356). On the first floor, the wider central bay is projected out and is inset with a *jharokha*. The central projection is flanked by bays flushed with the floor below. On the second floor, the entire stretch of the gateway facade is projected out in a manner similar to the northern stretch of the facade. The central bay is projected out further from the line of projection on the first floor, and is treated as a curtain wall inset with *baris*. A projected *jharokha* positioned in the centre, completes the scheme. The theme of projections in the facade is carried through to the parapet at terrace level.

The stretch of elevation to the north is relatively simple, and acts as a foil to the richer and more plastic stretch of elevation forming the gateway towards the southern edge (fig. 373). The theme in the left part of the elevation is an emphatic panellisation imparting to it a vertically striated appearance. The scheme works fairly successfully with the rhythmic projections and recesses in the facade. The panellisation achieved with pilasters, infill with decorative carving responds to the rhythm of the structural *khambhas*, with the width of the *khambhas* on the ground floor represented by their panel equivalents on the floors above. The double *chajja* is present as a continuous element stretched across the entire facade both on the first and second floors. The different types of aedicules used on the first floor include *nokwala jharokha* with inclined *takiyas* (fig. 374), *nokwali baris* and punched miniature *margol* panels, each of them positioned in the centre of different bays.

On the second floor, projecting *tibari jharokhas* with flat *chajjas* occur directly above the *nokwala jharokhas* on the floor below. Plain *baris* with flat *chajjas* are used on this floor, in place of *nokwali baris*. The chief difference in the articulation of this facade from the other facades is the similarity of treatment of the panellised facade on the first and second floors. On both the floors, the carving is sparse and restricted to *takiya* panels and spandrel panels of the cusped *margol* carved in relief at the upper end of the panels.

The main focus in this elevation is the gateway-elevation to the right. It is integrated with the stretch of elevation to the left, in the continuous bands of horizontal double *chajjas* running across the stretch of the whole facade, and the coherence in the key levels of location and sizes of aedicules such as *baris* and *jharokhas*. A *nokwala jharokha* with an inclined *takiya* and surmounted by a *ravati*, emphasizes the central projection on the first floor (fig. 375). The bays flanking the central projecting bay are divided into three parts with framed panels, and a *nokwali bari* is inserted in the middle of each.

On the second floor, a *jharokha* supported on a double row of *todis* projects out further from the projecting central bay, with the *chajja* above picking up the successive staggers in the planes of the facade. The bays flanking the central projection echo the tripartite panellisation on the floor below, and are inset with miniature *baris* with flat *chajjas*. The richness and expanse of infill carving in the framed wall panels is markedly more on the first floor than the second floor. The close proximity of successively projecting planes in the facade of this part of the gateway and the overall porosity of the facade enables generous views into the interior,

from the street below. The most dramatic visual effect lies in the layering of diverse arch types thrown across the openings in the facade in successive planes, in close proximity (fig. 375). The principle of layering of planes as explained previously, is visually most emphatic in the elevations of the gateway, both on the eastern and western faces.

*Gateway Strip Elevation on East:* The strip elevation on the east facing the inner part of the street providing access to the *havelis*, is treated in a manner similar to the western facade (fig. 359). The difference lies primarily in the aedicular composition. The wide central bay on the ground floor is flanked by narrow bays, with the staircase leading to the floors above located in the left bay. On the first floor, the wide central bay has an open arcade with cusped *margol* strung across the facade. A *jharokha* is positioned in the centre of the projected mass. The two narrow bays flanking the projected mass in the centre are flat with inset *baris*. On the second floor, the projection in the central bay follows the profile of the floor below. The external wall is solid with inset *baris*. In the centre, a *kanwal* with a *gumbad* is positioned.

Facing the east, the elevation has a giant cusped *margol* framing the gateway opening on the ground floor (fig. 371). On the first and second floors, the centre-piece of the composition is a projection in the facade corresponding to the central bay. The projection is divided into three sub-bays on both floors. On the first floor, an arcade of cusped *margol* supported on plain *khambhas* is thrown across the facade, with a projected *nokwala jharokha* inserted in the centre (fig. 372). This relatively large *nokwala jharokha* has a trisegmental arch across the front supported on *surangdar khambhas*, and is provided with an inclined *takiya*. The level of the *chajja* of the *nokwala jharokha* is picked up in the flat *chajja* across the length of the projection. There is a second *chajja* higher up, with a continuous horizontal *kangra* frieze in between. On the second floor, a *kanwal* with flat *chajja* is positioned in the centre of the projection. The *kanwal* is flanked by miniature *nokwali baris*. The *kanwal* is supported on a double row of *todis* arranged radially and terminating in a pendant at the base. There is a double *chajja* on this floor similar to the floor below, with a horizontal *kangra* frieze between the *chajjas*. The treatment of the parapet is similar to that of the main elevation on the south.

*Elevations To The Chowk:* The *chowk*, though five bays along both the length and width is actually rectangular in plan. The ground floor is an arcade of cusped *margol* on all four elevations. Typically, there is a continuous gallery on the first floor, skirting the inner perimeter of the *chowk* overlooking it. This gallery provides access to all the four ranges around the *chowk*. Interestingly, this gallery is not provided with a screen arcade, as in most *chowks*, but is completely open from the sides (fig. 360, 361). There is only a protective *takiya* railing along the edge. The projection in the floor slab is handled ingeniously. It is arranged in two gradual steps, on successive rows of *todis* (fig. 362). The first step is arranged at the level of the *chajja*, which actually only covers half the depth of the gallery. A series of *todis* anchored to the top ends of the *khambhas* take the load of the projection. The second projection, which forms the other half of the total depth of the gallery, occurs a few feet above, at the level of the *dasa* marking the floor line. Another row of *todis* anchored back to the structural lines, helps distribute the load of this projection. The gallery is formed in this manner on both, the first and second floors, as also at the roof level, forming a canopy over the gallery. Structurally, the problem of supporting a deep span (forming the depth of the gallery) in one step, is resolved by breaking it into two smaller spans. The potential problem of having to use large, oversized *todis* to support the span in one step is thus avoided. When seen from below, from the level of the *chowk*, the two strips of ceiling of the projected gallery at the level of the *chajja*, and the other at the level of the projected *dasa*, are seen simultaneously (fig. 363). They appear as successive layers of soffit, perched above each

other, creating deep bands of shadow, and adding a strong horizontal dimension to the elevations. The row of *sehrabandhi* which strings along the periphery of the projecting soffits, adds delicacy to the composition, accentuating the horizontality of the projecting slabs.

The projected gallery follows the simple rectilinear profile of the *chowk* on the first floor. On the second floor, *jharokhas* are inserted in the scheme, positioned in the centre of the four ranges (fig. 363).

## Chapter 7 CONCLUSION

The traditional architecture of Jaisalmer may be described as a live architectural tradition, with sources of reference in historical buildings and living guilds of craftsmen. The key to understanding the spirit of tradition lies in understanding the process of design, which encompasses the principles of design and making. This, as we have seen in the course of the thesis, demands systematic and comprehensive visual documentation of historical buildings as a starting point. Mere documentation, no matter how meticulous and detailed, is not useful until the material is analysed, to identify consistent themes and patterns. Lack of analysis has



been the main drawback, for example, with the architectural documentation projects for the Festivals of India in France (1985) and the USSR (1986).

The process of analysing the principles of design, in the case of this study was a slow and gradual process, not obtainable from observing formal patterns in one building or one source. It was a multi-layered process of observation and understanding, often involving intuitive deductions clarified in consultation with building craftsmen. The importance of drawing as a tool in the analysis cannot be emphasised enough. Drawing as a tool of analysis is not very popular in art history research, primarily because it involves a different discipline to that in which most art historians are trained. For me, the process of drawing is a much more direct and appropriate tool for any kind of architectural analysis, as the medium is visual, which is the medium of expression in which the architect is trained. More importantly, the subject matter is by nature visual, lending itself best to the medium of drawing. A single drawing may successfully express and communicate what pages of writing may not be able to do. I would like to emphasize that the drawings done as part of the thesis are the most important elements of this study, and constitute the base material, on which my understanding of the tradition is hinged.

Art historical studies on the subject have not ventured into this methodology till date. This is not to suggest that no visual documentation on the subject has been done. However, whatever documentation has been done has largely been arbitrary and partial, focussing on an area of the city, or a specific group or style of buildings. In general, the approach has not been panoramic attempting to grasp the tradition in its entirety.

Contemporary architectural studies on the city of Jaisalmer have not so far ventured into this research methodology either, primarily due to the lack of interest of most modernists with issues of traditional architectural language and imagery. Broadly speaking, their interpretations have been concerned with the sensual aspects of the architecture, chiefly the effects of spatial organisation on the spectator. Tradition as a collective whole, with its principles of composition and design characteristics and techniques of making, has not previously been acknowledged in any study of Jaisalmer. Analysis of this nature may be compared with an appreciation of classical music using paradigms of modern music. Listened to in this way, the music will most possibly appeal, but purely as a collection of interesting sounds and notes. The appreciation of the music is based completely on the sensual pleasures offered by the collection of sounds, in an arbitrary sort of way. Appreciation of this nature misses the essence of classical composition. To the trained ear, the essence of classical composition are the rules of composition and the inventiveness achieved within the rules. An aesthetic appreciation of this nature, in my understanding, is more complete and intellectually sound, using what may be described as the correct paradigm in the analysis.

The issue of the correct paradigm in analysis becomes all the more pertinent, in view of attempts at reinterpretation of aspects of design and composition in traditional models in contemporary architecture. Without a sound intellectual understanding of the particular architectural tradition, no reinterpretation may successfully be inventive within the spirit of tradition. It is precisely due to this reason that none of the references to tradition in the work of contemporary architects is substantial enough. Well known architects such as Correa, Doshi and Rewal, as we have discussed, have been mainly concerned with the organisation of spaces – mainly the relationship of open and covered spaces in traditional building complexes. Spatial organisation, as we have seen, forms only one principle of the traditional design process. Also, the understanding of the principle is partial and incomplete if not

understood in relation with other related principles such as the structural layout and the design system using bays.

Historically, the architectural tradition of Jaisalmer developed, as we have seen, through a synthesis of the medieval architectural tradition of Gujarat with that of neighbouring Rajput kingdoms, and later, with the imperial Mughal tradition. Stylistically, there are three different architectural schools or *shailis*: *Sompuriya*, *Mughlai* and *Angrezi*. As illustrated, each *shaili* has its characteristic repertoire of architectural forms. The *Sompuriya* and *Mughlai shaili* are distinct in their respective architectural languages. There is also most certainly a distinctive difference in the spirit of the heavy, chunky and grounded *Sompuriya shaili* from the light, and playful character of the *Mughlai shaili*. What is consistent between them, however, is the design discipline, concerning rules for plan organisation, treatment of bays and massing. The two *shailis* have an integral unity, in spite of their obvious stylistic differences. When elements such as *jharokhas*, *baris* etc are introduced into one *shaili* from the other, as in Salim Singh Ki *Haveli* and one of the *Patua* group of *Havelis*, it does not look incongruous. When buildings constructed in different periods employing the two different *shaili* are seen together, they convey an impression of a cohesive whole. An example of this is the *Sompuriya* Juna Mahal building of the palace, seen adjacent to the eastern and northern facades of the *zenana* and *mardana*, both built primarily in the *Mughlai shaili*. The primarily *Sompuriya* *Hawa Pol* blends perfectly with the *Mughlai* north front of the *mardana*. We have also seen examples of crossing over of specific architectural forms from one *shaili* to the other such as *surangdar khambhas*, *kakshasana*, *takiyas*, and *todis*.

However, when one looks at the application of these styles to clothe buildings, designed in a completely alien discipline, as in the *Angrezi Shaili*, the elements look incongruous. Based on the western classical tradition, the *Angrezi Shaili* with large halls, long colonnades and galleries, wide flamboyant staircases seeks to address a completely different set of design paradigms to the indigenous tradition. It is here that the grafting of indigenous architectural style fails. The same is true of modern houses designed with a traditional facade, where the internal layout has no relation with the facade.

In the course of the thesis, we have seen that the design concerns in the tradition are centred on form. We have also seen that space is a by-product of the process of the design of form. It is ironic that the overwhelming interest that most modernists have in spatial planning and organisation in their interpretation of traditional buildings is not shared by traditional building craftsmen. The craftsmen discuss the design of the form, and the space that is created in the process is intrinsic to that process.

In the design of the form, structure is of pivotal importance. The structural layout is based on a system of bays with variable widths laid in parallel and perpendicular to each other, around or adjacent to an open to sky *chowk*. This effectively creates a structural grid, which remains constant on various floors. A range of spaces and enclosures is created using infill walls, screens, arcades and various other architectural elements, which are positioned in relation to the structural grid. Equally important in the creation of spaces, from the structural grid is a conceptual framework, which as we have seen is inseparable from the structural logic. The conceptual framework, based on ideas of symmetry, centre and balance, permeates design decisions at various levels. This includes positioning of walls within the structural grid to create rooms and spatial enclosures, the patterns in combining bays to make rooms, and the positioning of aedicules within the structural layout, defining entry points and visual links, thus physically and visually connecting spaces. The principle of elimination of structural

elements, and sections of the roof on higher floors to create large open consolidated spaces and *chandnis*, is also based on the structural layout.

Key patterns are observed in the spatial and formal structuring of *havelis*. We have discussed these in the thesis, as the rules of thumb of design and composition. As illustrated these are few in number and fairly simple and straightforward in principle. However, in their application in particular solutions in buildings there is great inventiveness and variety. We have seen that the same structural layout may lead to completely different spatial and formal compositions. The manner of application of the rules of thumb is difficult to explain, but may (only) be illustrated. The particular solutions are ever fresh, full of novelty, and illustrate the gift of the individual craftsman/designer. They also illustrate the nature of inventiveness within tradition. This is where the real nature of the architectural tradition lies.

Skill in design of this nature, in my opinion, may be put to very good use in contemporary architecture. It may potentially be acquired after many years of hard work working within the system of design. Designing creatively using the rules of thumb may be compared with improvisation in classical music – rules are learnt to begin with and then newer possibilities are discovered within the rules. Having worked with the system of design for a while, I sense the beginnings of being able to design creatively using the system.

The structural and conceptual logic, in a similar though less direct manner, influences the design of the elevations. In the design of the elevations, the concept of the structural bay as a unitary element of composition is central. Each bay is designed as a perfectly symmetrical entity about its centre line. The architectural treatment and aedicular composition of the bay may change, sometimes considerably from floor to floor, nevertheless the composition throughout is symmetrical about the centre-line of the bay. Design attention to the part is given priority over the whole, (almost) as if the part might possibly exist in isolation. This incremental approach to form-making, especially in the treatment of elevations is characteristic of the tradition, and may often produce complex and apparently random compositions in the overall form. The overall form comprising a number of such unitary bays may be symmetrical about its own centre line, however, there is no necessity that it should always be so. It might be asymmetrical with either an even or odd number of bays. There might even be overall symmetry, however, with no hierarchically expressed focal element in the centre.

The incremental approach to design often produces elevations wherein the various parts are not co-ordinated. For example *chajja* levels of various aedicules in different bays might not match, and there might be differences in the architectural treatment of the different bays. Examples of this, as illustrated, are plentiful in the older *Sompuriya Shaili* and the early phases of the *Mughlai Shaili*. Only in the golden phase, in the nineteenth century, is there a considered visual integration of the parts into a cohesive architectural entity. The carefree abandon of a variety of visually uncoordinated parts imparts to the earlier buildings the spirit of a folk art. On the other hand, the visual integration of the nineteenth century buildings imparts to them a more restrained feel of a sophisticated classical art.

An important aspect in the composition of the elevation is the organisation of solids and voids. The facade of the *haveli*, as illustrated, is similar to a curtain wall in a number of segments, detached from the structural columns and arranged in a variety of projections. The pattern of projections are based on structural bays. Like the organisation of plans, the structural grid acts also as a design reference in the design of the elevation. Key patterns in



the organisation of projections are observed in the course of the tradition, but the specific solutions are full of innovations. Technical devices or techniques to effectively realise the design are full of novelty, producing an incredible richness of expression. Internally, the projections in the facade become usable spaces connected with the space of the room, as illustrated in the course of the thesis.

Detailed architectural expression in the *Mughlai shaili*, especially in the buildings of the nineteenth century, involves the characteristic technique of panellisation, which involves subdividing the wall surfaces visually into smaller panels, both vertically and horizontally along the length of the facade. The pattern of vertical panellisation, as has been illustrated, is tied in with the structural bays. There is no structural requirement for this, as the facade is independent of the line of the structure. This may be described as another characteristic design trait, wherein the design is closely tied in with the structural grid. Panellisation creates a dense network of framed panels which are then infill with decorative carving. The density and scale of the decorative infill carving varies from floor to floor thus helping introduce further variety.

The composition of solids and voids together with the panellisation creates a framework to display what may be described as the most showy objects in the architectural repertoire – the aedicules. The aedicules, have been described in the thesis as miniature representations of buildings. Though there are a number of key types, there is great variety in specific forms. This again illustrates the skill of craftsmen in creatively mixing and matching from a limited palette of architectural elements to create these forms. The positioning of the aedicules within the unitary structural bay is always symmetrical with reference to the centre of the bay.

The architectural tradition of Jaisalmer has been described in the thesis as a live tradition of which contemporary building craftsmen form an essential part. Though there are individual examples of master craftsmen possessing very high levels of skill, the craft tradition as a whole has rather bleak chances of survival in this form. The craft practice is still very primitive, with a surprising ignorance of the technological advancements in contemporary construction industry elsewhere. The tools for design and execution are still very primitive and basic, possibly not having changed in the last couple of hundred years. The vocabulary of designs does not seem to have changed with time either.

Change is essential in the continuum of the tradition, and more importantly for the survival of the tradition. One of the ways this is possible is for craftsmen to be integrated with mainstream building industry so that they may potentially modify their methods of working and make their skills more viable and available to a wider market. Architects play an important role in the integration of craftsmen with mainstream building industry. Craftsmen may be involved with the design process from the initial stages of the building, rather than being brought in in the final stages to embellish the building with their handiwork.

The present generation of patrons, possibly due to a sentimental attachment to the past, still commission *havelis* based on historical models. It is very likely that the future generations might not commission work on the same lines. It is therefore crucial for the survival of the crafts tradition that it adapts and modifies itself to suit the realities of society and of the construction industry.

One of the main issues in the thesis has been an understanding of the process of design in the tradition, which art historical and architectural studies in the past has not attempted. Understanding the process of design not only provides an intellectually sounder

understanding of the tradition, but suggests possible ways in which it might be used in contemporary architecture. The key to forging a contemporary architecture rooted in the spirit of tradition may lie in this. Below, I briefly discuss possible ways in which this might be done.

### *Spatial and Formal Organisation*

The buildings on which our discussion is based are built in sandstone. The structural strength, the spanning limits of blocks of stone, has a direct bearing on widths, heights and spans. Equally a conceptual framework, which influences spatial and formal design at all levels, engenders a characteristic design system typical to the architectural tradition.

The structural possibilities of concrete and bricks are very different from sandstone, which generate requirements of very different spans and sizing of structural members. It would be wrong to imitate the spans possible in sandstone to brick and concrete technology. Yet, one is perfectly justified in adopting this conceptual framework in alternate building technologies, for example brick and concrete. Adopting the conceptual framework of design, however, informs the design of form at a much more primary level. Working within the framework, the designer is not designing walls, ceilings, columns and windows guided merely by functional constraints, but by a conceptual design system which permeates every decision: the location of doors and windows in walls and their relation to doors and windows on opposite walls, and to the structural layout, the changes in ceiling and floor levels related back to the structural layout and other similar issues. The list is potentially endless. The transformation is profound, and the overall feel of the space so designed is completely different from space designed just for functional efficacy.

The treatment of form may also pick up clues from specific details, such as weaving in built in storage-space into the fabric of building. The *alas* built into the thickness of the walls in traditional examples may be explored for their functional and decorative qualities (fig. 376). Various rhythms of *alas*, *pilasters* and doors may be used, in the articulation of internal walls. The passive wall surfaces around the *ala* may be treated as glazed panels, creating transparent shelves, against which objects may be displayed. The *beel* associated with the *ala* may be explored for its design potential as a light ledge, as a display shelf at a high level in a room, and to define low intimate spaces in peripheral areas such as near doors and windows.

The stepping out of the external wall, detaching itself from the line of structure to create *jharokhas* and built-in storage shelves along the external periphery is a wonderful concept, of great appropriateness in the architecture of hot and dry climates such as much of north-western India. Concrete is a very flexible material and may easily detach itself from the line of structure and project out a couple of feet, and also take the load of an additional wall on top. It is a matter of the ingenuity of the designer to incorporate balcony spaces, built-in storage spaces and niches along the periphery of the room, and weave them together in a cohesive design entity. The ceiling heights may be lowered in these areas to create spaces of intimate quality for reading, enjoying music or looking out. In large rooms with long external lengths of walls, various rhythms of balconies, windows and built in storage spaces may be explored. The results may be ingenious, all without sacrificing any usable area of the room. The advantage of a thick insulating external wall in a hot dry climate is an added bonus.

The spatial effects achieved by the distinct delineation of openings in a successive series of planes, as in traditional architecture, is worth exploring in contemporary architecture. Simple

lines and shapes may be integrated with glazing and trellis work, in different planes, to produce visually rich compositions.

The spatial relationship between an open to sky and covered space provides spots of the most profound spatial experience in a *haveli*. Be it in a *chowk*, or in a *chandni* on an upper level, the experience of inhabiting a space in its vicinity is a most sensual experience, which may successfully be adapted in contemporary buildings. A contemporary adaptation of the *chowk* may be larger than its traditional prototypes, be planted and provided with water features. Views to it may be selectively opened or screened from surrounding ranges as in traditional examples. The model of the *chandni* may be followed to weave in intimate patches of open space with rooms at upper floors. They may be walled in like rooms, with discreet openings, overlooking a *chowk*, or range beyond. Intermediary spaces like the *pathiyal* may be associated with it, creating ideal environment of enjoying moments of good weather, and the monsoon rains. Unlike traditional models, these spaces may be planted, creating a microclimate in their vicinity. Such high level terraces are perfectly appropriate to contemporary lifestyles, when a patch of relaxing open space is always welcome, which may be reached effortlessly, as opposed to making the effort of visiting the nearest park or *maidaan*.

### *Solids and Voids in the Elevation*

The organisation of solids and voids in the elevations of traditional buildings, as we have seen, is integrally related to the structural bays. In a symmetrical arrangement of structural bays the organisation of solids and voids is symmetrical, while in other cases it is directly related to the individual bay. Various ingenious ways are devised by craftsmen to detach the external facade of the building from the line of structure, so as to arrange them in diverse arrangements of projections and recesses. This is no longer a functional requirement with modern building technologies. The distinctive aesthetic in the arrangements of projections, however, provides clues for contemporary application. In a symmetrical elevation, the centre and side bays may be projected, or only the sides may be projected or only the centre may be projected. The projection pattern may change on different floors. In a non-symmetrical elevation, the projections would be organised with respect to individual structural bays. The line of the external facade may be projected out progressively on successive floors. Alternatively, the total extent of projection of the external facade may occur in one bold sweep in a single floor. The full effects of massing are integrally linked with the arrangement, shape and type of *jharokha* or *bari*. The hollow form of the *jharokha* is what really imparts porosity and formal richness to an elevation. When a number of such *jharokhas* are piled on top of each other, some with further projections from the surface of the wall, they are the key elements in imparting the characteristic spirit of playfulness to architectural form. This aspect of formal design may be adopted in contemporary buildings. Some contemporary *havelis*, built with *jharokhas* piled up in a way similar to the historical precedents are visually dead, because all *jharokhas* and *baris* have been sealed with windows flush right with the surface of the stone work. The sealed box decorated though it is from head to toe in the most opulent array of decorative carving, is completely removed in spirit from the playfull richness of traditional examples.

### *Architectural Language and Craftsmanship*

The key factor is the successful continuity of the tradition is its design discipline. Principles of formal and spatial disposition and organisation of solids and voids in the elevation, which



may successfully be incorporated in contemporary practice, have been just discussed. Here we discuss the related issue of architectural language.

We have seen that the architectural language in the history of the tradition is never constant. The change may be as substantial as that between the *Sompuriya* and *Mughlai Shaili* or it may involve the subtle synthesis of specific architectural details, such as the acanthus leaf decoration, the semi-circular arch and the balustrade motif in *takiya* panels, or the crossing over of elements from one style to the other. Architectural language in the tradition is to a large extent related to and stems from building technology. However, as shown earlier, imagery has an equal role to play in its generation.

In generation of an appropriate contemporary language the challenge for the designer, in my understanding is to try to forge an aesthetic, very much true to contemporary technology but with a considered incorporation of aspects or even specific features of traditional imagery. For example, extensive use of the *margol* to span openings in for example a brick and concrete building would be incongruous, or the use of *todis* to support projecting concrete slabs would be a lie. But, *jharokhas*, either antique, salvaged from old buildings, or well crafted new pieces may certainly be used successfully. Visual framing of wall panels, using pilasters, which are such an important part of the imagery of the *Mughlai Shaili*, may be incorporated in the design of external and internal walls. Specific architectural mouldings and features such as *galat*, *dasa*, *todis* may be used in the articulation of wall panels, over doorways, perhaps in a way very similar to the way they are used in traditional buildings. The aesthetic of dividing wall panels into smaller framed panels and filling them with ornamental carving may be explored for its decorative qualities on the most visible walls of the building. Alternative technologies to stone carving, such as casting in terracotta, ceramic or hued sand, which are quicker and cheaper, may certainly be explored. Frank Lloyd Wright's concrete textile block technology comes to mind here, creating large planes of textured, patterned surfaces, cheap and easy to make and eminently beautiful. Ornamental patterned panels may be used, as internal screens, or like *takiya* panels, on railings of balconies and terraces, or as large sun-shading screens on external elevations. Handcrafted elements such as *khambhas*, *todis*, doors etc. may also be used, with the degree of incorporation of handicraft depending on the budget and the client's taste.

But would all this look in place in the context of a hard core modernist language, of clean lines, sharp planes and edges? This is a subjective opinion, depending on the individual designers artistic sensibility.

My opinion is that the lines of the building have to be receptive to take handicraft gracefully. The right degree and touch of mouldings must be achieved, and the right combination of framed panels with clean planes. The design should be set within a border, whether in the flooring, or in a ceiling. The answer lies in doing and learning from the process, rather than suggesting precise solutions.

Handcrafted elements may be added successively and incrementally to the building, enriching it over time as and when budget and circumstances permit. Each added element, however, would be in place, and never look incongruous, because it would exist in relation to a system of design with which it would be cognate.

The potential application of principles of traditional architecture in contemporary practice has certainly opened a new avenue for me in my own design philosophy. The exciting possibilities of a new, fresh approach, which takes on a path quite different from that of the

previous generation of modernist architects interpreting traditional architecture, has been possible only by going back to the sources, and spending time within them, observing them, drawing them and having discussions about them with craftsmen.

No study is ever complete, and learning is a continuous experience. If, however, this study points to a way of understanding traditional buildings, as products of a design tradition, with its particular process, forms, aesthetic, and techniques of making, it will have fulfilled its aims.

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